November 2006

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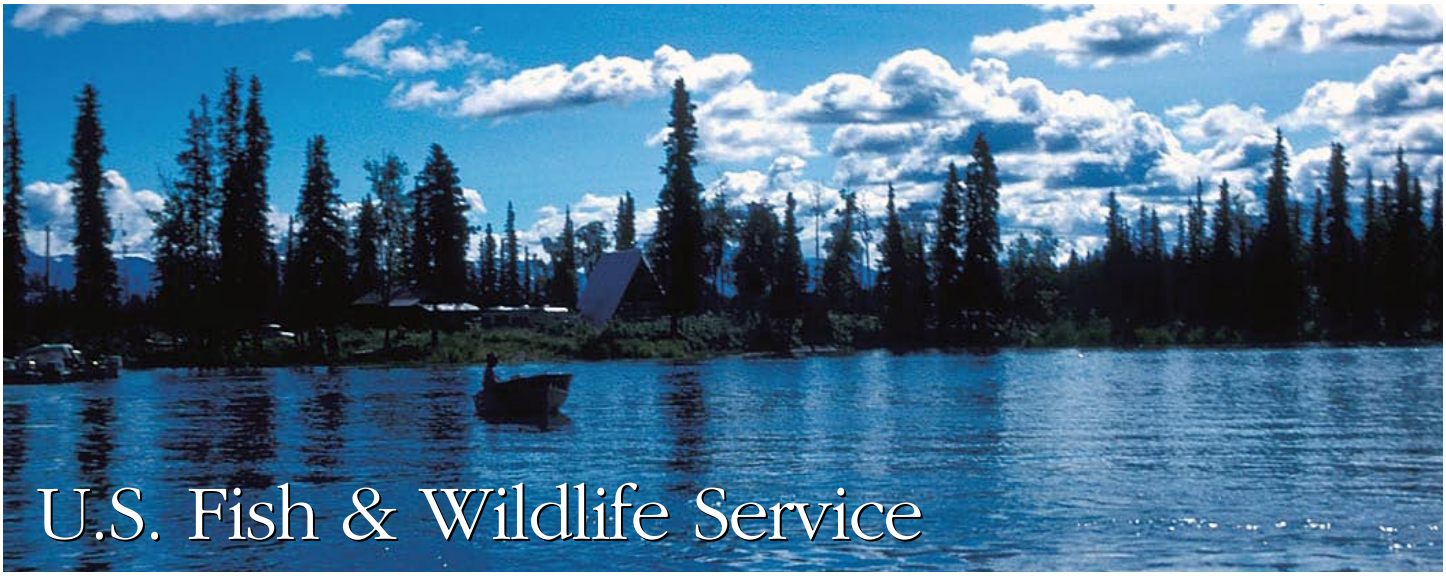
U.S. Fish & Wildlife Service

ENDANGERED Species BULLETIN

November 2006 Vol. XXXI No. 3

To a large extent, the need to list plants and animals as endangered or threatened species represents a failure of natural resource management at the federal, state, and local levels. After all, the most effective way to ensure the health of wildlife and its habitats is to conserve species before they reach the brink of extinction. Doing so requires careful planning, the resources to carry out the plans, a commitment to achieving conservation goals, and monitoring the results to see if any additional management changes are necessary. A milestone in conservation took place last year with the approval of State Wildlife Action Plans for all 56 states and territories. These plans will go a long way towards promoting cooperative efforts for vulnerable wildlife and habitats.



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On the Cover
The yellow-throated vireo has been identified in some State Wildlife Action Plans as a species of concern due to population declines in many areas. It requires large blocks of forested habitat. This bird was photographed at the Minnesota Valley National Wildlife Refuge.

Photo by Leopoldo Miranda-Castro

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 will be published each year. To be notified when a new on-line edition has been posted, you can 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, habitat conservation plans, and cooperative ventures. Please contact the Editor before preparing a manuscript. We cannot guarantee publication.

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

IN THIS ISSUE

Departments

States Working Together for Wildlife

by Dave Chadwick

USFWS

Northern goshawk

Species such as the Northern goshawk, black-tailed prairie dog, striped bass, *Hesperomannia arbuscula*, timber rattlesnake, and a crayfish *(Barbicambarus cornutus)* are among those considered species at-risk in State Wildlife Action Plans.

