

ENDANGERED SPECIES

Technical Bulletin

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

Protection Extended to Three Plants

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During June 1988, three plants were added to the Federal list of Endangered and Threatened species. Protection under the Endangered Species Act is now available to the following:

Daphnopsis hellerana

This Puerto Rican plant, an evergreen shrub or small tree, is so rare that it has no common name. The species is found near the San Juan metropolitan area in only two populations of about seven plants each. Two other historical populations have been lost to urbanization, limestone quarrying, land clearing, and other human activities. One of the known sites, although on Commonwealth (Land Authority) land, is subject to construction and quarrying activities. The other is on land leased from the National Institutes of Health by the University of Puerto Rico Medical School for a primate research center. Both the Land Authority and the primate research center have expressed a willingness to cooperate in the protection of the plant. *Daphnopsis hellerana* was proposed for listing as an Endangered species in the July 6, 1987, *Federal Register* (see summary in BULLETIN Vol. XII No. 8), and the final rule was published June 23, 1988.

Lakeside Daisy (*Hymenoxys acaulis* var. *glabra*)

This herbaceous perennial with attractive yellow flowers is known from only a few sites on Manitoulin Island and the Bruce Peninsula in Ontario, Canada, and from scattered locations over 4 square miles of private land on the Marblehead Peninsula in Ottawa County, Ohio. The survival of the Ohio population is threatened by limestone quarrying and natural succession to woody growth over its open prairie habitat. Efforts are under way by the Ohio Department of Natural Resources to acquire one of the Marblehead Peninsula sites populations to provide protection against ongoing quarrying activities. The Lakeside daisy was proposed for listing as Threatened on August 19, 1987 (summary in BULLETIN Vol. XII No. 9), and the final listing rule was published on June 23, 1988.

Cumberland Sandwort (*Arenaria cumberlandensis*)

Unlike most species of the genus *Arenaria*, which grow in hot, dry, sunny environments, this herbaceous perennial requires cool, moist, shady sites that are found on sandstone rock faces in Tennessee and Kentucky. Its four Tennessee sites on public and private land are being affected by hikers and other recreationists, logging, and people excavating for Indian artifacts. The Kentucky site in Daniel Boone National Forest is subject to the same threats.

The Cumberland sandwort is listed by the State of Tennessee as endangered, and as such is provided some protection. Although it is listed as endangered on Kentucky's unofficial list, it is provided no protection by that State. Federal listing as an Endangered species was proposed on July 6, 1987 (see BULLETIN Vol. XII No. 8), and the final rule was published on June 23, 1988.

Listing Proposal is Withdrawn

The Fish and Wildlife Service published a notice in the June 23, 1988, *Federal Register* withdrawing its November 4, 1987, proposal to list the Miami palmetto (*Sabal miamiensis*), a small palm restricted to Dade County, Florida, as an Endangered species. Information received subsequent to the proposal indicates that the characteristics used to separate *Sabal miamiensis* as a distinct species fall within the range of variation found in populations of the scrub palmetto (*Sabal etonia*), a widespread species. The Service believes that this information is substantial enough to place the taxonomic validity of *Sabal miamiensis* into doubt.

Further publications on *Sabal* systematics are expected. In the event that the taxonomic disagreement about *Sabal miamiensis* is resolved in favor of it being a distinct species or variety, the Service will consider proposing it again for listing.



The population of black-footed ferrets at Wyoming's breeding facility has grown to 58 animals. Some of this year's largest litters were produced by ferret kits born just last year (above). For more news on these animals, see *Regional News*, page 6.

photo by LuRay Parker • 1987 Wyoming Game and Fish Department



Regional endangered species staffers have reported the following news from May and June:

Region 1—Regional personnel participated in two training sessions on endan-

gered species issues in Oregon for the U.S. Forest Service. Section 7 consultation and Oregon's listed species were two subjects presented to approximately 100 Forest Service staffers (predominantly

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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.

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biologists, but also foresters and land managers).

Fish and Wildlife Service representatives appeared before the California Fish and Game Commission in May to present the Andean condor (*Vultur gryphus*) experimental release proposal and to address any concerns the Commissioners might have. No opposition was voiced by the public or the Commissioners. The Commission voted unanimously in favor of the project and amended the current Memorandum of Understanding on condors to include the experimental release.

