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Cover: A traditional sweetgrass wreath adorns a birch bark canoe paddled by a Penobscot Indian Nation team as it participates in the "Katahdin 100," a Native Spiritual Run. The journey retraces the annual migration of the Native people who lived, hunted, and sought spiritual attainment in the shadow of Mt. Katahdin and on the Penobscot River (see story on page 16).

Photo by Bridget Besaw

Opposite page: Hoopa Tribal members Dawn McCovey and Aaron Pole attach leg bands to a juvenile spotted owl.

Photo by Mark Higley, Hoopa Tribal Forestry

The Endangered Species Bulletin is now an on-line publication. Three electronic editions are posted each year at www.fws.gov/endangered/bulletin.html, and one print edition of highlights is published each year. To be notified when a new on-line edition has been posted, sign up for our list-serv by clicking on "E-Mail List" on the Bulletin Web page.

The Bulletin welcomes manuscripts on a wide range of topics related to endangered species. We are particularly interested in news about recovery actions and conservation partnerships.

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IN THIS ISSUE

- 4 Restoring a Vital Partnership
- 6 Apache Leader Promotes Tribal Conservation Rights
- 8 A Shared Responsibility
- 9 Tribal Wildlife Grants
- 10 Hoopa Tribe Leads in Fisher Conservation
- 13 Restoring Endangered Species on the Pueblo of Santa Ana
- 16 Penobscot Indian Nation Aids River Restoration
- 18 Traditional Ecological Knowledge
- 20 The Fox People Care for a Rabbit
- 22 Mill Creek Restoration Project

Departments

- 26 Partners for Pollinators
- 28 Partners for Fish and Wildlife
- 30 Focus on Hatcheries
- 32 USGS Research News
- 36 Children in Nature
- 38 Listing Actions

Please send us your comments and ideas! E-mail them to us at esb@fws.gov.

Restoring a Vital Partnership

by Patrick Durham

I am delighted to introduce this edition of the *Endangered Species Bulletin* highlighting the important work of Indian tribal governments in helping to protect, preserve, and restore threatened and endangered Species. In these pages, you will find stories about how Native Americans from across the United States are integrating their unique cultural and traditional values with modern biological management principles to make a difference for conservation.

It is critical that the Fish and Wildlife Service, as a world leader in species and habitat conservation, continue to seek out

and support many and diverse partners. Indian Country offers tremendous collaborative opportunities for the Service in a variety of ways.

First and foremost, Indian tribes have a special sovereign status with the U.S. as domestic dependent nations, and the Service has a trust responsibility to honor this trustee-to-beneficiary relationship. The special status of Indian people and their duly elected governments is distinctly political in nature, and should not be confused with the rights afforded to racial or other minority constituencies.

There are 567 federally recognized tribes in 34 states with 56 million acres in tribal trust and 44 million acres owned by Alaska Native corporations, totaling more than 100 million acres. The vast area and diversity of Indian Country suggests that Indian tribes are natural partners in the conservation and recovery of federally protected species.

Today, Indian Country is abundant with pristine wilderness and a host of environmentally valuable restoration sites. In 2000, the Bureau of Indian Affairs surveyed 120 tribes and catalogued more than 150 listed species on their reservations.

In 1997, the secretaries of the Interior and Commerce signed Secretarial Order 3206, "American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act." This order was designed to clarify the responsibilities of the departments of the Interior and Commerce, and their agencies, when Endangered Species Act actions may affect Indian lands, tribal trust resources,

A Tribal Wildlife Grant is helping the Pyramid Lake Paiute Tribe to conserve two listed fishes, the Lahontan cutthroat trout (below) and the cui-ui.



Laurie Moore/USFWS



The Lower Brule Sioux Tribe received a Tribal Wildlife Grant in 2003 to work toward the restoration of the black-footed ferret on tribal lands. As one member of the tribe said, "The ferret is one of the animals we used in our medicine. Bringing back the buffalo was the first step; the return of the ferret is the final step."

or the exercise of American Indian tribal rights. Service representatives should all become acquainted with this guidance, which is posted at; <http://www.fws.gov/endangered/tribal/Esatribe.htm>.

I have touched on the special status of tribes, the scope and condition of their vast ecological resources, and our guidance in the implementation of the Endangered Species Act in Indian Country. True, these are all great reasons for the Service to be fully engaged with Indian tribes, but to me, there is something more magical happening.

In 2003, when our competitive Tribal grant program was launched (see <http://www.fws.gov/nativeamerican/grants.html>), we intentionally left very broad sideboards in identifying project priorities. Our tribal partners had great latitude in proposing creative conservation solutions from a Native American perspective. We discovered that when

we sat down at the table and talked about conservation priorities with our tribal partners, we have far more in common than not. In fact, many of our Tribal Wildlife Grants have supported endangered species conservation projects on tribal lands. You will read about some of these projects in this issue.

Most of us have chosen to work with the Service because of our love of nature and the outdoors. As this continent's first people, Native Americans have a common cultural thread that places a religious reverence on the connection to the natural world. The Lakota word *Oyate*, meaning "all of my relations," refers not only to family relations but to kinship to all people, plants, and creatures of the earth. It speaks of reverence for the land itself and of our dependence on it. *Oyate* is the spirit of "place" and, in many ways, speaks to the mission of the Service.

The stories that follow represent some of our shared conservation goals and priorities with Indian tribes. As we continue to explore and expand opportunities for Indian tribes to share in accomplishing what is important to the Service, we also have an opportunity and obligation to support tribes in their fish and wildlife conservation efforts.

Patrick Durham, the Service's Native American Liaison, can be reached at patrick_durham@fws.gov.

by Sarah E. Rinkevich

Apache Leader Promotes Tribal Conservation Rights



Sarah Rinkevich

Ronnie Lupe, Chairman of the White Mountain Apache Tribe

The Apache word *ni* holds the dual meaning of “mind” and “land,” illustrating the connection to “place” that the Apache people carry with them. It’s no surprise that the White Mountain Apache Tribe’s chairman, Ronnie Lupe, would advocate ardently for conservation of the 1.6 million-acre (65,000-hectare) Fort Apache Indian Reservation in Arizona.

Lupe became chairman of the White Mountain Apache Tribe in 1966 and entered the ongoing struggle to make tribal sovereignty a reality. Tensions over endangered species issues reached a crescendo in the 1990s. The Endangered Species Act was being implemented in ways that conflicted with Indian rights to exercise authority over their lands. The White Mountain Apache Tribe sought to overcome this problem and achieve recognition of sovereignty on its lands. In the early 1990s, Chairman Lupe began a dialogue with Mollie Beattie, who had been named the new Director of the U.S. Fish and Wildlife Service. On June 28, 1994, the Service released “The Native American Policy of the U.S. Fish and Wildlife Service.” This policy (see <http://www.fws.gov/nativeamerican/Native%20American%20Policy.pdf>) articulated the government-to-government relationship the Service would have with Native American governments. Later that year, Lupe and Beattie signed the first of its kind “Statement of Relationship” that recognized the tribe’s aboriginal rights, sovereign authority, and institutional capacity to self-manage its lands.

Other tribes asked Lupe how he did it. He told me, “I don’t want to glorify myself. I had a lot to do with it but it was not me alone. Mollie had a lot to do with it.” Recalling his conversation with Betty in a small park in Washington, “I told her, you think you have a strict rule, but we have more strict rules than your provision under [the Endangered Species Act]. Ours far exceeds what you’re after.”

Chairman Lupe and the White Mountain Apache Tribe received considerable national publicity for this achievement. The Statement of Relationship became the catalyst for the historic 1997 Joint Secretarial Order 3206, “American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act,” which was signed by secretaries of the Interior and Commerce. The order clarifies the federal government’s responsibilities under the Endangered Species Act, recognizes the exercise of tribal rights, and ensures that Indian tribes do not bear a disproportionate burden for the conservation of listed species.

I had the unique opportunity to discuss Secretarial Order 3206 recently with Chairman Lupe, who offered insight about how and why the order came to be.

He recalled with sadness the closing of timber operations across the Southwest in the 1990s when the Mexican spotted owl (*Strix occidentalis lucida*) was listed as a threatened species under the Endangered Species Act. Given the effects on the tribal economy, Lupe went



Mexican spotted owl

straight to Washington, D.C., and met with Beattie. He said that he extolled to her the serenity of the White Mountain Apache homeland, explaining it was still pristine. “As stewards of our area, the White Mountain Apache people are one with the land. And all of these endangered species are very sacred to our ways because they correlate with our culture and tradition.”

From that meeting, the idea for Secretarial Order 3206 was born. “It wasn’t easy,” Lupe said. “For the first time, Indian Tribes were consulted. The order was not behind our back. We set the tone of it as Indian Tribes.”

When I asked about the most important endangered species issue on the reservation, Chairman Lupe related struggles with the reintroduction of the Mexican gray wolf (*Canis lupus baileyi*) and the conflicts with cattle operations and trophy elk hunts. He told me that the tribe would like to have more flexibility in management of the wolf on their reservation. “A lot can be said about the wolf being released on our reservation – by cattle owners, by tribal members. Yet in

our own existence, there is a relationship that we have with the animals, a different kind of relationship from the outside world.”

When I asked Lupe about how the relationship between the Service and the Tribe could be improved, he described the importance of continuity. When governments are ever-changing, he said, continuity can be lost. He imparted the need to record and archive historical events such as the development of Secretarial Order 3206. As he put it, “We need to make recordings for ourselves so that continuity is there, and if anyone wants to listen, four years from now, eight years from now, or 10 years from now, they will know. The relationship with the government as Indian Tribes is becoming so very important today.”

Chairman Lupe graciously explained other issues, but paramount was his concern for his people. “Mostly, we think about our children, retaining our way of life, retaining our language. We want our people to learn the Apache language. There are sacred words in Apache that cannot be translated into English. We’ve

gone through a lot of challenges, and I’ve seen so many changes.”