American wildlife conservation has reached a historic milestone: the completion of statewide wildlife action plans in every state and territory. Continuing the long tradition of state-federal partnerships, the wildlife action plans complement existing programs aimed at the conservation of game species on the one hand and endangered species on the other. Taken as a whole, the wildlife action plans provide a national agenda for preventing wildlife from becoming endangered, with a focus on those that have not benefited from conservation attention due to a lack of dedicated funding.

Teaming with Wildlife

The impetus for wildlife action plans comes from the Teaming with Wildlife initiative, a national grassroots campaign launched in the early 1990s to expand the funding base for wildlife conservation. The goal of Teaming with Wildlife was to provide additional resources to support a more comprehensive approach to wildlife conservation and mirror the success our nation has had with the Pittman-Robertson Wildlife Restoration Act and Dingell-Johnson/Wallop-Breaux Sportfish Restoration Act. Over time, the Teaming with Wildlife coalition has grown to include more than 4,000 organizations and agencies, including hunters and anglers, environmentalists,

Curtis Carley/USFWS

Black-tailed prairie dogs

professional biologists, wildlife managers, and nature-related businesses.

During the late 1990s, the efforts of the Teaming with Wildlife coalition helped advance the Conservation and Reinvestment Act, a broad proposal to dramatically increase federal funding for a variety of land, water, and wildlife conservation programs. Despite strong bipartisan support, the Conservation and Reinvestment Act did not pass. However, Congress did enact two new programs in 2000 to support state-level efforts to prevent wildlife from becoming endangered: the Wildlife Conservation and Restoration Program and State Wildlife Grants.

The Wildlife Conservation and Restoration Program and State Wildlife Grants provide funding to state wildlife agencies for wildlife conservation planning and projects. Both programs are administered by the U.S. Fish and Wildlife Service's Division of Federal Assistance. Funds are distributed according to a formula based on each state's population and land area, and they require matching funds from state or other non-federal sources. The Wildlife Conservation and Restoration Program was created as a subaccount of the Pittman-Robertson Wildlife Restoration Act and requires a 25 percent non-federal match for all activities. State Wildlife Grants operates as a stand alone program, requiring a 50 percent non-federal match for implementation projects and a 25 percent match for development of the action plans.

Although the Wildlife Conservation and Restoration Program was authorized as a permanent program under Pittman-Robertson, funding was only provided for the first year. However, federal funding has continued to flow to State Wildlife Grants through the annual appropriations process. Over the past five years, the two programs have provided a total of more than $400 million in new money for wildlife conservation. In a relatively short time, these programs have become the federal government's core programs for keeping wildlife from becoming endangered. This dramatic growth in a very tough budget climate has been the result of the strong bipartisan support built by the Teaming with Wildlife coalition.

Timothy Knepp

Striped bass

As a condition of both the Wildlife Conservation and Restoration Program and State Wildlife Grants, each state wildlife agency committed to developing a wildlife action plan, known technically as a "comprehensive wildlife conservation strategy." These statewide action plans draw together all available information on the condition of each state's wildlife species and habitats, outline the conservation issues that need to be addressed, and make recommendations to address those issues. Each of the plans was submitted to the Service for review and approval in 2005.

In the legislation defining the wildlife action plans, Congress outlined eight core planning requirements (sidebar on next page). Beyond those requirements, the states have considerable flexibility to develop approaches that fit their own unique wildlife resources, management structure, and local issues. Wildlife agencies worked together to share information and priorities across jurisdictions. The states also gathered ideas from federal agencies and conservation groups, drawing on many different models and experiences to develop innovative planning approaches.

Required Elements for Wildlife Action Plans

Congress outlined eight core requirements that are contained in every wildlife action plan:

1) **information on the distribution and abundance of wildlife, including low and declining populations that are indicative of the diversity and health of the state's wildlife;**
2) **descriptions of locations and relative condition of habitats essential to species in need of conservation;**
3) **descriptions of problems that may adversely affect species or their habitats, and priority research and survey efforts;**
4) **descriptions of conservation actions proposed to conserve the identified species and habitats;**
5) **plans for monitoring species and habitat, and plans for monitoring the effectiveness of the conservation actions and for adaptive management;**
6) **descriptions of procedures to review the plan at intervals not to exceed 10 years;**
7) **coordination with federal, state, and local agencies and Indian tribes in developing and implementing the wildlife action plan; and**
8) **broad public participation in developing and implementing the wildlife action plan.**

John Obata

Hesperomannia arbuscula

Species in Greatest Need

Congress asked states to assess the health of a "full array" of wildlife, with particular attention to the wildlife species that have low or declining populations and are "indicative of the diversity and health of wildlife" of each state. Most of the wildlife action plans refer to these targeted species as "species of greatest conservation need." In identifying these species, the intent was not to define a new official status on top of existing threatened, endangered, or other designations. Instead, the goal was to identify the wildlife species that need attention in order to avoid the need for formal regulatory protection.