On May 20, 1988, the Service's Portland Regional Director signed a Finding Of No Significant Impact and a decision document on the experimental Andean condor release. This represents the final go-ahead for the 2-year project that will involve the release, study, and recapture of up to 20 young Andean condors in Ventura County as a means of testing potential release sites and techniques that can be used in the eventual reestablishment of California condors (*Gymnogyps californianus*) in their native range. Up to 10 young Andean condors are scheduled for release this August at the Hopper Mountain National Wildlife Refuge and Sespe Condor Sanctuary.

Seventy five percent of the California least terns (*Sterna antillarum browni*) nesting in the three Orange County colonies were killed recently in a rash of predation. The major culprit is the red fox (*Vulpes vulpes*). Trapping efforts on Seal Beach National Wildlife Refuge have not kept up with the influx of foxes, although 140 had been trapped and removed as of mid-June.

The Service's Great Basin Complex in Reno, Nevada, is participating in the 1988 census of snowy plovers (*Charadrius alexandrinus tenuirostris*) in the western States. The census is being coordinated by the Oregon Department of Fish and Wildlife. Volunteers are being used to survey key nesting areas of this bird, which is a category 2 candidate for a future listing proposal.

Dr. John Hafernik, an entomology professor at San Francisco State University, recently reported that Bay checkerspot butterflies (*Euphydryas editha bayensis*) have been rediscovered at a historical collection locality near Mt. Diablo in Contra Costa County, California. This population was thought to have been extirpated by the last severe drought. The County plans to construct a small water storage reservoir in the watershed within which these butterflies occur.

A joint Federal/State/local government task force has been established to focus on Kern County (San Joaquin Valley), California, endangered species issues.

(continued on page 3)

Regional News

(continued from page 2)

The task force met in Bakersfield, California, on April 21, 1988, to define objectives. The primary objective is to develop a plan to conserve listed species (State and Federal) and high priority listing candidates in conjunction with proposed development in the County. The mood of the task force members was optimistic, even though they realized the difficulty of the task. The planning area encompasses the known range of the blunt-nosed leopard lizard (*Gambelia silus*), San Joaquin kit fox (*Vulpes macrotis mutica*), and giant kangaroo rat (*Dipodomys ingens*). Listed species have been declining in California's San Joaquin Valley due to agricultural development, urban expansion, and oil and gas production. The task force hopes to address these and other threats.

The Service was informed by Dr. Michael Hadfield of the University of Hawaii's Department of Zoology that 80 percent of one adult population of the Endangered Oahu tree snail (*Achatinella* sp.) was lost recently to rat (*Rattus* sp.) predation. This particular population had been studied for 5 years and had been considered relatively stable. The reasons for the increase in rat predation are not known.

The Nature Conservancy of Hawaii closed escrow on the purchase of the 400-acre Sutton parcel at Hakalau Forest National Wildlife Refuge on April 13, 1988. Once subdivisions are completed next month, the Service will purchase 100 percent interest in the parcel from The Nature Conservancy for the appraised value of \$360,000. The refuge protects important habitat for some of Hawaii's endangered forest birds.

A meeting was held among Regions 1 and 2 of the Service, the California Department of Fish and Game, and the Bureau of Land Management concerning the potential listing of the flat-tailed horned lizard (*Phrynosoma mcalli*). It was decided that Region 1 would take the lead because the threats there are better documented. A remaining question is the status of the animal in Mexico. The California Department of Fish and Game supports the listing, and the Bureau of Land Management does not oppose it.

Region 1 staffers assisted the California Departments of Transportation and Fish and Game in the design of a water delivery system and management plan for improving habitat for the Endangered Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) at Valencia Lagoon in Santa Cruz County. A nearby well will provide a dependable water supply to the lagoon, especially important during drought years. This may help to attract salamanders away from an adjacent water channel that requires periodic sediment removal.

As part of a compensation package for the destruction of valley elderberry long-horn beetle (*Desmocerus californicus dimorphus*) habitat by the Gold River housing project, 10 acres of land adjacent to the development in the American River Parkway near Sacramento, California, are being revegetated with elderberry trees. The revegetation effort, which consists of transplanting elderberry bushes to restorable riparian sites within the Parkway, began in February 1988. A visit to the site on April 26 revealed that elderberry long-horn beetles had emerged recently from the transplanted trees. One beetle had been observed on the site earlier that day by the biological consultant monitoring the project. We hope to determine the extent to which it is possible to successfully

transplant elderberry trees and have beetles survive inside the transplants. Although these preliminary observations are encouraging, it is too early to predict how many of the transplanted trees will ultimately survive and provide long-term habitat for the beetle. We also do not know the reproductive or emergence success of beetles inhabiting the transplanted trees.