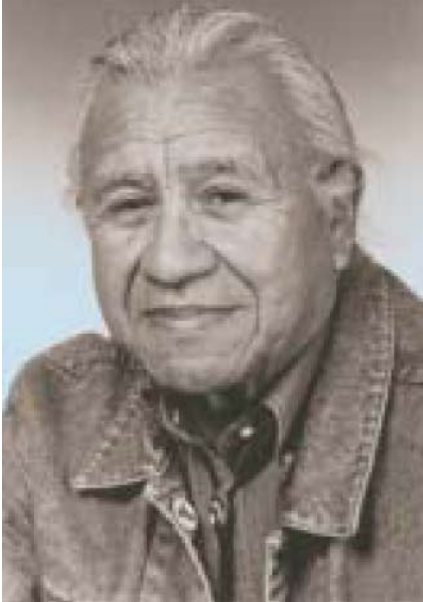
He related that he enjoys telling stories to the Apache children and articulates the importance and use of an Apache story. “Our own stories tell our children discipline and obedience. We don’t tell the children what to do, we just tell a story – around a camp fire, and you listen. And the story tells you how to live, discipline yourself, and how to avoid danger. The stories are all about that, the upbringing, the discipline, the sacredness, the ways of the Apache.”

In one word, *ni* is a story. When uttered from the lips of Lupe, it speaks of a sacred relationship and a discipline we can all embrace.

Sara Rinkevich, a fish and wildlife biologist in the Service’s Southwest Region, can be contacted at sarah_rinkevich@fws.gov.

A Shared Responsibility

by Billy Frank, Jr.



Tribes have a proud and distinguished history as stewards of the land and waters of this continent. We learned long ago that to respect mother earth and to be good stewards of natural resources is among the best of legacies we can provide to all the descendants of this land. If our children are to be healthy and content, they must have clean water teeming with fish and vibrant uplands where deer and bear are sustained. These things are critical to the spirit of all people, just as the survival of fish and wildlife are, in fact, critical to long term prosperity.

The tribes work hard, as our ancestors taught us, to assure the continuation of natural resources for seven generations and beyond. But to achieve this we must have help, in the form of collaboration with non-tribal government at all levels, the cooperation of all people, and direct funding from the federal government that must safeguard our sacred trust.

The Service's Native American Program has helped follow through with this commitment, with its Tribal Wildlife Grants (TWG) and Tribal Landowner Incentive Program. Over the past four years, these programs have provided nearly \$40 million to about 125 tribes across the nation, including awards of more than \$4.1 million to tribes in the state of Washington.

As with other funding from other sources, this funding has been put to good use by the tribes, through programs that benefit Indian and non-Indian alike. Projects range from the monitoring of water quality to the enhancement of wildlife habitat. But the job has just

begun. The United States bears a solemn responsibility to collaborate with tribes on an ongoing basis to protect and restore the habitat and natural resources so essential to all Americans.

Billy Frank, Jr., a noted elder in the Nisqually Indian Tribe, has served as Chairman of the Northwest Indian Fisheries Commission for more than two decades. In 2006, he penned the above message for a Service publication on its Tribal Wildlife Grant program (see www.fws.gov/grants/NativeAmericanLiaison60807.pdf). Since that time, the Service has partnered with another 50 tribes with an additional investment of more than \$10 million bringing the current totals to 175 tribal partnerships and over \$50 million in grant awards. The Landowner Incentive Program, however, was not funded in Fiscal Years 2007 and 2008.

Tribal Wildlife Grants

Secretary of the Interior Dirk Kempthorne announced recently that more than \$6.2 million in grants will go to 38 Native American projects this year in 18 states to fund a wide range of conservation projects.

“Tribal Wildlife Grants are much more than a fiscal resource for tribes. The projects and partnerships supported by this program have enhanced our commitment to Native Americans and to the United States’ shared wildlife resources,” he said.

More than \$34 million has gone to Native American tribes through the Tribal Wildlife Grants program in the past six years, providing funding for 175 conservation projects administered by 133 participating federally recognized tribes. The grants provide technical and financial assistance for the development and implementation of efforts that benefit fish and wildlife resources and their habitat, including species that are not hunted or fished.

The annual grants have enabled tribes to develop increased management capacity, improve, and enhance relationships with partners, address cultural and environmental priorities, and heighten the interest of tribal students in fisheries, wildlife, and related fields of study. Some grants have been awarded to enhance recovery efforts for threatened and endangered species.

The grants are provided exclusively to federally recognized Indian tribal governments and are made possible under the Related Agencies Appropriations Act of 2002, through a component of the State Wildlife Grant program.

During the last grant cycle, tribes submitted 110 proposals that were scored by panels in each Service region using uniform ranking criteria. A national scoring panel recommended 38 proposals for funding.

The grants cover a wide range of conservation projects, including:

- The Yurok Tribe of the Klamath River Reserve in northern California will get a \$200,000 grant to study the feasibility of reintroducing California condors to the Yurok Ancestral Territory.
- A grant of \$62,604 to the Iowa Tribe of Oklahoma will help manage the tribe’s Wildlife Conservation Area, which, among other things, includes the Grey Snow Eagle House (Bah Kho-Je Xla Chi), the first federally funded eagle rehabilitation facility in the United States. This facility cares for injured eagles that cannot return to the wild, rehabilitates eagles that are returned to the wild, and takes advantage of the eagles’ natural molting process to provide eagle feathers for Native American religious and other ceremonies.
- The Lummi Nation of Washington State will receive a grant of \$200,000 to support endangered species recovery work in the Nooksack River Basin. It will seek to restore degraded habitat identified as limiting the production of bull trout, steelhead, chinook, and other salmon.



California condor

David Clendenen

Call for new grant proposals

On May 1, 2008, the Service issued a request for grant proposals for the 2009 Tribal Wildlife Grants. The maximum award for any one project under this program is \$200,000. Tribal representatives interested in applying for a Tribal Wildlife Grant are invited to access the application toolkit at <http://www.fws.gov/nativeamerican/grants.html>. Proposals and grant applications must be post-marked by September 2, 2008.

Hoopa Tribe Leads in Fisher Conservation

by Mark Higley

The Hoopa Valley Indian Reservation, the largest reservation in California, is located in a remote area of Humboldt County approximately 90 miles (145 kilometers) south of the Oregon border. Composed of 90,000 acres (36,422 hectares), it is surrounded by the Klamath-Trinity mountains. The reservation is centered on the tribe's

ancestral homelands in the Hoopa Valley and is bisected by the Trinity River. The Hupa people have occupied these lands for thousands of years¹.

Although all living things are held sacred in the tribe's traditional culture, it was not until the listing of the northern spotted owl (*Strix occidentalis caurina*) as a threatened species in 1990 that the tribe hired a wildlife biologist. The Bureau of Indian Affairs (BIA), an agency of the U.S. Department of the Interior, had been in charge of the tribe's forest and natural resources management until 1989, when the tribe exercised its sovereignty and became self-governing. The BIA's forest management had emphasized economics over tribal cultural concerns, at the expense of wildlife and most other natural resources. The tribe's economy is almost entirely timber-based, with an annual harvest of approximately 9.3 million board-feet of old-growth Douglas-fir. However, the tribe takes a holistic approach as it struggles to balance cultural values and socio-economic needs on a land base that represents only a fraction of its original territory.

Since 1992, the BIA has provided base funding to the tribe for the purposes of Endangered Species Act (ESA) compliance and surveys and monitoring for northern spotted owls through the tribe's self-governance compact. The tribe's struggling economy makes it difficult to fund wildlife programs on its own, no matter how important wildlife species are to the people and their culture.

When the U.S. Fish and Wildlife Service launched the Tribal Wildlife Grants (TWG) and Tribal Landowner

Whidehch, Little Sister in the Hupa language, on the day of her release from captivity. She was bottle fed for three weeks and held in large enclosures until demonstrating that she could capture and kill natural prey readily.



Mark Higley, Hoopa Tribal Forestry

¹The Reservation, town, and location are referred to as "Hoopa," while the people are referred to as the "Hupa People."

Incentive (TLIP) programs to provide much needed funding for wildlife work, the Hoopa Tribe was ready. These grant programs have benefited many tribes nationwide, and the Hoopa Tribe has been successful in obtaining both TLIP and TWG grants. The TWG grants have been focused primarily on researching the status of the fisher (*Martes pennanti pacifica*).

The focus on the fisher stems from its cultural importance to the tribe; its hides are used in making ceremonial

dance regalia. A “distinct population segment” (a term sometimes used under the ESA to delineate a separate portion of a species that requires different treatment by the law) of the fisher within California, Oregon, and Washington is a candidate for federal protection under the ESA. Because of the fisher’s cultural importance, the potential for federal listing, and the animal’s association with older forest habitats, the Hoopa Tribe has taken an active approach in collecting information about the fisher on tribal

lands. The information collected will help shape future forest management decisions and will prepare the tribe for working with the Service on revisions to the tribe’s forest management plan.

Starting in 1992, surveys conducted across most of the reservation found that the fisher was quite abundant compared with surveys conducted elsewhere. During 1996 to 1998, a radio-telemetry study was conducted on a 21-square-mile (55-square-km) area of the southeast portion of the reservation. Researchers captured 56 fishers (36 females, 20 males) to radio collar and, in some cases, replace old collars. The main emphasis of this study was to identify and describe fisher rest sites, although some reproductive dens also were found.

Objectives of the first TWG grant included several ambitious tasks, including the study of den site selection and the feasibility of studying fisher dispersal. To accomplish these tasks, tribal members and others involved in the project set out to radio-collar 15 to 20 adult females. Modeling of rest and den site selection variables will help the tribe develop habitat protection guidelines for the fisher. In addition, we attempted to mark each fisher kit produced in these dens with a passive integrated transponder (PIT) tag so that they might be identified when they grew large enough to be fitted with radio transmitters prior to their dispersal.