States used various sources to identify the species that needed to be targeted in each wildlife action plan, including natural heritage programs and other wildlife occurrence databases, data from other planning efforts and assessments, and input from agency biologists, academics, and other scientific experts. While the identification of species of greatest conservation need included species that had been designated under state-level programs and the federal Endangered Species Act, the wildlife action plans placed more emphasis on identifying at-risk species not yet identified by other conservation efforts.

Getting the Biggest Bang for the Buck

Many of our great wildlife restoration stories tell of the return of one species at a time, from the wild turkey to the American alligator. However, a species-by-species approach is not practical when dealing with the breadth of each state's wildlife. In even the smallest states, the native fauna can encompass several thousand species, while in Texas, California, and Florida, the number of species can reach into the tens of thousands. On top of the sheer complexity of addressing this many species individually, conservation planning efforts are challenged by serious information gaps about the habitat needs and life history of many species.

To efficiently address the needs of each state's full array of wildlife, the action plans are broadly built around a "coarse-filter/fine-filter" approach. Broad, habitat-focused conservation

actions (the coarse filter) are combined with specific interventions for individual species whose needs are not completely addressed by habitat-focused actions (the fine filter).

In outlining habitat conservation needs, the states took a variety of approaches. Some states assessed species richness, habitat quality, and threat magnitude to identify specific geographic areas that encompass a range of conservation targets. Others focused on identifying and prioritizing those habitat types or communities that are most important to species in need of conservation. Still other states took a more comprehensive ecosystem approach to outlining the steps needed in all of the state's wildlife habitats.

Suzanne L. Collins/Center for North American Herpetology

Timber rattlesnake

A New National Agenda

The strong commitment of the state wildlife agencies and the Service resulted in the completion of all 56 state and territorial wildlife action plans in 2005. At an event recognizing the completion of the plans, former Interior Secretary Gale Norton hailed the historic place of the action plans in the conservation of North America's wildlife. "These plans represent a future for conservation in America that is rooted in cooperation and a partnership between the federal government and states, tribes, local governments, conservation groups, private landowners and others with a commitment to the health of our land and water, fish and wildlife," she said. "Working together, we are tapping into the expertise of those who live and work on the land so that we can conserve our fish and wildlife before they become threatened or endangered."

Working Together to Take Action

The wildlife action plans are already being implemented both by state wildlife agencies and their partners, including federal, state, and local governments, conservation groups, private landowners, and a variety of other individuals and organizations with an interest in wildlife. The agencies committed to developing the wildlife action plans to serve as plans for *wildlife,* not plans for wildlife *agencies.* States are working cooperatively to develop shared priorities and to adjust the plans to local and regional scales. Implementation actions address problems or threats to habitats and species by creating partnerships, restoring habitats, monitoring species, and filling in data gaps.

Additional information, including copies of each state's action plan, links to useful resources, and contact information, is available on a special clearinghouse website hosted by the Association of Fish and Wildlife Agencies at www.wildlifeactionplans.org.

Barbicambarus cornutus

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Saving Saipan's White-eye

by Gayle Martin and
Shelly Kremer

Curt Kessler

Sarigan Island, near the center of the Mariana archipelago (see opposite page).