Region 2—Seventeen members of the Arizona Native Plant Society helped Service biologists search for *Agave parviflora* ssp. *parviflora*, a category 1 listing candidate, on the Buenos Aires National Wildlife Refuge in southern Arizona. Three previously unknown populations of this plant were found within the Refuge boundaries and another population was found on Coronado National Forest lands just outside the Refuge. The presence of this attractive agave on Refuge lands means that this species will be protected on the western edge of its range.

Permanent monitoring plots were established this spring for the endangered Cochise pincushion cactus (*Coryphantha robbinsorum*) and two category 1 listing candidates, the sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophylax*) and acuna cactus (*Neolloydia erectocentra* var. *acunensis*). The Cochise pincushion cactus is threatened by collecting and habitat degradation. The single population of the sentry milk vetch numbers fewer than 500 plants and occurs on the South Rim of the Grand Canyon where it is threatened by trampling. The acuna cactus appears to be declining due to unknown causes, and two of the three known populations are now being monitored.

(continued on page 4)

Chinese River Dolphin Proposed for Listing Protection

Gloria Thompson
National Marine Fisheries Service

In response to a petition from the Center for Environmental Education, the National Marine Fisheries Service (NMFS) proposed May 18, 1988, to list the Chinese river dolphin (*Lipotes vexillifer*) as Endangered. According to the petition, this dolphin is found primarily in the lower and middle sections of the Chang Jiang (Yangtze) River in the east central region of mainland China.

The NMFS, which has responsibility under the Endangered Species Act for most rare marine animals, had determined that the petition presented substantial scientific information and had solicited comments concerning the status of the Chinese river dolphin. Comments were

received from the U.S. Fish and Wildlife Service (FWS) and Chen Peixun of the Institute of Hydrobiology in the People's Republic of China. Both favored listing the species as Endangered. A status review was also conducted by Robert L. Brownell, Jr., (FWS) and William Perrin and Doug DeMaster (NMFS).

The status review indicates that the population size has declined drastically since the species was originally described. Between 1979 and 1981, it was determined that fewer than 400 occurred in the middle and lower reaches of the Chang Jiang River. The total world population currently consists of an estimated 300 individuals, of which about 100

occur in the lower reaches of the river. The species is listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and is classified as endangered on the International Union for the Conservation of Nature and Natural Resources (IUCN) 1986 Red List of Threatened Animals. Factors relevant to the dolphin's population decline are (1) reduction in prey availability resulting from overfishing, pollution, and loss of nursery areas for migratory fish species and (2) explosions associated with river construction projects and illegal fishing.

Regional News

(continued from page 3)

Arizona supports a unique desert population of nesting bald eagles (*Haliaeetus leucocephalus*), and the Service coordinates the equally unique Arizona Bald Eagle Nest Watch Program to monitor the birds during their breeding season. This year, 19 nest watchers monitored 20 active nests from February to June for both human and natural disturbances that threatened successful fledging of the nestlings. Fortunately, the season was a big success with a record 24 fledglings, 2 more than the previous high. Nest watchers played a vital role in establishing this new high by rescuing three nestlings that fell from their nests before they were ready to fly. In each case, nest watchers were able to place the young eagles back into their nests unharmed.

The U.S. recovery team for the whooping crane (*Grus americana*) approved draft criteria for establishing a captive whooping crane flock within Canada. All birds and eggs will remain the property of the Canadian and U.S. Governments, which will be responsible for use or disposition of the birds. The site must be funded by non-Federal money. Groups that might be interested in housing the flock will be canvassed and invited to apply.

Objectives of the facility will be to increase the numbers of birds and eggs for release into the wild, reduce the chance of an epizootic destroying the captive breeding program, afford Canadians an opportunity to view whooping cranes, and allow Canada to participate more actively in the captive propagation program. The goal is to have the first whooping crane on site by 1990.

Aransas National Wildlife Refuge in Texas has completed a study of whooping crane habitat losses along the Gulf Intra-coastal Waterway. The study was initiated because of concern about steady erosion of marshes along the Waterway. The erosion is a consequence of: (1) wave action caused by boat wakes; (2) wave action due to wind; (3) sloughing from the banks due to underwater suction after barges pass; and (4) sloughing due to maintenance dredging, which steepens the bottom gradient.

Measurements from aerial photographs taken since 1930 documented the changes caused by construction and maintenance of the Waterway. In the 11.9 miles of the Waterway within the Aransas Refuge, 1,485 acres of whooping crane habitat have been degraded or destroyed. An estimated 335 acres of crane habitat have been created or enhanced by the placement of dredged material, resulting in a net loss of 1,150 acres. Measurements along fixed land points indicate an annual loss of 3 feet of tidal marsh adja-

cent to the Waterway. This problem is being discussed with the U.S. Army Corps of Engineers.