During more recent trapping efforts, we quickly learned that fishers were much less abundant than from 1996 to 1998. We struggled to capture 14 females in our first year, even after expanding the study area. In fact, we documented a significant decline in the fisher population by using camera stations to photograph ear-tagged animals in the portion of the recent study area that overlaid the 1996-1998 study area. In addition to the population decline, we found that the sex ratio had changed from nearly two females per male to one per male.

We captured and tagged 85 juvenile and adult fishers between 2004 and 2007, and radio-collared 42. Our close monitor-

Chuck Goddard removes a fisher kit from a den so that a PIT tag can be injected beneath the skin. Similar tags are commonly used to mark pets.



Mark Higley, Hoopa Tribal Forestry

ing of these animals over the years has given us some insight into the causes of fisher mortality. During the current study, we have witnessed 16 mortalities (13 females and three males). One was killed by a vehicle and three we suspect died from disease. The other 12 deaths (11 females and one male) were the result of predation. Suspected predators include bobcats, mountain lions, and canids (coyotes and domestic dogs). Throughout much of the fisher's range, predation is not considered an important source of mortality; however, in our region, body size is substantially smaller, and there are plenty of larger predators.

Of the 28 fisher kits marked prior to weaning, we recaptured and radio collared nine. Five of the eight collared kits have established home ranges, two dropped their collars during dispersal, and two died, most likely from disease. Three of the eight were born in March 2007 and later radio collared. One of these was actually rescued from a den after its mother was lost to predation. The young animal was bottle fed for three weeks, then held at an off-exhibit display at the Sequoia Park Zoo in Eureka, California. She was then transferred to an enclosure in the woods at Hoopa within her mother's home range, where she was introduced to natural live prey. She was released October 3, 2007, and remained in her mother's home range until December 3, when she began to move northwest and left the reservation. On December 30, she slipped out of her collar, and we were unable to recapture her due to snowy weather that made access to the area impossible. The other two kits born in 2007 were sisters. One of them dispersed to the south and established a home range near the town of Willow Creek, and the other has remained in her mother's home range. The two older female kits produced litters of kits in 2008 on the reservation.

The Hoopa Tribe has formed a partnership with the non-profit Wildlife Conservation Society, which has provided the director for the fisher research project. In addition, the tribe has collabo-

rated with Humboldt State University and the non-profit Integral Ecology Research Center to better understand mortality causes and the role of disease in fisher ecology. These partnerships, and additional financial support and technical assistance from the Fish and Wildlife Service's Yreka Field Office and the U.S. Forest Service's Redwood Science Laboratory, have resulted in many advances in the knowledge of fisher ecology.

The stakeholders on Indian lands (tribal members) often live on the same lands managed for commercial resource extraction. On tribal lands like the Hoopa Valley Indian Reservation, culture, tradi-

tion, subsistence, and recreational use take precedence over purely economic gain. But implementation of forest management plans on tribal lands must continue due to the strong economic need. We believe that, if tribes were afforded sufficient funding for ecological monitoring programs, the effectiveness of tribal management would be documented and would eventually provide an example of effective forest management that could be emulated on federal lands.

Mark Higley, the Hoopa Tribe's wildlife biologist since 1991, can be contacted at mhigley@hoopa-msn.gov.

Tribal member Aaron Pole holding a newly radio-collared juvenile female that was PIT tagged at 5 weeks of age while in a den with two siblings. She eventually dispersed only a couple of miles from her natal area.



Mark Higley, Hoopa Tribal Forestry

Restoring Endangered Species on the Pueblo of Santa Ana

by Catherine Nishida and
Nathan Schroeder

The Pueblo of Santa Ana is located in north-central New Mexico and encompasses over 79,000 acres (32,000 hectares) of trust land. Six miles (9.6 kilometers) of the Rio Grande flow through the Pueblo's boundaries. Historically, the Rio Grande was a perennial, winding, and braided waterway meandering across a floodplain that was miles wide. The low, sandy banks often experienced flooding and deposition of alluvial material high in nutrients that helped support a healthy riparian ecosystem. In the southwest, such areas of riparian forest along the river floodplains are called bosques,

from the Spanish word for woodlands. A healthy bosque ecosystem includes cottonwood (*Populus deltoides wislizeni*) gallery forests with understories of coyote and black willow (*Salix* spp.).

More than 100 years of waterway modification for flood control has changed the Rio Grande into a river that is straighter, narrower, and more incised. The increase in incision and water flow has altered channel bed substrates from fine sandy sediments to gravel-dominated bottoms. The construction of dams for flood control and ditches for irrigation has reduced the channel sediments and annual flooding events upon which the bosque depends. Over time, the native cottonwood and willow ecosystem was invaded by introduced Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix ramosissima*).

The Rio Grande silvery minnow (*Hybognathus amarus*) is one of the most endangered fish species in North America. It occupies less than five percent of its historical habitat in the Rio Grande due to damming and channelization. Changes in the river corridor and loss of riparian habitat also have reduced populations of the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and a candidate for listing, the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Both subspecies are neotropical migrants that require densely vegetated riparian habitats for breeding.

The Santa Ana Rio Grande Restoration Program is an ecosystem-based restoration program that

A yellow-billed cuckoo uses the restored habitat at the confluence of the Rio Jemez and Rio Grande.



Glenn Harper



The confluence of the Rio Jemez and Rio Grande in 2001, prior to habitat restoration.

was started in 1998 by the Pueblo's Department of Natural Resources. The program is designed to restore a healthy, functioning Rio Grande ecosystem by reversing the negative impacts on riparian and aquatic ecosystems caused by flood control and channelization. Collaborations with federal and state agencies and non-profit organizations have focused on riparian restoration, habitat creation, and endangered species monitoring.

The Santa Ana Pueblo employs a philosophy of passive and active management along the Rio Grande. By allowing the river to create natural habitat through riparian vegetation regeneration and by mechanically removing invasive species, the river profile is being transformed. Along one bank, the Pueblo has removed all "jetty jacks," large metal structures that were installed in the 1950s and 1960s to straighten the river. Removing the jetty jacks allowed the Pueblo to recontour sections of the riverbank, which creates a lower floodplain that helps to reduce channel incision. The recontoured sections have experienced natural revegetation. In addition, the Pueblo has created backwater areas and

swales that are planted with native vegetation. The backwater areas increase potential habitat for the Rio Grande silvery minnow, which requires slow-moving currents for spawning. Preliminary surveys (2005–2006) for the minnow on the Pueblo have shown an increase from earlier captures (1995–2000).

Like the Rio Grande silvery minnow, the southwestern willow flycatcher has benefited from habitat changes on the Pueblo. Exploratory surveys in 2001 detected only migratory willow flycatchers. During the summer of 2005, the Santa Ana Pueblo started surveying all suitable riparian habitats within its boundaries for willow flycatchers. After three years of baseline standardized surveys, detections of migratory willow flycatchers have significantly increased from original 2001 estimates. More importantly, southwestern willow flycatchers started residing on the Pueblo in 2006. These new resident flycatchers are defending territories within naturally regenerating riparian vegetation at the confluence of the Rio Jemez and the Rio Grande. This confluence supported very little vegetation in 2001 but is now densely vegetated. The Pueblo used this riparian regeneration as an example to grade the riverbank in an adjacent area to increase sediment deposition. This will create the same type of natural regeneration and expand the available riparian area in hopes that more southwestern willow flycatchers will take residence.

Yellow-billed cuckoos have been detected on the Pueblo since 2001. After three years of standardized surveys for yellow-billed cuckoos, the Pueblo has had fluctuating numbers of detections and estimates of population size. Yellow-billed cuckoos are known to be loosely territorial and to move opportunistically following ephemeral resource abundances. Cuckoos are secretive and often unresponsive to playbacks of taped cuckoo calls. Oscillations in population numbers make multi-year studies critical to understanding any population trends.

In 2006, the Pueblo confirmed successful breeding for one pair of yellow-

billed cuckoos. The nest was located four meters (13 feet) above the ground in an old-growth saltcedar within the dense riparian vegetation along the Rio Jemez. The Pueblo will continue yellow-billed cuckoo surveys in known high-usage areas for two more years. This will provide five years of baseline survey data while allowing more time for population monitoring. With five years of data collection, population trends should become more apparent.

Through funding from the Fish and Wildlife Service's Tribal Landowner Incentive Program, the Pueblo has been able to collect baseline data on the southwestern willow flycatcher, western yellow-billed cuckoo, and Rio Grande silvery minnow. Restored areas will be actively managed and enhanced as more

is learned about the habitat preferences of the Pueblo's population of these three species through long-term monitoring.

Catherine Nishida, Wildlife Program Manager; and Nathan Schroeder, Restoration Division Manager; both of whom work in the Pueblo of Santa Ana's Department of Natural Resources, can be reached at 505-867-0615.

The confluence of the Rio Jemez and Rio Grande in 2005, after restoration activities began.



Kathy Brodhead

by Ann Haas

Penobscot Indian Nation Aids River Restoration

When is a river more than a river? To the Penobscot Indian Nation of Maine, it is life itself. Two Tribal Wildlife Grants from the Fish and Wildlife Service to the Penobscot Indian Nation have provided nearly \$350,000 in seed money for a project to restore the Penobscot River.

A series of hydroelectric dams built on the Penobscot caused many changes in the river's health. Recently, what began as a dam relicensing effort became a major river restoration project. The multi-year, multi-partner initiative will remove two dams, build a fish bypass at a

third, and enhance access to 1,000 miles (1,610 kilometers) of spawning habitat for 11 species of sea-run fish in Maine's largest watershed.

The restoration effort is a result of a settlement agreement involving the Penobscot Indian Nation, the PPL Corporation (a hydropower company), conservation organizations, and federal and state agencies. The Penobscot Indian Nation joined American Rivers, the Atlantic Salmon Federation, Maine Audubon, Natural Resources Council of Maine, The Nature Conservancy, and Trout Unlimited to form the Penobscot River Restoration Trust, a non-profit organization dedicated to implementing the project.