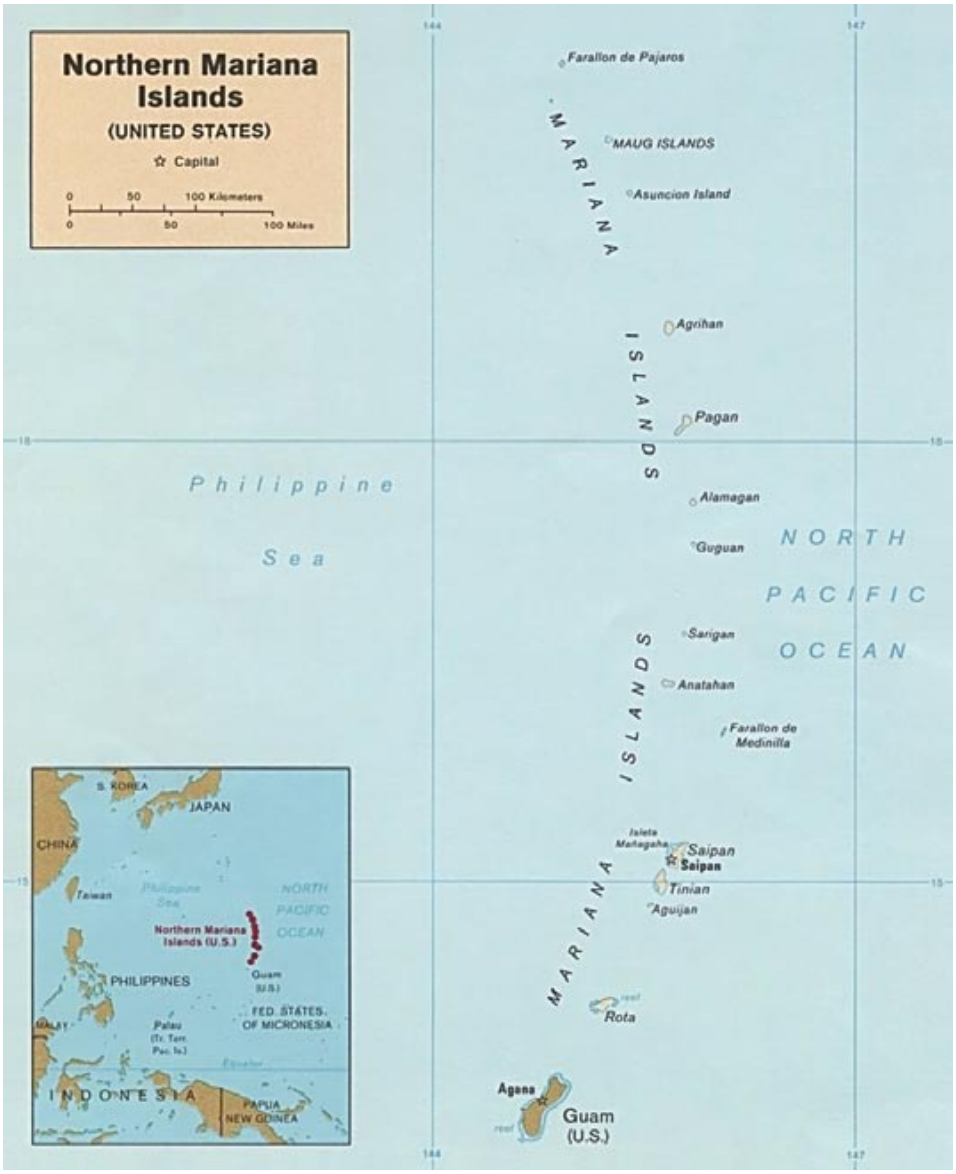
The little known Commonwealth of the Northern Mariana Islands (CNMI) is an archipelago of 14 tiny islands in the mid-Pacific region of Micronesia. Nestled just north of Guam and south of Japan, the entire Mariana archipelago spans 420 miles (675 kilometers). This story is about Sarigan, a volcanic island in the CNMI only 1.9 square miles (5 square kilometers) in size.

You could hike across Sarigan in a day if you didn't mind scrambling over boulders, hacking your way through dense vegetation with a machete, hunching down through thick hibiscus vines, trying to keep your balance walking over moss-covered coconuts, climbing precariously steep slopes, and getting really sweaty. Although Sarigan's northern and western slopes are blanketed with tall coconut trees, its plateau and ravines support pockets of native forest. Only grasses and ferns cover its precipitously steep eastern and southern slopes.

The Chamorros, Carolinians, Germans, and Japanese who inhabited Sarigan in

Saipan bridled white-eye

Shelley Kremer



the early 20th century planted coconuts by the thousands and brought goats and pigs to the island for food. Once humans abandoned the island, the pigs and goats they left behind became numerous and began eating all vegetation within reach. With no natural defenses against these non-native ungulates, Sarigan's native forests began to disappear. But through the cooperative efforts of the U.S. Navy, the U.S. Fish and Wildlife Service, and the CNMI Division of Fish and Wildlife (DFW), feral goats and pigs were eradicated from the island by 1998. Vegetation surveys before and after eradication demonstrated that the forest began to recover more quickly than anyone had ever imagined.