Surveys by Canadian Wildlife Service biologists in May located 30 whooping crane nests within Wood Buffalo National Park, Northwest Territories, Canada. Twenty-seven eggs were picked up in late May and a single viable egg was left in each visited nest. The 27 transferred eggs are a new record. Dr. Rod Drewien was given 12 viable eggs for cross-fostering in sandhill crane (*Grus canadensis*) nests at Grays Lake National Wildlife Refuge in Idaho because he believed the habitat would support that number despite the drought. Ten of the 12 hatched, one was eaten by a predator, and the embryo in the other egg died. Fifteen of the Wood Buffalo Park eggs, nine of them viable and six either infertile or containing dead embryos, were transferred to the Patuxent Wildlife Research Center in Laurel, Maryland, where the nine good eggs hatched. The six unhatched eggs will be tested for environmental contaminants.

Welder Flats, which provides coastal habitat for 11 to 13 wintering whooping cranes, is one of the first areas protected under the new Texas Coastal Preserve System. The system is designed to protect fragile biological communities. The 1,500-acre Welder Flats Unit contains mud flats and shallow-water feeding habitat across San Antonio Bay from Aransas National Wildlife Refuge. The Welder Flats property is owned by the Texas General Land Office and leased to the Texas Parks and Wildlife Department for management within the system.

A report on the status of the Mexican garter snake (*Thamnophis eques megalops*) and the narrow-headed garter snake (*Thamnophis rufipunctatus rufipunctatus*) in Arizona was completed recently for the Service by the Arizona Game and Fish Department. The report documents declines in both species and points out threats from bullfrog and exotic fish predation; human killing of snakes; and habitat damage resulting from overgrazing, water diversion, and general watershed degradation. Of 79 localities sampled, the Mexican garter snake was found in 21 and the narrow-headed garter snake was found in only 10.

Neither subspecies is restricted to Arizona; *T. r. rufipunctatus* also occurs in southwestern New Mexico, while *T. e. megalops* has one known locality in southwestern New Mexico and others in Sonora and Chihuahua, Mexico. Because more information is needed on the status and distribution of both snakes, they will be retained as category 2 listing candidates.

An attempt at captive propagation of Gila trout (*Salmo gillae*) began recently

with the transfer of 36 adult fish and 1,800 eggs from the wild to Mescalero National Fish Hatchery in New Mexico. The fish came from Main Diamond Creek in the Aldo Leopold Wilderness and the eggs came from McKnight Creek in the Gila National Forest. Hatchery Manager Dean Chase developed a unique "cookie jar" egg incubation system which has proven very successful in hatching the eggs and starting the fry on feed. From approximately 2,300 eggs he expects to obtain at least 1,500 "swim-up" fry. The goals of the Gila trout program are to (1) develop hatchery culture techniques for the species, (2) build a captive brood stock, and (3) produce enough offspring for reintroduction in native habitat.

Region 3—Peregrine falcon (*Falco peregrinus*) reintroduction efforts in the midwest are progressing toward establishment of a wild, self-sustaining population. Four pairs of peregrines in Minneapolis and St. Paul, Minnesota; Toledo, Ohio; and Chicago, Illinois, are known to have hatched at least 10 chicks. Another two pairs are nesting on the Wisconsin cliffs along the Mississippi River and are believed to be incubating eggs. Four additional pairs, all judged too young to successfully nest this year, are defending territories. Two of these pairs are at urban sites and the others are at natural cliff sites. Prospects are good for some of these four pairs to produce chicks next year. Meanwhile, hacking efforts are continuing; there are plans to release 80 to 100 young peregrines in Region 3 this year. A mix of urban and "natural" hack sites will be used, as well as one site on the wall of an abandoned iron mine pit in northern Minnesota.

The peregrine reintroduction program in Region 3 is a highly coordinated effort currently involving six States, three Federal agencies, the University of Minnesota, The Nature Conservancy, the Chicago Peregrine Release, and the St. Louis Peregrine Restoration Project. Drs. Patrick Redig and Harrison Tordoff have taken the lead in keeping the program running smoothly.