The Trust will raise funds to buy the two dams slated for removal, and will equip a third one with a fish bypass channel. Among the fish species that will benefit is the endangered Atlantic salmon (*Salmo salar*).

Reopening the passageway will also reconnect the home of the Penobscot Indian Nation to the Atlantic Ocean. "The river was a highway to get to where we needed to go to carry on commerce with neighboring tribes," observes John Banks, the Penobscot's Natural Resources Director.

Increased runs of a range of fish species will increase feeding opportunities for bald eagles and other wildlife. Recreational fishing, especially for striped bass and salmon, is expected to improve, along with birding, canoeing, and kayaking, thus boosting the pros-

Removal of the Veazie Dam will help to restore fish habitat on the Penobscot River.



D. J. Monette

pects for economic development in area communities.

The project enjoys broad-based support. As the Penobscot River Trust's Laura Rose Day says, "This is a multi-partisan initiative to bring back the national heritage that people realize we have lost."

The Service's Tribal Wildlife Grants have opened a new door for the Penobscot Indian Nation as well. "By providing a funding source for the tribe to tap, our tribe is entered into conservation and partnerships that 10 years ago would not have been possible," says Banks.

For more information, visit www.penobscotnation.org and www.penobscotriverriver.org.

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Bridget Besaw

Butch Phillips, an Elder of the Penobscot Indian Nation, encourages Penobscot River paddlers retracing the tribe's ancestral journey to the sacred mountain during the Katahdin 100. The annual run now includes walking, biking, and canoeing.

Atlantic salmon



Greg Thompson

Traditional Ecological Knowledge

by Sarah E. Rinkevich

*P*olar bears (*Ursus maritimus*) are marine mammals that primarily inhabit the ice-covered sea of the Northern Hemisphere but also use both marine and terrestrial habitats for feeding, denning, breeding, and seasonal movements. On May 15, 2008, the U.S. Fish and Wildlife Service listed the polar bear as a threatened species under the Endangered Species Act due to loss of habitat because of receding sea ice. For the Service, however, managing polar

bears is nothing new; it has been the agency's responsibility under the Marine Mammal Protection Act since 1972.

In 1993, the Secretary of the Interior directed the Service to enhance its management by developing a habitat conservation strategy for polar bears in Alaska. The Service sought out local knowledge of polar bear habitat needs to ensure that recommendations set forth in the strategy were based on the best information available. Recognizing and

A polar bear hide on a drying rack. Subsistence hunting, which is not considered a significant threat to the polar bear's survival, is allowed under the recent listing rule.



using local knowledge to manage fish and wildlife is consistent with the Service's Native American Policy to seek partnerships with Native governments and involve them in Service activities.

Such local knowledge is often termed Traditional Ecological Knowledge (or TEK). Although there is no universally accepted definition of TEK, the term describes the knowledge acquired by indigenous and local cultures about their immediate environment and includes the cultural practices that build on that knowledge. TEK incorporates an intimate and detailed knowledge of plants, animals, and natural phenomena; the development and use of appropriate technologies for hunting, fishing, trapping, agriculture, and forestry; and a holistic knowledge or "world view" that parallels the scientific discipline of ecology. It is often associated with a reliance on oral traditions.

While TEK accumulates over centuries, its expression at any point reflects the time scales that are discernible to people, from daily animal habits to landscape changes over a human lifetime. Information provided by Native hunters knowledgeable of polar bear habitat was used to develop the Habitat Conservation Strategy for Polar Bears in Alaska, which was completed in 1995. The Service, in cooperation with the Alaska Nanuuq Commission, regional Native corporations, and village councils, visited 12 villages in northern and northwestern coastal Alaska to speak with Native hunters about polar bear habitat use. Villages were selected for the consistency of harvest patterns and their location within polar bear habitat. Service biologists held discussions with Native hunters who were selected by their village council for their knowledge of local polar bear ecology and habitat.

Sixty-one hunters participated in the discussions held by the team that was developed the conservation strategy. The primary objective of the Native knowledge discussions was to identify the areas polar bears use within each village's hunting range. The team transcribed oral

information and created maps. The maps subsequently identified important areas used by polar bears for feeding, denning, and seasonal movements, information that was not previously available in scientific literature. For example, polar bear habitat is highly variable because ice is directly affected by wind and ocean currents. When wind direction changes, lead systems (linear areas of open water within ice) and ice edges change, dramatically altering the accessibility and desirability of an area to the bears. Denning locations, which are relative to snow depth and deposition, also vary annually. Hunter responses often reflected this variability through statements such as "this lead is present when the wind blows from the south."

Local knowledge had not been incorporated into a management plan for marine mammals until development of the 1995 Habitat Conservation Strategy for Polar Bears in Alaska (U.S. Fish and Wildlife Service 1995). The Strategy continues to serve as a primary tool for polar bear habitat management, including the identification of important denning areas for land use planning activities involving the oil and gas industry in polar bear habitat in Alaska. The use of TEK also alerted scientists to the importance of marine mammal carcasses as a food source for polar bears during the fall open water period. This led to a ground-based study to better understand foraging patterns and coastal use by polar bears. Further, the Service used TEK to produce a polar bear population estimate for the 2007 listing proposal. Native knowledge and scientific information can help the Service explore the close association between polar bears, pack ice movements, and the overall importance of leads and active ice critical to polar bears. TEK may also play a significant role in research into seasonal movements of adult male polar bears, for which scientific information is lacking.

Traditional ecological knowledge is complementary to western science, not a replacement for it. Admittedly, integrating indigenous and western scientific

ways of knowing and managing wildlife is difficult to achieve, but TEK has played an important role in the successful management of several other Arctic wildlife species. For example, the Inuit people provided information about the winter ecology of eiders (*Somateria mollissima sedentaria*). Inuit knowledge of winter concentrations of eiders suggested a more efficient means for biologists to monitor eider population size in southeastern Hudson Bay.

As it plans future conservation efforts for the polar bear, the Service will continue to work with indigenous and other local people to collect and make good use of their unique ecological knowledge.

Reference

U.S. Fish and Wildlife Service. 1995. Habitat Conservation Strategy for Polar Bears in Alaska. Unpublished Report. Alaska Region. 119pp (appendices).

The Fox People Care for a Rabbit

by Shelley Spohr and Sarah E. Rinkevich



Mashantucket Pequot
Tribal Nation

The symbol of the Mashantucket Pequot Tribal Nation is a reflection of its past. A tree perched on a rocky knoll and framed against a clear sky represents Mashantucket, the “much wooded land” where the people hunted and prospered. At its base, a fox stands as a vigilant reminder of the turbulent times when the Pequots adopted the name that means “The Fox People.” Located in southeastern Connecticut, the Mashantucket Pequot Reservation is one of the oldest continuously occupied Indian reservations in North America.

As part of a larger project examining the population status, habitat needs, and home ranges of significant predator and prey species in suburban Connecticut, the Mashantucket Pequot Nation decided to evaluate the status and habitat use of the New England cottontail (*Sylvilagus transitionalis*) on tribal lands. Ultimately, the goal of this investigation was to determine if New England cottontails occurred on tribally owned properties. Funding from a 2003 Tribal Wildlife Grant enabled a tribally employed wildlife biologist to set 22 box traps to live-capture cot-

After measurements of foot and ear length, this rabbit, likely a New England cottontail, was ear-tagged and released.



Lisa Selner

tontails on tribal lands. Traps were set from January 1, 2005, through April 29, 2005, and again from December 20, 2005, through April 15, 2006, for a total of 4,641 trap-nights. The traps captured cottontails 42 times, including 17 recaptures.

It is nearly impossible to distinguish New England cottontails from eastern cottontails (*S. floridanus*) simply by looking at them. The minor differences of ear length, body mass, and presence or absence of a black spot between the ears and a black line on the front of each ear are subtle enough to be missed and are not always accurate. Therefore, ear tissue samples were taken from all rabbits captured and were frozen for future DNA analysis. Measurements such as ear length, right hind foot length, and weight were taken from 23 captured individuals (15 males and 8 females). These 23 rabbits were also ear-tagged, sexed, and released. Two rabbits died during capture, likely because of below-average temperatures. One of the rabbits was captured three times in as many days and appeared to be in poor health.

Although the formula recommended by Litvaitis (2002) which takes into account ear and hind foot length, suggested that all captures were eastern cottontails, five rabbits from four unique sites had pelage characteristics representative of New England cottontails. Therefore, tissue samples from these five individuals were sent to the University of New Hampshire for DNA testing through a cooperative agreement with the State of Connecticut's Department of Environmental Protection - Wildlife Division (CTDEP). Results received in 2006 were inconclusive for three of the samples, whereas the other two were confirmed eastern cottontails. Correspondence with the university stated that the three inconclusive samples were "most likely" New England cottontails, but because the analysis did not yield clean sequences, these results are not definitive.

The Pequot Tribe is sharing information from this study with CTDEP, the U.S. Fish and Wildlife Service, and the

public. Articles published in January and November 2005 editions of the tribal newspaper, *The Pequot Times*, described this cottontail research to the public. (See <http://www.pequotimes.com/archives.php>.)

In 2006, the Fish and Wildlife Service identified the New England cottontail as a candidate for listing under the Endangered Species Act. Why would a rabbit, the embodiment of prolific breeding, be considered for protection? The reasons are a severe reduction in range and numbers. As recently as 1960, New England cottontails were found east of the Hudson River in New York, across all of Connecticut, Rhode Island, and Massachusetts, and north into New Hampshire and southern Vermont and Maine. But this species' range has shrunk by more than 75 percent, and its population numbers are declining. It can no longer be found in Vermont and has been reduced to only five smaller populations throughout the rest of its historical range. We hope that the data collected by the Mashantucket Pequot Tribal Nation will determine if New England cottontails inhabit tribal lands so that we can better protect their habitat.