The CNMI's Comprehensive Wildlife Conservation Strategy (CWCS) identified 24 species as species of special conservation need. Of these, 18 are endemic, occurring nowhere else in the world. Endemic wildlife species are not evenly distributed throughout all the islands in the archipelago. For example, nine of the 11 endemic forest bird species occur on only four or fewer islands. Being small places removed from other land masses, islands tend to support comparatively few numbers of species and small population sizes, making wildlife species susceptible to extinction, and the Mariana Islands are no exception. The non-native brown treesnake (*Boiga irregularis*) devastated Guam's endemic forest

Shelley Kremer

Robby Kohley takes a blood sample from a Sarigan Island bird, the Micronesian honeyeater.

bird species, and it is slithering its way northward aboard cargo ships and planes to the other populated islands of the archipelago—Rota, Tinian, and Saipan.

The accidental introduction of the brown treesnake was identified as one of the biggest threats to wildlife in the CWCS. This nocturnal predator has the potential to drive all of the Marianas' terrestrial wildlife species to extinction, including all 14 species of endemic forest birds, one endemic freshwater bird (Mariana common moorhen), two endemic mammals (Mariana fruit bat and sheath-tailed bat), two native geckos (Micronesian gecko and rock gecko), and one endemic skink (tide-pool skink). Conservation actions identified in the CWCS to combat this threat include interdiction of the snake on the populated southern islands through installment of snake barriers and traps at ports, teams of detector dogs, a rapid response program, public education, establishment of a captive breeding program for native bird species, and translocation of native birds to uninhabited northern islands in the archipelago.

This brings us to the Saipan bridled white-eye (*Zosterops conspicillatus saypani*), the first candidate chosen by the DFW for translocation. The diminutive insectivore is the most abundant endemic bird in the southern islands of the CNMI. Although not yet endangered, its distribution is limited to only three islands. White-eyes were the first avian species to become extinct on Guam as a result of brown treesnake infestation. Successful translocation of the white-eye will promote translocation plans for other species in the future.

Sarigan was the first island chosen to receive translocated birds because its feral animals have been eradicated, its native forests are recovering, and transportation costs and time to Sarigan are less than for the more remote northern islands. In April 2006, the DFW and its partners embarked on an expedition to Sarigan with a field crew of 22 to assess the recovery of Sarigan's ecosystem and to determine if its habitat was suitable for the white-eye.

The Sarigan expedition was a huge undertaking. Biologists surveyed the island's birds, vegetation, reptiles, small mammals, and invertebrates. They also sampled for avian disease, examined the stomach contents of monitor lizards, and conducted a census of fruit bats. All of this work was done over a two-week period. Although the quantitative data have not yet been analyzed, we have already learned much from our qualitative observations. We confirmed that the native forest is returning with gusto on Sarigan's plateau and in ravines following the removal of goats and pigs. Other changes are not as encouraging; monospecific coconut plantations are being perpetuated by young coconuts and the invasive wood rose vine (*Operculina ventricosum*) has blanketed the native forest, although tree seedlings are beginning to emerge through the vine mat. The steep grassy slopes of Sarigan are still devoid of birds, but abundance of birds in newly vegetated areas appears to be increasing. Native tree snails were present in higher densities than ever seen before. The size of the resident Mariana fruit bat (*Pteropus mariannus*) colony

Shelley Kremer

Gayle Martin

Above left: Native tree species have thrived since the removal of feral animals eight years ago.

Above: The humped tree snail, a species endemic to the Mariana Islands, is a candidate for listing under the Endangered Species Act.

was reassuringly stable, and a new survey protocol for coconut crabs (*Birgus latro*) was tested in the field.

The most encouraging news is that Sarigan is a potential refuge for Saipan bridled white-eyes. To test for presence of avian disease on Sarigan, biologists captured Micronesian honeyeaters (*Myzomela rubrata*) and collared kingfishers (*Halcyon chloris*) by mist-net and took blood samples, with a subsample of birds subjected to necropsies. (We are anxiously awaiting analysis of these data.) The invertebrate abundance survey indicated that there is enough prey on Sarigan to support a population of approximately 6,000 Saipan bridled white-eyes. In May 2006, we began to develop trapping and holding procedures with a group of zoological experts by capturing 40 white-eyes for captive breeding. We are looking forward to translocating white-eyes to Sarigan in 2007 with our partners from the American Zoo and Aquarium Association.

Funds from the DFW's State Wildlife Grant paid for two round-trip vessel charters and supplies. This expedition would not have been possible, however, without the generous support of personnel, expertise, supplies, helicopter time, and additional vessel charters from our partners: the Fish and Wildlife Service, Navy, Workforce Investment Agency, University of Guam, volunteers, residents of Alamagan Island, Institute of Wildlife Studies, Brown Treesnake Program, and University of California at Davis.