As of June 1, the Service knew of eight populations of an Endangered plant, the running buffalo clover (*Trifolium stoloniferum*). Three are in Indiana, one is in Kentucky, three are in Ohio, and one is in West Virginia. Historically, this plant was known to occupy a range extending from Kansas into West Virginia. A recently completed survey funded by the Service in Indiana revealed the three populations there. Additional Service-funded surveys are proceeding in Ohio and Illinois, and a fourth will soon commence in Missouri. The draft recovery plan calls for considering the species for reclassification to Threatened status when 30 secure, self-sustaining populations are known. When

(continued on page 5)

Manatees on the Move

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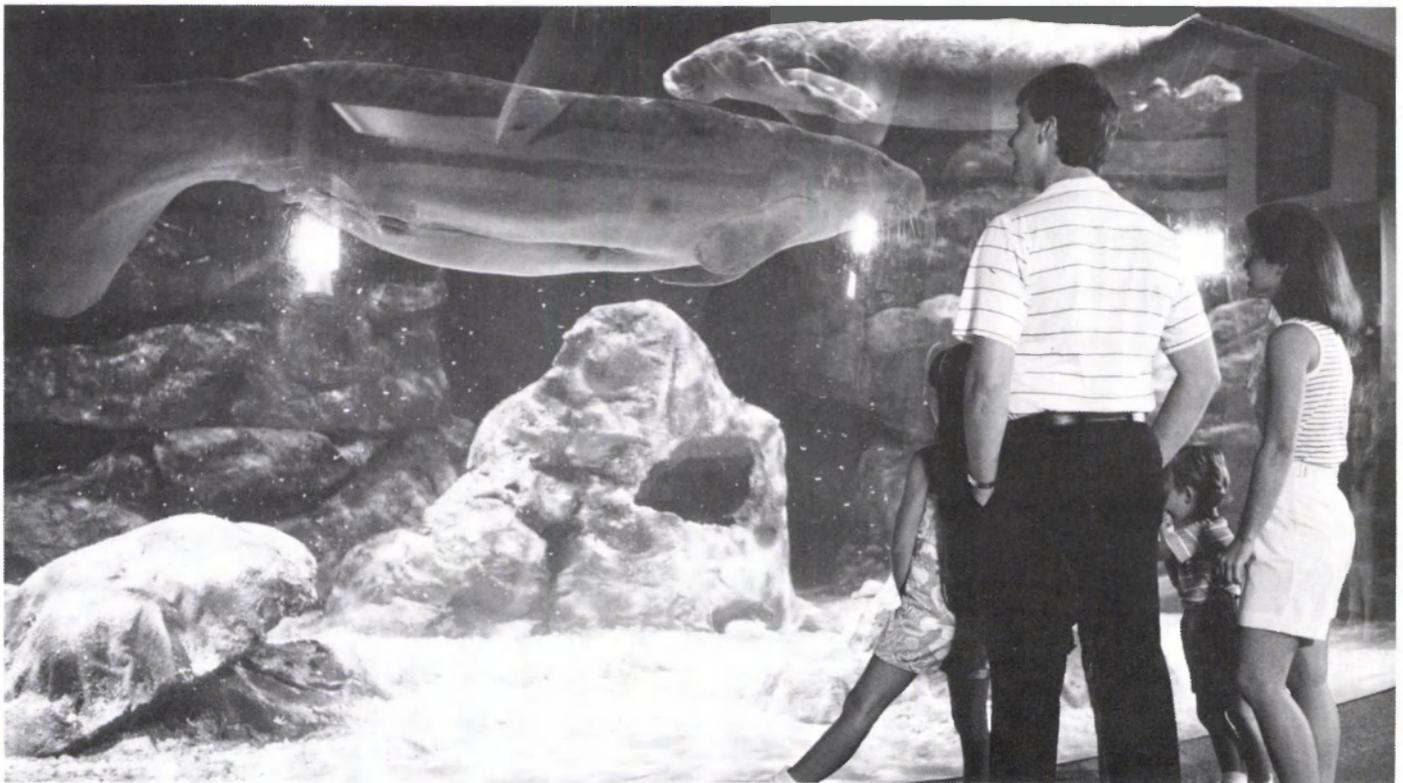
The West Indian (Florida) manatee (*Trichechus manatus*) was in the spotlight recently as two of these critically endangered marine mammals were set free on the Merritt Island National Wildlife Refuge and another pair was featured in a new exhibit at Walt Disney World's Living Seas in Epcot Center.

Magoo and Hillary were released on the Merritt Island Refuge on June 7 after being rehabilitated at Sea World of Orlando. Magoo, a 722-pound male manatee, had spent more than 5 years recuperating from what appeared to be chemical burns received in a drainage canal, and Hillary, an 880-pound female, was rescued in February 1988 after becoming entangled in a shrimp net. At

their release site in the Banana River, both manatees were equipped with radio transmitters to assist Fish and Wildlife Service researchers in tracking their movements and in determining their reacclimation to the natural environment. As of June 18, both manatees were still doing well, and had joined other wild manatees.