Reference

Litvaitis, J.A., B. Johnson, A.I. Kovach, and R. Jenkins. 2002. Manual of sampling protocols for a regional inventory of New England cottontails. Durham, N. H. 53pp.

Shelley Spohr is the wildlife biologist for the Mashantucket Pequot Tribal Nation. Sarah Rinkevich is an endangered species biologist with the U.S. Fish and Wildlife Service in its Southwest Region.



Lisa Selner

This rabbit was found to be an eastern cottontail and released.

The Mill Creek Restoration Project

by Warren Mitchell

The Round Valley Indian Reservation lies within the Coast Range of northern California and is essentially surrounded by salmonid-bearing river systems: the Eel River (mainstem, Middle Fork, and North Fork), Williams Creek, and Hulls Creek. The original treaty boundary, established in 1856, encompassed nearly 150,000 acres (61,000 hectares). Today, however, the reservation consists of about 30,000 acres (12,000 ha) scattered in a checkerboard of sections across the original expanse. It serves as home to a confederation of seven tribes (Yuki, Wylaki, Nomalaki, Pomo, Pit River, Concow, and Little

Lakes) collectively known at the Round Valley Indian Tribes (RVIT). Within these 30,000 acres, the tribe has stewardship responsibilities over a wide range of fish and wildlife species, several of which are found on the federal and state endangered species lists.

Mill Creek, like many river systems in the Northwest, was once a healthy stream used by large numbers of Chinook salmon (*Onchorhynchus tshawytscha*) and steelhead (*O. mykiss*) as their natal stream. Today, only a much smaller number of salmon and steelhead return to Mill Creek. But the RVIT has undertaken an ambitious multi-year stream restoration effort, the Mill Creek Stream Restoration Project (SRP), to restore a section of the creek and the wildlife it once supported.

This photo shows the typical condition of Mill Creek just upstream and downstream of the project area with regard to the presence of surface water, channel width and definition, riparian corridor function, and overall ecological health.



The Problem

Essentially, Mill Creek is a single channel stream about 60 feet (18 meters) wide capable of supporting surface water flow (and fish life) during the summer months and a functional riparian corridor along both banks. While much of the habitat within Mill Creek is viable, a significant section has suffered extensive bank erosion during the past several decades. Over time, the 2.4 mile (3.8-kilometer) section to be covered by the restoration project area had become a highly braided, multi-channel system with a bank width of about 700 feet (215 m). This section became incapable of maintaining surface water flow during the summer and had virtually no riparian vegetation. The result was such severe

ecological damage that this reach of Mill Creek became a deathtrap for all aquatic life in summer as the surface flow went subterranean.

While the RVIT served as the lead agency for the design and implementation of the stream rehabilitation project, it was the cooperation and support by outstanding individuals within federal and state agencies (U.S. Fish and Wildlife Service, National Marine Fisheries Service, Natural Resource Conservation Service, Bureau of Indian Affairs, Bureau of Reclamation, FishAmerica Foundation, and the California Department of Fish and Game), as well as the support from the Tribal Council, local schools, and the community as a whole, that ultimately turned the tide to make the project a success.

The Solution

The Mill Creek Project had myriad technical, ecological, fiscal, and other issues to contend with for a project of this size and complexity. One of the key concepts for the project was to maintain a holistic approach in coordinating each of the individual components. A second was finding the balance between what the data said we could do and what Mill Creek was indicating we needed to do. We collected “hard” data extensively from throughout the project area using methods described in the California Department of Fish and Game’s California Salmonid Stream Habitat Restoration Manual (2nd Ed). We also collected “soft” data by talking with tribal elders who remember what Mill Creek was like when they were children, when they could jump across the creek and catch fish in the summer.

After analyzing the data and contemplating stream gradients, substrate materials, sinuosity ratios, hydrographs, and other factors that describe stream behavior, we toured the project area to see what the creek had done in the past, what it was currently doing, and what it would probably do the next winter, basing our observations on deposition and erosion patterns from the past winter.



Typical conditions within the Mill Creek Stream Restoration Project Area prior to the habitat recovery work included a lack of surface water, poor channel definition, and little riparian function.

We combined the patterns in a delicate balance to determine what the creek indicated to us that it “wanted” to do. (Yes, I am a scientist, but I believe there are some things about a stream’s unique nature that numbers and models cannot convey.)

In 2001, Phase I of the project restored nearly 2,700 feet (825 m) of the stream’s primary channel. At the same time, almost 3,000 feet (915 m) of the braided side channels were modified or taken out of the stream’s active use, except in the case of high water events. In such cases, the rising water enters the side channels and encounters a series of brush baffles that slow down the water flow, allowing the deposition of suspended sediments to fill in and stabilize areas within the floodplain. In 2002, we implemented Phase II of the project, nearly 3,000 feet of primary channel development and almost 3,500 feet (1,065 m) of side channel modifications.

Phase III in 2003 was a rebuild of Phase II, which was necessary due to insufficient funding, which meant that we were unable to purchase enough boulder riprap to finish armoring the turns in the



Reconstruction of the Mill Creek channel in 2005.

river; and a flood event that caused the river to “zig” instead of “zag.”

The re-build of Phase III went well, and the next year’s Phase IV efforts incorporated approximately 4,800 feet (1,465 m) of primary and side channel work. Phase V saw the introduction of a new agency member, an engineer who advised that we not go so high up the bank with the boulder riprap in the corners as we had in previous phases. Despite our concerns, we felt compelled to follow the advice. That winter, the Pacific Northwest was hit by the 2006 “New Years Day Flood,” which erased most of Phase V’s results. The work done in Phases I – IV, on the other hand, held up well against the storm. The summer of 2006 involved rebuilding Phase V (with additional rock riprap) and the implementation of Phase VI, based on the original methods used since Phase I.

One thing that has contributed to the success of this project has been our practice of keeping an eye on the project area after each winter and fine-tuning any specific sites that have the potential for enhancement. This approach adds a tremendous amount of stability to the project for a relatively small additional investment of time and material.

What really makes this project so interesting to us is the way the Tribal Natural Resources Department (NRD) grew in conjunction with the implementation of the Mill Creek SRP. The Tribal Fisheries and Wildlife Program was only in its second year of existence when the Mill Creek SRP was initiated, but today the NRD has three tractors, one excavator, one backhoe, two dump trucks, a water truck, a service vehicle, and several pickup trucks. In addition to the equipment necessary to implement the project, a greenhouse was needed to start propagating the many native trees needed to revegetate the 4.8 miles (7.7 km) and 52 acres (21 ha) of stream bank associated with the Mill Creek SRP. The tribe has devised a system to water several hundred trees in a fairly short time, which will prove to be a critical component of reestablishing a riparian corridor within the barren floodplain that currently exists throughout the project area.

The Results So Far

To date, we have seen an increase in the amount of time that surface water flows through the project area into the summer months, as well as the return of water flow earlier in the fall months. With the increased quality of the instream habitat, salmon and steelhead are spawning and producing fry. The tribe has conducted an emergency fish rescue operation within project area for the past couple of years, and the number of steelhead being rescued from the reach as it begins to dry up and transported to locations upstream or downstream have been showing an upward trend (although fish production is highly variable depending on amount, timing and frequency of rainfall, among other issues), which we hope will continue. Reestablishing the riparian corridor is a slow process; it will take years to become functional in terms of shading, bank stabilization, and other factors. As it proceeds, the participation of schools in the tree planting efforts, combined with the Adopt-a-Watershed Program, will help kids gain a better understanding of the delicate balance

that exists between people and natural resources, and the effects that we all can have on that balance.

The tribe has invited a graduate student to document our approach of combining the hard and soft sciences for restoring Mill Creek. I hope that the success we've seen so far in Mill Creek will inspire other tribal, state, and federal agencies to use innovative approaches for restoring other degraded streams. We found that restoration is almost as much art as it is science. As a quote on my wall so eloquently states, "Streambank stabilization ain't rocket science, it is way more complex than that, with many more variables and unknowns." So listen to what the stream is telling you -- it will tell you what the numbers can't -- but balance it with what the numbers can.



The tribe's greenhouse for propagating vegetation used in restoring riparian habitat throughout the Mill Creek project area.

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Students, teachers, and community members gather around the tribe's biologist to listen to the purpose, goals, and instructions for the day's tree planting exercise to restore the riparian corridor along Mill Creek.