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Planning for Wildlife in the Lone Star State

by Steven Bender

In September of 2005, the Texas Parks and Wildlife Department (TPWD), along with myriad conservation partners, completed its first comprehensive strategy for the recovery of nongame species and their associated habitats. The strategy focuses on the 10 ecoregions, 15 major river basins, and approximately 1,000 of the more than 30,000 nongame species known in Texas. The final result of this hard work is now known as the Texas Wildlife Action Plan.

The Action Plan allows Texas to participate in the State Wildlife Grant (SWG) program, which provides federal funding for conserving nongame species in danger of becoming threatened or endangered so they will not need Endangered Species Act protection. While threatened and endangered species were considered in the development of the Texas Action Plan, a lot of work went into determining which additional species needed to be addressed. Texas refers to these animals as "species of concern." Special emphasis will be put on these species to stabilize them and, we hope, restore them to healthy levels.

With the strategy complete, Texas has moved into the implementation phase. This means working with species such as the Louisiana black bear (*Ursus americanus luteolus*), which is listed as threatened, and other species such as the lesser prairie-chicken (*Tympanuchus pallidicinctus*), box turtles (*Terrapene* spp.), and Townsend's big-eared bat (*Corynorhinus townsendii*) that need assistance. Not only does it mean working with individual species, it means working with habitats and monitoring key areas such as our bays and estuaries in order to better understand pressure placed on the species.

In order to accomplish the goals of the Action Plan, the Texas Parks and Wildlife Department is working with our partners to identify areas across the state where conservation can be focused for the greatest return on the money spent. Although this is difficult, we have a great deal of information on species dispersal and habitat needs. We can take that information and use the latest mapping technology to target our efforts. Another part of this process is employing that same technology to better understand the habitats in which we are already working. This includes new vegetation data mapping that allows biologists to create better habitat or recover lost habitat.

In addition to updating our resources and focusing our conservation efforts, it is critical to work with private landown-

Lesser prairie-chicken

Tom Harvey

ers. This means gaining permission for access to private lands to develop our vegetation information as well as collect species data. One way to motivate private cooperation is the Landowner Incentive Program (LIP). This program began in Texas 10 years ago as a state effort to create incentives for private landowners to conserve endangered animal and plant species and their habitats. It became a nationwide federally funded program under the current administration, with the U.S. Fish and Wildlife Service overseeing the implementation. In Texas, the TPWD intends to run this program parallel to the State Wildlife Grants program to assist with implementation of the Action Plan. Since the Texas program's inception, the state has developed contracts with more than 120 landowners for approximately 190,000 acres (77,000 hectares) under management. The TPWD considers these landowners to be partners in the overall conservation of native Texas species, and it will continue to seek their involvement and support.

Over the next 5 to 10 years, the TPWD also will continue to work with conservation organizations throughout Texas to implement the Action Plan. Projects will focus on learning more about Texas flora and fauna, digitizing that new knowledge, and using the information to create more specific goals and revise the Action Plan. Concurrently, on-the-ground projects will create better habitat through the use of LIP monies and other funding sources. This dual approach should allow Texas biologists to accomplish a great deal of conservation in a relatively short period of time.

Texas is a wonderful state with a great deal of natural beauty and diversity. All Texans should feel responsible for maintaining that beauty. It is important that we all work together to support the habitat and the species that make it wonderful to be a Texan. With the help of these programs and some motivated individuals, we can do just that. Texas conservation organizations are well aware of the need to become partners and be strategic with limited resources. We will use that knowledge to make good use of those resourses and move conservation forward in Texas.

USFWS

Louisiana black bears

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Building on a Conservation Legacy

by Rich Bechtel and Aislinn Maestas

Fracé/NWF Poster Stamp

This eastern painted turtle is one of a collection of paintings commissioned by the National Wildlife Federation for its wildlife poster stamp program, which began in 1938 to support wildlife conservation.

It can take years, sometimes decades of perspective to gain appreciation for some of history's greatest moments. So it was with passage of the 1938 Pittman-Robertson Aid in Wildlife Restoration Act. While the name may not suggest greatness to people unfamiliar with its purpose, the Act has funded many of America's most successful wildlife conservation efforts through a unique federal-state partnership. To date, it has directed over $4.8 billion in excise taxes sportsmen pay on their hunting equipment to state wildlife agencies for the restoration of wildlife and its habitat.