At Disney World's Epcot Center, Jean Pierre and Lorelei were relocated on June 1 to a 200,000-gallon undersea environment at the Living Seas exhibit. The exhibit was designed to recreate conditions identical to the underwater world at Homosassa Springs, Florida, where the two manatees had been held since 1986 following their relocation from Miami Seaquarium. Lorelei, the 13-year-old, 815-

pound female, was the first manatee conceived and born in captivity. Jean Pierre was rescued as an orphaned calf in 1980. Since neither manatee could be released to the wild after such extended periods of captivity, the Service and the Florida Department of Natural Resources endorsed placing them in the exhibit at Living Seas. This exhibition will provide an opportunity for in-depth behavioral and life history studies, and will significantly benefit public awareness efforts. It is hoped that exposing the manatees to the 8 to 10 million international tourists who annually visit the attraction will promote a greater desire to protect manatees in the United States and other parts of the world.



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Walt Disney World guests view West Indian manatees close-up at Epcot Center in a 200,000-gallon saltwater enclosure constructed specially for the rare mammals. Two manatees have a new home at the Living Seas as part of a research facility that will also provide visitors information about these endangered animals.

Regional News

(continued from page 4)

the species was listed in June 1987 as Endangered, it was known to survive at only one site in the wild, and the population contained only 18 plants. The new findings on the running buffalo clover are a fine example of the importance of Federal listing in spurring survey and protection efforts for little-known species.

* * *

Region 4—The southern Appalachian Mountains are experiencing better than expected success in peregrine falcon restoration efforts. Peregrine releases in the region began in 1984. A model based on past data had predicted that first pair establishment would take place in 1988 and first reproduction would occur in 1989. However, results ran 2 years ahead of predictions, with first pair establishment in 1986 and first reproduction in 1987.

Five pairs of birds, all in North Carolina, have already been confirmed this year; reports of two additional pairs and several

single birds also have been received. Since the model predicted only one pair in 1988, the results are five to seven times what had been expected by this point. The model predicted 20 breeding pairs by 1994 and 26 breeding pairs by 1996. It seems likely that these goals also will be achieved sooner than expected. This success is probably attributed to greater survival of peregrines from fledging to one year of age; the model had assumed only 45 percent survival the first year. The greater survival is believed to be at least

(continued on page 6)

Regional News

(continued from page 5)

partially the result of benefits gained from experiences in other Regions.

Tennessee Valley Authority biologists found a freshly-dead, 4-year-old specimen of the Endangered tan riffle shell mussel (*Epioblasma walkeri*) in an area of the Duck River in west central Tennessee that is being considered for impoundment by the Columbia Dam. This mussel, one of the most endangered of the federally listed mussels, is known to survive in only two other rivers — the Middle Fork Holston River and the Clinch River, both in southwestern Virginia. Both rivers contain only small populations. The Tennessee Valley Authority will conduct further surveys of the Duck River.

The Asheville, North Carolina, Field Office has negotiated a cooperative agreement with the Arkansas Game and Fish Commission for the production of a booklet on the bats of the eastern United States. The booklet will follow the format of "The Bats of Arkansas: A Valuable Resource," written by Dr. M. J. Harvey, which is produced and distributed by the Commission. The new booklet will expand on the earlier publication, covering all bats found in the eastern United States. The four federally listed endangered bats found in the east and the four eastern bats that are currently candidates for addition to the Federal list will be given special emphasis. The booklet will include color photographs of most of the eastern bats and brief summaries of their life histories. The status, natural values, and ecological roles of these unique flying mammals also will be discussed.

Human misunderstanding and fear of bats have been a significant factor in their decline in the United States. Informational publications such as this will assist in alleviating this fear and misunderstanding. Funds for this publication are being provided from Region 4's prelisting recovery program. Region 3 is also contributing funds to purchase copies of this publication, which is scheduled for distribution by July 1989.

The small-anthered bittercress (*Cardamine micranthera*), a plant historically known from only 2 counties in North Carolina and presumed extinct for 3 decades, was recently rediscovered in Stokes County, North Carolina. Subsequent searches of remaining suitable habitat by personnel of the Asheville Office and the North Carolina Natural Heritage Program resulted in the location of two additional sites. All three of the existing populations are small (one consists of three plants) and are vulnerable to disruption of the fragile streamside seepage habitat they occupy. The Asheville Office is preparing

a proposal to list the species as Endangered.