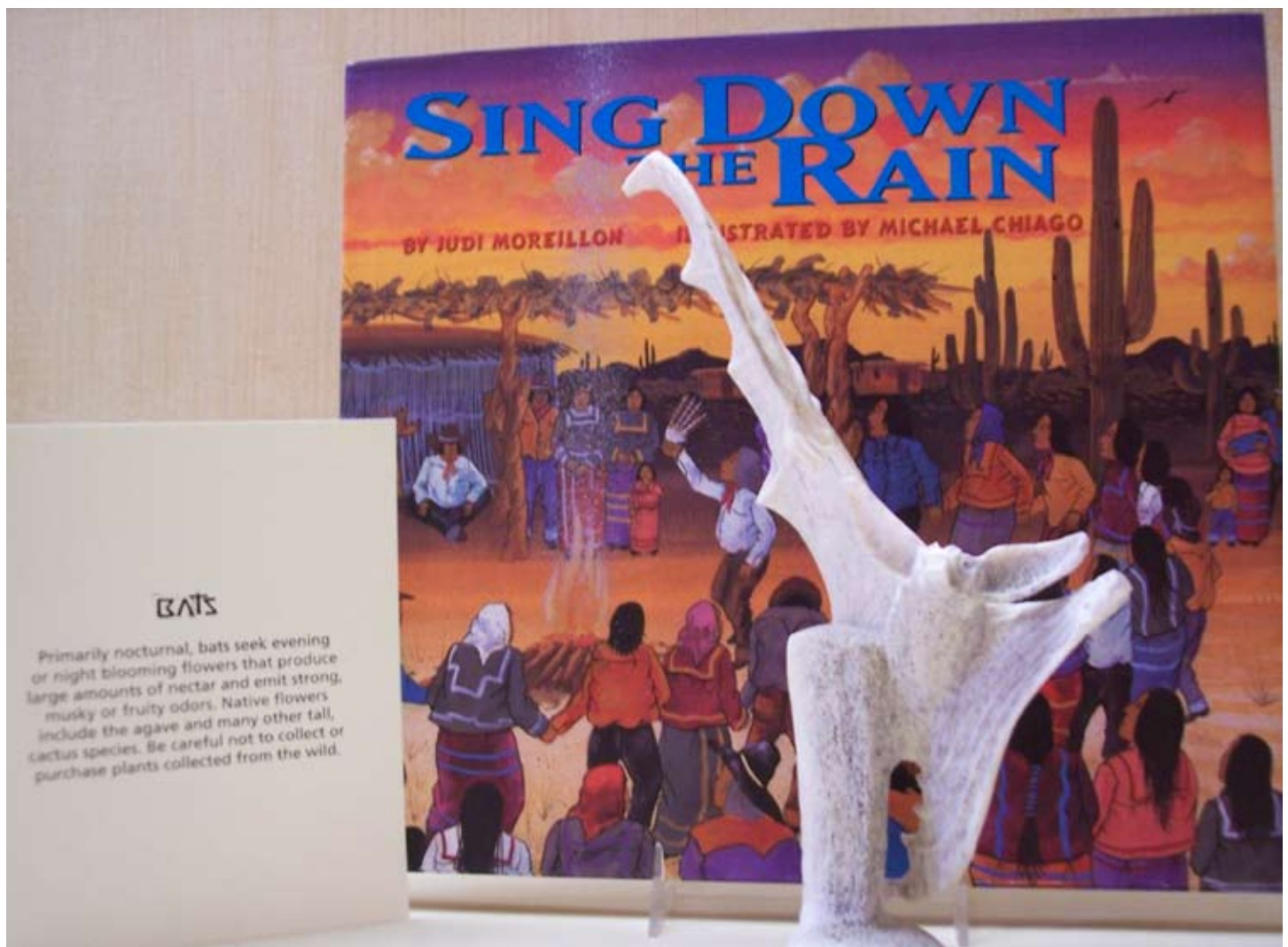
by Mary Byrne and
Patricia S. De Angelis

Pollinators, Plants, and People

Nearly 80 percent of the world's crops depend upon animals for pollination. Some estimates are that one out of every three bites of food people take every day comes from a plant that relies on an animal pollinator. Obviously, pollinator conservation is vital to healthy people and healthy ecosystems. This is the focus of the North American Pollinator Protection Campaign

(NAPPC), a collaboration of more than 100 partners that works to protect the health of resident and migratory pollinating animals in North America.

NAPPC experts have met each year since 2000 to focus on pollinator conservation. In anticipation of last year's meeting, which was hosted by the Department of Interior (DOI) in Washington, D.C., the NAPPC Public Land Managers'



PARTNERS FOR POLLINATORS

Task Force (PLMTF), comprised of federal agency representatives, set out to highlight DOI's work in native plant and pollinator conservation and to emphasize the importance of these species to people. As part of this effort, we collaborated with the DOI Museum (Hunter Hollins, Coordinator of Museum Services, and Debra Wurdinger, Museum Technician) and the DOI's Indian Craft Shop (Susan Pourian, Director) to develop communication plans to convey the "Pollinators, Plants, and People" message.

In September 2007, the DOI Museum opened the exhibit, "The Bats and the Bees: Pollination Systems in America." The exhibit showcased four North American systems involving a native plant, its pollinator, and a product from that relationship that is beneficial or economically important to humans. One of the featured systems is that of the endangered lesser long-nosed bat (*Leptonycteris yerbabuena*), agave (*Agave* sp.), and tequila. During the bats' annual migration from Mexico into the Sonoran Desert region of the United States, they rely on nectar provided by agave and other flowering desert plants to survive. In return, the bats perform a vital pollination role in agave reproduction. Without this pollinator/plant interaction, there would be no agave seeds produced to supply the tequila industry. Tequila, which is produced from fermented agave juice, had an estimated worth in 2005 of \$1 billion.

The Indian Craft Shop raised the public's awareness of the pollinator/plant relationship by highlighting Native American arts and crafts that depict, or are derived from, pollinators and the native plants that rely on them. During last year's National Pollinator Week (June 24-30, 2007), information tags about pollinator/plant relationships were displayed next to selected items in the shop. For instance, the tag on an item with a butterfly motif read: "There are 24 butterflies, moths and skippers listed

as endangered or threatened under the Endangered Species Act. Butterflies... prefer broad, flat-faced flowers. Purple coneflower provides food for butterflies... Try planting some in your yard – and watch the diversity they attract!" To learn more about the pollinators and plants in their area, readers were referred to two websites: www.pollinator.org and www.npg.gov/plants.

These collaborative efforts were well received and have had lasting effects. The DOI Museum exhibit, "The Bats and the Bees: Pollination Systems in America," will run indefinitely. A portable exhibit is being designed to take to K-12 classrooms to bring the native plant/pollinator conservation message to a younger audience. The Indian Craft Shop used the pollinator/plant tags again for this year's celebration of National Pollinator Week,

which took place June 22-28, 2008. We would like to express our gratitude to the DOI Museum and the Indian Craft Shop for making this pollinator awareness partnership such a great success!

Mary Byrne is the National Collections Data Manager for Seeds of Success, the national native seed collection program, coordinated by the Bureau of Land Management. She can be reached at mary_byrne@blm.gov or 202-452-7767. Patricia S. De Angelis, Ph.D., is a botanist in the International Affairs Program at the U.S. Fish and Wildlife Service and is chair of the Plant Conservation Alliance's Medicinal Plant Working Group. She can be reached at patricia_deangelis@fws.gov or 703-358-1708, ext. 1753.



DOI Indian Craft Shop Photo

by Joe Milmo

Tribal Land Habitat Restoration Through Partnerships

The Partners for Fish and Wildlife Program is the premier voluntary habitat restoration program within the U.S. Fish and Wildlife Service. It provides technical and financial assistance to private landowners throughout the nation to support the habitat needs of the federal trust species. We place a high priority on partnerships with tribal landowners and emphasize connectivity between the state, local, regional, and federal partners.

One example is our partnership with the Ho-Chunk Indian Nation of

Wisconsin. The Billings Creek habitat restoration project is located within the Kickapoo Valley Reserve, which is jointly owned by the State of Wisconsin and the Ho-Chunk Nation. The reserve is made available for such public recreational purposes as hunting, fishing, hiking, and canoeing.

This section of Wisconsin is part of what is known as the Driftless Area – a region of southwest Wisconsin, southeast Minnesota, northwest Illinois, and northeast Iowa that escaped glaciation during last ice age. (The term “driftless” indicates a lack of glacial drift, the material left behind by retreating continental glaciers.) It contains an unusual type of ecosystem characterized by algific (“cold-producing”) talus, a loose-rock slope affected by the movement of cold air produced by sinkholes and ice. These sites create cool summer and fall microclimates, which host species usually found farther north. Wildlife in the Driftless Area is subject to habitat damage from soil erosion, sedimentation, filling of sinkholes, and degradation of water quality. The Service considers habitats in this area a high priority for conservation.

The Billings Creek stream channel is known for its native brook (*Salvelinus fontinalis*) and non-native brown (*Salmo trutta*) trout populations that occupy the stream’s cold, flowing waters. In recent years, intensive grazing had resulted in highly eroded stream banks along Billings Creek. Because of erosion, the stream habitat suffered from a widened

Prior to the habitat restoration work, the Billings Creek stream channel was excessively wide due to recent bank erosion, and the water velocity was low. Consequently, many riffles and deep holes had filled with silt, providing poor trout habitat.



USFWS

channel, reduced depth, decreased water flow, and increased sedimentation. The deep holes and stream riffles were filled by silt, which directly disturbed the trout population.

In cooperation with the Natural Resource Conservation Service (NRCS) and Vernon County Land Conservation Department, Partners Program Biologist Bill Peterson provided technical assistance to the Ho-Chunk Nation for in-stream and wetland floodplain habitat restoration. The reshaping of eroding

banks and narrowing of the stream channel effectively increases downstream water velocity, which previously had flushed stream sedimentation in a matter of days. This in-stream and stream bank fish structure restoration provides immediate improvement to the native brook trout habitat, while effectively enhancing downstream water quality.

Bald eagles (*Haliaeetus leucocephalus*) will benefit from an increased brook trout population, because the trout are an important seasonal food during their

fall run. Additionally, the surrounding six acres (2.4 hectares) of wetland floodplain were restored by plugging two ditches in the adjacent area. The sandhill cranes (*Grus canadensis*) that nest nearby also will benefit from the restored wetlands.

Joe Milmoie, a fish and wildlife biologist in the Partners for Fish and Wildlife program, can be reached at joe_milmoie@fws.gov or 703-358-1879.

Working with the Natural Resources Conservation Service and the Vernon County Land Conservation Department, the Fish and Wildlife Service's Partners for Fish and Wildlife program assisted the Ho-Chunk Indian Nation in restoring Mill Creek's in-stream and wetland floodplain habitat. We shaped the eroding banks to prevent further erosion and used the fill to plug nearby drainage ditches. We also narrowed several stream channel sections to increase the water velocity and direct the current towards lunker structures (devices to stabilize streambanks and create cover for fish). Within several days, much of the accumulated sediment had flushed downstream, exposing rock riffles and deep pools.



by Doug Olson

Adaptive Management at Warm Springs

Showing most types of the Pacific Northwest's natural wonders, the Warm Springs Indian Reservation in Oregon encompasses alpine lakes, pristine rivers, deep canyons, and vistas of high desert and volcanic peaks. More than half of the reservation is forested, with the rest primarily consisting of range land. Home to the Warm Springs, Wasco, and Paiute Native American Tribes, the reservation stretches from the

summit of Oregon's Cascade Mountains east to the Deschutes River, with the Metolius River and Lake Billy Chinook forming the southern boundary.