Even more remarkable than the success of the Act is the story of its creation. It started in 1936 when President Franklin Roosevelt convened sportsmen, gardeners, Jaycees, and other civic leaders to assess the plight of the nation's wildlife and to recommend how to restore its health. Within two years, they formed local and statewide wildlife federations across the country and persuaded Congress to take action.

This story serves as the inspiration for the National Wildlife Federation's State Wildlife Action Plan Initiative. With the help of the Doris Duke Charitable Foundation, the NWF and five of its affiliates launched the Initiative in 2006 to help states implement their State Wildlife Action Plans. These plans, which were completed by all 56 states and territories last year, present a state-based nationwide biological survey and provide the most up-to-date scientific assessment of the status of wildlife and habitat as well as current threats. They also outline the conservation actions needed to keep wildlife and habitats healthy. The NWF believes these Action Plans can stimulate another renaissance in wildlife conservation.

Ivory-billed woodpecker

Ripper/NWF Poster Stamp

While the Pittman-Robertson Act continues to conserve wildlife, new problems require new solutions. Unlike the previous threats of drought, depression, market-hunting, and the feather trade, wildlife today must cope with habitat fragmentation, declines in water quality, invasive species, and global warming. Because these threats occur on a much broader scale, they are outstripping the financial resources and responsibility of sportsmen and women.

The NWF's State Wildlife Action Plan Initiative is focused on educating the public and decision-makers about the opportunities to conserve America's wildlife heritage for future generations. The NWF and its affiliates are dedicated to translating the Action Plans into on-the-ground conservation activities and to securing long-term, dedicated funding at the state and federal levels. Here are a

few examples of how NWF affiliates are engaged in the State Wildlife Action Plan Initiative:

The Montana Wildlife Federation is working with the Montana Department of Fish, Wildlife and Parks (MFWP) and other members of the Teaming With Wildlife steering committee to increase awareness of, and garner support for, Montana's Wildlife Action Plan. To do so, they are giving presentations to organizations and businesses, organizing congressional field trips to visit Action Plan projects, and briefing local, state and federal decision makers. They are also working to organize tours of habitat and state wildlife grants projects for reporters to generate media coverage. Through a public process, the MFWP has identified opportunities to partner with others most effectively and leverage the most resources. The partnership is now working on a prototype outreach strategy that will engage citizens in "community conversations."

The North Carolina (NC) Wildlife Federation is reinvigorating the state's Teaming with Wildlife Coalition to implement and promote the state's Wildlife Action Plan. They have developed a leadership team that includes a co-chair from the NC Wildlife Federation and the NC Wildlife Resources Commission. With 127 members, the NC Teaming With Wildlife Coalition is working on education and communication tools, and is identifying opportunities for members to participate. The NC Wildlife Federation has also been coordinating with several land trusts across the state to deliver the NC Wildlife Action Plan as a tool for habitat acquisition opportunities.

The Environmental League of Massachusetts and Gun Owners Action League have joined forces with MassWildlife to develop a common goal and implement that state's Wildlife Action Plan. They have also created a strategy for broadening support for increased funding and implementation.

The Georgia Wildlife Federation and Georgia Wildlife Resources Division believe the State Wildlife Action Plans are the greatest opportunity since passage of the Pittman-Robertson Act for bringing everyone together for comprehensive conservation. They plan to use Georgia's Action Plan to communicate the justification for providing landowners the incentives and information they need to conserve wildlife on private lands. This is especially important in states like Georgia where 92 percent of the lands are in private ownership. Grown to over 230 organizations, the Georgia Teaming With Wildlife Coalition involves its leaders in "hands-in-the-dirt" wildlife conservation projects and teaches volunteers that even simple actions like building a fence are building blocks in sophisticated wildlife conservation.

The Wisconsin Wildlife Federation (WWF) and the Wisconsin Department of Natural Resources have formed a unique partnership in which they share an employee who works half-time as the State Birding Trail Coordinator and half-time as the Teaming With Wildlife Coordinator. The WWF's first task was broadening the coalition to include not only WWF affiliates and other rod and gun clubs, but such organizations as The Nature Conservancy, the Council of Churches, labor unions, bed and breakfast owners, garden clubs, local land trusts, bird watching centers, convention and visitor bureaus, and the Department of Tourism. With over 200 members on board and a final goal of between 300 and 500 groups, the coalition has now turned to implementing the Wisconsin Action Plan by becoming actively involved in setting priorities, educating, showcasing, and undertaking grant projects, as well as providing support for the agency and its wildlife program.