Region 5—In early May, non-game biologists with the West Virginia Department of Natural Resources checking squirrel boxes in West Virginia found seven Endangered northern flying squirrels (*Glaucomys sabrinus fuscus*) in a single nest box. The animals were apparently all adults of both sexes. The reasons for their aggregation at this time of year are unknown.

A study is being conducted in West Virginia this summer to determine the impacts of gypsy moth (*Lymantria dispar*) control on Endangered Virginia big-eared bats (*Plecotus townsendii virginianus*). The concern is not that the control methods would affect the bats directly, but that they could decrease the bats' food supply (primarily moths) at a time of maximum energy demand for the bats, such as when females are nursing their young. Researchers from West Virginia University are collecting guano samples from the bats and are sampling insects from treated and untreated areas to determine which "non-target" moth species, if any, are decreasing in association with gypsy moth control efforts, and whether these moths figure importantly in the bats' diet.

Recent observations of two pairs of Threatened piping plovers (*Charadrius melodus*) and their chicks on the Delaware coast revealed that these birds do not remain in the immediate vicinity of their nests after hatching. Chicks are capable of rapid movement and were seen feeding in dune areas more than 900 feet north and south of their original nest location within 2 days of hatching. Unfortunately, chick mortality was high. Within 10 days of hatching, only one of seven chicks remained alive. Some chicks disappeared overnight and likely were victims of predation. The deaths of others could be directly or indirectly attributed to the impacts of heavy human and vehicular use of the birds' preferred feeding areas.

A recovery meeting was held this spring at Great Dismal Swamp National Wildlife Refuge to begin development of a recovery plan for the Threatened Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*). The plan will be written to be consistent with refuge management objectives. It is expected that refuge management practices will be of key importance in recovering this shrew.

Another recovery planning session was held this spring at Blacksburg, Virginia, for the Endangered Peter's Mountain mallow (*Iliamna corei*). Some recovery work has already been carried out by the State of Virginia, in cooperation with researchers at Virginia Polytechnic Institute and State

University, using funds provided by the Service under Section 6 of the Endangered Species Act. Most of this work concentrated on keeping the small handful of plants alive through last year's drought and determining the conditions needed for seed production and germination.

The Maryland Heritage Program will conduct studies this summer, also using Section 6 funds, on the status and habitat requirements of the harperella (*Ptilimnium nodosum*), which was proposed in February 1988 for listing as Endangered (see proposal summary in BULLETIN Vol. XIII No. 3). In another project, the Maryland Heritage Program will study management and transplant feasibility for Canby's dropwort (*Oxypolis canbyi*), a plant listed in 1986 as Endangered.

A study will be conducted this summer to review the taxonomy of two listing candidates in the genus *Bacopa* that grow in freshwater tidal habitats in Virginia. This research, which is being conducted with prelisting recovery funds, will determine whether or not the plants are distinct taxa. If they are, these plants will very likely warrant listing proposals.

Region 6—As of June 28, 13 of the 15 female black-footed ferrets (*Mustela nigripes*) at Wyoming's captive breeding facility had produced litters. Some of the largest litters were produced by ferrets born just last year. There are now 34 kits at the facility, giving us a total population of 58 ferrets. As mentioned in last month's BULLETIN (Vol. XIII No. 5), there is considerable concern about having all of the known ferrets in one location. Region 6's Chief of Endangered Species and Environmental Contaminants, along with two people from the Wyoming Game and Fish Department, recently toured three zoos (in Minneapolis, Minnesota; Omaha, Nebraska; and Washington, D.C.) that had submitted proposals to provide facilities for housing and breeding the ferret. A determination will be made soon as to the location of the new facility.

The people of Chevron Corporation recently donated \$10,000 to the University of Wyoming to support research related to reintroduction of the black-footed ferret. Chevron also contributed \$5,000 last year to assist in the captive breeding effort.

The Service's Grand Island, Nebraska, Field Office has been involved in an active public information program regarding the interior populations of the least tern (*Sterna antillarum*) and piping plover. It is working with the Service's Law Enforcement Division, Nebraska Game and Park Commission's Law Enforcement Division, National Audubon Society, Sierra Club, and Platte River Whooping Crane Trust to protect these species dur-

(continued on page 7)

Piloting a New Course

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Missouri Department of Conservation

In September 1986, two teenage boys decided to explore an inactive iron ore mine at Pilot Knob Hill near Arcadia, Missouri. While others had passed through this dangerous rite of boyhood without serious injury, these youths were not as lucky and they suffered a nearly fatal accident. The episode, however, had one positive result: the ultimate protection of a major hibernaculum for an Endangered bat.