The Warm Springs National Fish Hatchery, funded and operated by the U.S. Fish and Wildlife Service, is located within the reservation on the Warm Springs River, which flows into the Deschutes River, a tributary of the Columbia River. The Service initiated the program in 1978, in cooperation with the Confederated Tribes of the Warm Springs, to produce spring Chinook salmon (*Oncorhynchus tshawytscha*) for harvest, maintain wild fish characteristics in the hatchery and stream environment, minimize hatchery impacts on wild fish to very low, acceptable levels, and develop and implement a hatchery operations plan to achieve our harvest and conservation goals for Warm Springs River fish populations.

For more than 25 years, information on fish populations has been collected cooperatively by the Confederated Tribes of the Warm Springs, the Oregon Department of Fish and Wildlife, and the Service to monitor changes and compare the performance of wild and hatchery-produced fish. Every five years, the cooperators develop a hatchery operation plan based on this monitoring. Significant actions for 2007-2011 hatchery operations and a cooperative agreement between the Service and the Confederated Tribes include: 1) mass marking of hatchery-produced fish for harvest and brood stock management, 2) selecting brood stock to mimic the timing of wild fish runs, 3) integrating wild fish into the hatchery

Tribal technicians sample spring Chinook salmon raised at the Warm Springs National Fish Hatchery.



USFWS photo

USFWS and Confederated Tribes of the Warm Springs



Tribal and Service biologists tracking radio-tagged Chinook salmon.

brood, 4) limiting the number of hatchery fish allowed to spawn naturally, 5) operating an automated passage system for returning adults (to reduce handling of wild fish), 6) simulating environmental and biological factors in the hatchery environment to match natural production features, 7) assessing ecological interactions between wild and hatchery fish, and 8) determining the reproductive success of hatchery fish released into the stream. To preserve the genetic integrity of wild steelhead trout (*Oncorhynchus mykiss*) that are listed under the Endangered Species Act, the hatchery is operated to allow only wild, unmarked steelhead upriver into the major spawning areas. The cooperative management and operation of the hatchery since its inception has created the only wild steelhead sanctuary in the Deschutes River. The hatchery also passes all other native fish upstream, including mountain whitefish, rainbow trout, suckers, and listed bull trout (*Salvelinus confluentus*). The monitoring and management of Warm Springs National Fish Hatchery demonstrates a cooperative, sustainable

program, integrating the need for both harvest and wild fish conservation.

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Native fish habitat on the Warm Springs Indian Reservation.



David Hand

by Janet Cushing and
Susan Marcus

USGS Aids Tribes in Wildlife Recovery

*T*he U.S. Geological Survey (USGS), primarily a research science bureau, does not have regulatory or land management responsibilities, so most of the activities described below are collaborations with tribes, tribal organizations, or professional societies. Others were conducted cooperatively with the Bureau

of Indian Affairs (BIA) or other federal entities.

The USGS realizes that Native American knowledge and cultural traditions bring unique perspectives that enrich USGS studies. The USGS work is done by collecting and reporting data, monitoring, and modeling to gather

Members of the Nisqually tribe and U.S. Fish and Wildlife Service beach seining in the nearshore habitat.



Meghan Young

information that is used to explain the past in ways that are significant to understanding future conditions. The USGS also strives to increase the sensitivity and openness of our scientists to the breadth of Native knowledge, expanding the information on which our research is based. Below are several examples of USGS work with tribes and other partners on threatened and endangered species issues.

Kootenai River White Sturgeon Recovery

USGS biological scientists have worked in a multi-year partnership with the Kootenai Tribe of Idaho, Idaho Department of Fish and Game, and U.S. Fish and Wildlife Service to recover endangered Kootenai River white sturgeon (*Acipenser transmontanus*). The Kootenai River Sub-Basin is an international watershed, and the river is the second largest tributary to the Columbia River. About 500 wild Kootenai River white sturgeon remain, and they spawn at specific locations within the spawning reach. USGS studies have focused on

spawning success as it relates to incubation success, fish movement, bottom sediment, and stream flow modeling.

In 2006, staff from the USGS Western Fisheries Research Center’s Columbia River Research Laboratory conducted experiments at the Kootenai Tribe of Idaho’s white sturgeon hatchery to investigate survival of white sturgeon eggs incubated on several types of river sediments. In addition, the USGS collaborated with Idaho Department of Fish and Game by providing telemetry equipment and expertise to monitor movements of spawning white sturgeon over an area scheduled for habitat improvements. A USGS facility, the S. O. Conte Anadromous Fish Research Center in Turners Falls, Massachusetts, is conducting research on behavior and dispersal of the Kootenai River white sturgeon early life stages. The Kootenai Tribe supplied fertilized eggs for the USGS study.

The USGS Idaho Water Science Center and the USGS National Research Program, in cooperation with the Kootenai Tribe, are studying the sturgeon’s spawning habitat near Bonners

Juvenile white sturgeon on a measuring board.



USGS photo

Ferry, Idaho. Scientists are using hydraulic and sediment-transport models to assess the feasibility of restoring natural sturgeon recruitment. The USGS continues developing a multidimensional computer model of the spawning reach that simulates river depth, down-stream and cross-stream flow velocities, flow direction, and sediment motion over a large range of stream flows. The model can simulate historical river flows as well as river management scenarios, and it will be used to design spawning habitat enhancement proposals.

Together, the egg incubation experiments, field telemetry studies, and hydraulic models provide the Kootenai Tribe and the Kootenai River White Sturgeon Recovery Team with information that will help guide habitat restoration.

Nisqually and Skagit River System Tribal Cooperative Chinook Recovery Plans

USGS scientists from the Western Fisheries Research Center worked in partnership with the Nisqually Tribe and

the Fish and Wildlife Service to collect juvenile Chinook salmon (*Oncorhynchus tshawytscha*) from various habitats and process their otoliths. (The otoliths are structures within the inner ear, composed of calcium carbonate particles within a gelatinous matrix, that help the brain interpret motion.) In fish, these structures can be used to determine residence and growth in particular habitat types and ultimately identify successful life history strategies. This particular research provides data needed to evaluate the estuary restoration planned by the Service at the Nisqually National Wildlife Refuge and will help to meet monitoring priorities listed by the Nisqually Tribe in the 2001 Nisqually Chinook Recovery Plan.

The USGS Western Fisheries Research Center and the Skagit River System Cooperative also collaborated to investigate whether rearing Chinook salmon in the Skagit River delta increases the survival of juveniles and whether limitations in the amount of that habitat is limiting the Skagit population of Chinook salmon. This research, through examination of the otoliths, has shown that the longer juvenile salmon stay and grow in the delta, the faster they grow when they move on to the bay. The results contribute specific life history data to a habitat-based salmon production model. In turn, the data support priorities listed in the Skagit River System Tribal Cooperative Chinook Recovery Plan.

USGS Research Supports Shivwits Band of the Paiute Indian Tribe

USGS ecologists from the Southwest Biological Science Center in Arizona and USGS geologists from the Earth Surface Dynamics Program initiated collaborative research on the endangered Shivwits milk-vetch (*Astragalus ampullarioides*), a narrowly distributed plant with only five known populations in Washington County, Utah. This research focuses

Setting the beach seine in the Nisqually Reach of Puget Sound.



Meghan Young



USGS photo

The endangered Shivwits milk-vetch with Mt. Kinesava in Zion National Park in the background.

on plant/soil relations and threats from invasive exotic plants. It is being conducted in support of the Shivwits Band of the Paiute Indian Tribe, National Park Service (Zion National Park), Bureau of Land Management, and Fish and Wildlife Service. Previous work suggested that this species was restricted to outcrops of the Petrified Forest Member of the Triassic Chinle Formation, but during the first week of this new study, the interdisciplinary USGS team documented occurrences on the Dinosaur Canyon Member of the Jurassic Moenave Formation. This significant finding expands the potential

habitat for this plant and thus may lead to the discovery of additional populations.

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by Norman Jojola

Southwest Region Natural Resources Youth Practicum

During the week of July 16–20, 2007, the Native American Fish and Wildlife Society's Southwest Region conducted its annual Natural Resources Youth Practicum in southern New Mexico. Twenty-four students from Southwest tribes participated. It was held at the Ladder Ranch, a Turner Enterprises, Inc., property in New Mexico.

The practicum was co-coordinated by Jeanne Lubbering, Adjunct Professor of Natural Resources at the Southwestern Indian Polytechnic Institute in Albuquerque, New Mexico, and Norman Jojola, Natural Resource Manager with the Bureau of Indian Affairs (BIA)/Northern Pueblos Agency. Students from the Zuni, Jemez, Laguna, and San Felipe pueblos; the Navajo Nation; the Pyramid Lake Paiute, Fallon Pai-Sho, and Mescalero Apache tribes; and the Sioux Nation participated in the practicum.

On Monday, Steve Dobrott, the ranch manager, joined the practicum staff in welcoming the students to the camp. At this time, the students introduced themselves and provided a brief summation of what they expected from the oncoming week and why they were at the practicum.

After the formalities, Dobrott provided a presentation about the Ladder Ranch. The next morning, he led a ranch tour and gave a presentation on the Ladder Ranch Bison Management Plan. The afternoon session consisted of an introduction to ecology of the Ladder Ranch by Dobrott and Lubbering, followed by a session on plant identification. For the evening, students learned about the National Environmental Policy Act process from Priscilla Wade, Environmental Specialist with the BIA/Southwest Regional Office (SWRO), and heard a presentation on the Mexican wolf recovery program by Melissa Woolf from the U.S. Fish and Wildlife Service (FWS).