As they headed out toward one of the 13 entrances, called the "Devil's Icebox," a wall collapsed and trapped one of the boys, crushing both of his legs. After 19 hours, rescue workers extracted him from the rubble using hydraulic jacks and air bags. The potential for another collapse was so great that the workers left behind the equipment, which was worth more than \$50,000. Another boy was apprehended attempting to liberate the equipment the following week.

The injury and obvious potential for future accidents led many local citizens to demand the closure of all of the mine entrances. This sentiment increased as residents remembered that the hilltop was an attractive vantage point for viewing a Civil War battle reenactment in the valley below Pilot Knob. However, closing the entrances would also seal the fate of one-fourth of the world's Indiana bat (*Myotis sodalis*) population. Although Missouri abounds in caves, only a few caves and mines have the temperature and moisture

characteristics, along with the lack of human disturbance, that this Endangered bat needs to survive the winter. Approximately 140,000 Indiana bats hibernate in Pilot Knob Mine, which has not operated since 1890.

These factors brought together an unusual group of interests in an effort to prevent future accidents and, at the same time, save the Indiana bat population. The property owner, Pilot Knob Ore Company, was involved, as were representatives of the Fish and Wildlife Service, Missouri Departments of Conservation and Labor Standards (Mine Safety), Commissioners of Iron County, several private conservation organizations, and many interested individuals.

After all was said and done, the owner decided to donate the peak of Pilot Knob (90 acres) to the Service for protection of the bat population. The area is now managed as a satellite of the Mingo National Wildlife Refuge. To prevent future accidents, the Missouri Department of Conservation is spending \$43,000 to construct a barbed wire-topped chain link fence around the area containing the entrances. Ninety percent of this cost will be reimbursed by the Service from funds appropriated by Congress under Section 6 of the Endangered Species Act. Entry to this dangerous inactive mine is now prohibited, and violations can result in a fine of up to \$20,000 and/or a year imprisonment.

These Indiana bats must cluster densely in a cold cave to maintain proper temperatures with minimum energy expenditure. Of all available caves, only a few are suitable for their hibernation. Pilot Knob Mine fortunately has the particular characteristics that duplicate the cave habitat needed by this endangered species.



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Regional News

(continued from page 6)

ing their nesting season. News releases, posters, and public service announcements and interviews on Nebraska television and radio stations have been used to encourage the public to avoid disturbing nesting colonies along the Platte River wherever possible. Local businesses that could directly disturb the species (such as sand and gravel companies) have been asked to display posters in conspicuous areas to remind people of the birds' presence. Businesses and organizations that could have indirect impacts on the species (such as those that sell recreation equipment or four-wheel drive and all-terrain vehicles) also are displaying the posters. Volunteers are participating in a "Tern Corps" that watches nesting colonies during times of heavy human use.

Research funded by the Bureau of Reclamation and the Colorado Division of Wildlife, and conducted by researchers from the Larval Fish Laboratory at Colorado State University in Fort Collins, Colorado, recently led to the capture of two humpback chubs (*Gila cypha*) and a Colorado squawfish (*Ptychocheilus lucius*) in a canyon of the lower Little Snake River in Colorado. The Little Snake River is a tributary of the Yampa River in northwest Colorado. The discoveries were made as part of a radio-tracking study of adult Colorado squawfish that were originally tagged in the Yampa River.

There have been scattered reports of Colorado squawfish and humpback chub in the Little Snake River, but very little sampling had been done to confirm those reports. Because of its widely fluctuating flows, it was previously assumed that the Little Snake River was important only for input of seasonal flows and sediments to the Yampa River. Followup studies will seek to determine if Colorado squawfish and humpback chub use the Little Snake River for spawning.

Fishery surveys of the San Juan River, which originates in southwestern Colorado and flows through the northwestern corner of New Mexico into southeastern Utah, indicate that the San Juan River may be more important to the recovery of the Colorado squawfish than previously believed. In 1987, 6 adult and 20 young-of-the-year Colorado squawfish were captured in the San Juan. So far in 1988, three adult squawfish and one razorback sucker have been captured. Past studies of the San Juan have resulted in only incidental capture of Colorado squawfish. Studies to be conducted in fiscal years 1988 and 1989 will attempt to determine the abundance and distribution of rare fishes in the San Juan River in Utah and New Mexico, assess habitat potential and possible limiting factors, and describe current and likely future hydrologic conditions

(continued on page 8)