Chris Kitcheyan of the Fish and Wildlife Service conducts a class in fish shocking techniques. The temporarily stunned fish are measured and released.



courtesy of Native American Fish and Wildlife Society

Wednesday began with sessions on Water Quality and Benthic Surveys by Lubbering and Jim Sandoval, FWS; Fish Population Analysis by Chris Kitcheyan and Bernard Lujan, FWS; Stream Analysis by Tim Gatewood and Matt Rustin of the White Mountain Apache Game and Fish Department; and Herpetology by Randall Gray (retired from the Natural Resources Conservation Service).

In the afternoon, the students heard sessions on Big Game Habitat and Population Analysis by Joe Jojola, Endangered Species Biologist, BIA/SWRO, and Norman Jojola, BIA Northern Pueblos Agency; Rangeland Management by Curtis Chee of the U.S. Forest Service (USFS); Soil Identification by Jennifer Hill, USFS; and Forest Inventory Techniques by Paula Shattuck, BIA Southern Pueblos Agency (SPA). The evening session on Bat Monitoring and Identification by Lawrence Abeita, BIA/SPA, rounded out a long, busy day.

Thursday morning began with another presentation on the National Environmental Policy Act by Justin Tade, a FWS solicitor, and concluded with the students receiving assignments for their presentations on the mock Tribal Natural Resource Management Issues session. These mock sessions provided students with the opportunity to address resource management issues from a tribal and scientific community standpoint. The students used the information they learned throughout the week to lay a reasonable foundation in addressing their assignment.

On Friday, the final day of the program, students gave presentations on their mock session assignments to the staff and an attentive student audience. Finally, they cleaned up the camp site, packed their gear, and prepared for the trip back home. Certificates of participation were handed out to each student and the staff congratulated the students for



Jeanne Lubbering (in hat) teaches the students about insect identification.

courtesy of Native American Fish and Wildlife Society

their participation. With a final blessing, thanking the Creator for a safe week and asking for a safe trip home, the students loaded up the vans and the 14th Annual Natural Resources Youth Practicum came to an end.

This article was adapted, with permission, from a story in From the Eagle's Nest, a quarterly publication of the Native American Fish & Wildlife Society (<http://nafws.org/images/editor-Pro/fromtheeaglesnest/2007Winter.pdf>). Norman Jojola is with the BIA Northern Pueblos Agency.

The Fish and Wildlife Service recently published the following proposed and final rules in accordance with the Endangered Species Act:

Polar Bear Listed as a Threatened Species

Secretary of the Interior Dirk Kempthorne announced on May 14, 2008, that he accepted the recommendation of the U.S. Fish and Wildlife Service to list the polar bear (*Ursus maritimus*) as a threatened species under the Endangered Species Act. The listing, as published in the May 15 Federal Register, is based on the best available science, which shows that loss of sea ice threatens, and will likely continue to threaten, polar bear habitat. This loss of habitat puts polar bears at risk of becoming

endangered in the foreseeable future, the standard established by the Act for designating a threatened species.

In 2007, the Service proposed listing the polar bear as threatened throughout its range, based on receding sea ice. At that time, Secretary Kempthorne directed the Service and the U.S. Geological Survey to work with the public and the scientific community to broaden the understanding of what is facing the species and its habitat. In September 2007, the USGS delivered to the Service nine studies related to the future condition of the polar bear and its habitat.

At the announcement, charts depicted satellite images of the differences in sea ice from the fall of 1979 to the fall of 2007. (Studies and models at http://www.doi.gov/issues/polar_bears.html). Last year,

Arctic sea ice fell to the lowest level ever recorded by satellite, 39 percent below the long-term average from 1979 to 2000. The amount of sea ice lost in years 2002-2007 exceeded all previous record lows.

In developing the nine studies it delivered to the Fish and Wildlife Service, the USGS relied upon 10 peer-reviewed climate models, all of which project a continued decline in Arctic sea ice. In particular, the models project declines in September sea ice of more than 30 percent by the middle of the 21st century. Four of the 10 models project declines in September sea ice in excess of 80 percent by the mid-21st century. Seven of the 10 models show a 97 percent loss in September sea ice by the end of the 21st century. Based on actual observations of trends in sea ice over the past three decades, these models may actually understate the extent and change rate of projected sea ice loss.

The Service drew upon biological information on the bear, careful consideration of whether the bear can adapt to new habitat conditions, over 30 years of actual sea ice observations, and dozens of studies and models on sea ice.

To ensure that the listing rule is not used as a means to regulate global climate change, Kempthorne directed the Service to propose a special rule under Section 4(d) of the Act, stating that if an activity is permissible under the stricter standards imposed by the Marine Mammal Protection Act, it is also permissible under the Endangered Species Act with respect to the polar bear. This rule, effective immediately, will address protection of the bear while allowing the development of natural resources in the



Scott Schliebe

Arctic. The Service will issue guidance to staff that the best scientific data available cannot make a causal connection between harm to listed species or their habitats and greenhouse gas emissions from a specific facility, or resource development project or government action. The Department will issue a Solicitor's Opinion further clarifying these points.

Under the special rule, the production, interstate sale, and export of native handicrafts by Alaska natives may continue and the existing subsistence hunting of polar bears is not affected.

The Department will continue to:

- monitor polar bear populations and trends,
- study polar bear feeding ecology,
- work cooperatively with the Alaska Nanuq Commission and the North Slope Borough for co-management of the polar bears in Alaska, and
- provide technical assistance to the participants of the 1988 North Slope Borough Inuvialuit Game Council Agreement for the conservation of polar bears in the Southern Beaufort Sea region and monitor the effects of oil and gas operations in the Beaufort Sea region.

More information on the final listing rule and proposed special rule is available at http://www.doi.gov/issues/polar_bears.html.

Maguire Daisy Proposed for Delisting Due to Recovery

The Service proposed May 16, 2008, to remove the Maguire daisy (*Erigeron maguirei*), a plant found in southeastern Utah, from Endangered Species Act protection due to the species' recovery. This plant occurs from the San Rafael Swell in Emery County south into Wayne and Garfield counties through the Waterpocket Fold in Capitol Reef National Park. Cooperative recovery efforts have increased the known number and distribution of Maguire daisy populations range-wide, stabilized popula-

tions, addressed threats, and provided adequate protection and management to ensure the plant's long-term survival.

A member of the sunflower family (Asteraceae), the Maguire daisy is a perennial herb with a branched woody base. Its stems and spatulate-shaped leaves are densely spreading and hairy. The flowers are dime sized with white or pink petals.

The Maguire daisy was listed as an endangered species in September 1984. In 1994, the Service accepted a taxonomic revision of *E. maguirei* that included the plant variety formerly known as *E. maguirei* var. *harrisonii*. Combining the two varieties into one species increased the total known populations for the Maguire daisy. Based on the new genetic information and the combining of the two varieties, the Service proposed to reclassify the species from endangered to threatened in 1996.

Since the plant was listed, federal land management agencies have worked to ensure long-term protection for the species and its habitat. Approximately 97 percent of the plant's range occurs on federal lands, with substantial protective measures now in place. To help ensure the species' future, an Interagency Rare Plant Team involving the Forest Service, Bureau of Land Management, National Park Service, and Fish and Wildlife Service have developed a conservation strategy (see <http://mountain-prairie.fws.gov/species/plants/maguiredaisy>).

When it was listed in 1984 and down-listed in 1996, mineral exploration and development and off-road vehicle recreation were cited as threats to the Maguire Daisy. Continuing recovery efforts since then have increased our understanding of the plant, its habitat, distribution, and abundance. The species occurs predominantly within the Navajo Sandstone formation, which has low potential for oil and gas development and uranium mining. Most mineral resources occur on the periphery of mapped populations and

are not likely to significantly affect any of the populations. Land management actions throughout most of the species' range also have reduced the effects of recreational use. While potential impacts to individual plants could occur when accessing mineral resources or during recreational use, these activities are considered unlikely to pose significant threats to the species in the foreseeable future.

If the Maguire daisy is delisted, the Service and its federal partners will continue to monitor the status of the plant through at least 2017. The Service can reinstate listing the plant if it again becomes imperiled.

Native plants are important for their ecological, economic, and aesthetic values. Plants play an important role in development of crops that resist disease, insects, and drought. At least 25 percent of prescription drugs contain ingredients derived from plant compounds, including medicine to treat cancer, heart disease, juvenile leukemia and malaria, as well as those used to assist in organ transplants. Plants are also used to develop natural pesticides.

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









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BOX SCORE

Listings and Recovery Plans as of August 13, 2008

GROUP	ENDANGERED		THREATENED		TOTAL LISTINGS	U.S. SPECIES W/ PLANS
	U.S.	FOREIGN	U.S.	FOREIGN		
 MAMMALS	69	256	13	20	358	56
 BIRDS	75	179	15	6	275	85
 REPTILES	13	66	24	16	119	38
 AMPHIBIANS	13	8	10	1	32	17
 FISHES	74	11	65	1	151	101
 SNAILS	64	1	11	0	76	69
 CLAMS	62	2	8	0	72	70
 CRUSTACEANS	19	0	3	0	22	18
 INSECTS	47	4	10	0	61	38
 ARACHNIDS	12	0	0	0	12	12
 CORALS	0	0	2	0	2	0
ANIMAL SUBTOTAL	448	527	161	44	1,180	504
 FLOWERING PLANTS	570	1	143	0	714	629
 CONIFERS	2	0	1	2	5	3
 FERNS AND OTHERS	26	0	2	0	28	28
PLANT SUBTOTAL	598	1	146	2	747	660

TOTAL U.S. ENDANGERED: 1,046 (448 animals, 598 plants)
TOTAL U.S. THREATENED: 307 (161 animals, 146 plants)
TOTAL U.S. LISTED: 1,353 (609 animals**, 744 plants)

* Separate populations of a species listed both as Endangered and Threatened are tallied once, for the endangered population only. 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.

** Sixteen U.S. animal species and 17 foreign species have dual status.

ENDANGERED Species BULLETIN

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