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Bierly/NWF Poster Stamp

Florida panther

by Peg Boulay

Tree Farmers Help Grow the Oregon Conservation Strategy

Ken and Karin Faulk have a vision for their land, one that allows them to meet a variety of management objectives while making a real difference for wildlife. It is a vision shared by the Oregon Conservation Strategy.

The Faulks are successfully weaving conservation into their land management to meet both conservation and economic goals. As Ken explains, "In some areas, our primary objective is Douglas-fir production. But in areas with unique habitat values, our objective is to provide quality habitat for a wider range of wildlife species. Without losing very much value in timber production, we can add a lot of value in wildlife habitat by picking areas that are special and where a little bit of work can make a big difference."

These habitats are identified as a priority target in the Oregon Conservation Strategy. The Faulks have completed restoration on 5 acres (2 hectares) of oak woodlands and are hard at work on a 3-acre (1.2-ha) upland prairie enhancement. They are taking conservation actions such as removing competing conifers, controlling an invasive nonnative grass, and seeding native grasses and wildflowers. Their work will benefit declining species like the western gray squirrel, slender-billed nuthatch, Lewis' woodpecker, western bluebird, wayside aster, and many others.

The Faulks were selected as Benton County's 2006 Tree Farmer of the Year for the sustainable management of their timber operation and for the work they have done restoring habitats. Tree Farmers of the Year are chosen in all counties through the American Tree Farm system, a long-standing voluntary conservation tradition. The Faulks recently shared with other landowners their knowledge about forest management and restoration through a field tour organized by Benton County Oregon State University Extension.

The Faulk's restoration work is also exciting because their property is part of the larger Cardwell Hill Regional Conservation Planning project area. The Cardwell Hill project is a cooperative, voluntary, landscape-scale planning and restoration effort. It involves over 30 landowners and 2,000 acres (810 ha). Much of the area is contiguous, allowing participating landowners to work for

Next page: Tree farmer Ken Faulk admires a large oak on his land.
Photo by Robert E. Petit

The Fender's blue butterfly (shown here on a blue camas plant) is one species benefitting from the Oregon Conservation Strategy.

Bruce Newhouse

Bruce Newhouse

Western gray squirrel on the Faulk property.

conservation across property lines. The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program, Mary's River Watershed Council, Institute for Applied Ecology, Oregon Watershed Enhancement Board, and many other partners have provided technical and financial assistance to landowners in the project area.

"The idea of neighbors working with neighbors across property lines is great," says Ken. "One person might have a pond where western pond turtles live, and his neighbor might have some nesting habitat. By working together, you can make a difference for the turtle. This kind of work is going to catch on, and it can do what state conservation strategies hope to do. It can happen even with small properties if landowners compare notes and get a little help from biologists."

The Faulk's property is also located in one of the Oregon Conservation Strategy's "Conservation Opportunity Areas," which are prioritized landscapes where broad fish and wildlife conservation goals can best be achieved. Conservation Opportunity Areas can help focus investments on priority landscapes, increase the likelihood of long-term success over larger areas, improve funding efficiency, and promote cooperation across land ownership boundaries. The Strategy profiles each area, describing the special features, key habitats and species, and some recommended actions. The Faulk's restoration efforts are implementing many of the actions identified for their area.

Ken and Karin's vision can be felt in the Oregon Conservation Strategy, since Ken served on the stakeholder advisory committee that helped develop Oregon's conservation approach. The committee was a diverse coalition including scientists, conservation groups, landowners, extension services, anglers, hunters, and representatives from agriculture, forestry, and rangelands.

As Ken sums it up, "This tree farmer is proud to have worked with other landowners and conservationists on Oregon's Strategy. Until the past 10 years, there was very little guidance or assistance for tree farmers working towards conservation goals. But now with the Tree Farm System, the Service's USFWS Partners for Fish and Wildlife, and ODFW's Conservation Strategy providing guidance and financial help, a lot of projects will be accomplished. As more projects happen, the word will get out, and more people will come to the table. Hopefully, it will snowball."

Peg Boulay (Peg.C.Boulay@state.or.us) is the Sensitive Species Coordinator for the Oregon Department of Fish and Wildlife.

A Closer Look at the Oregon Conservation Strategy

By Audrey Hatch, Peg Boulay, Moran Rosenthal, and Avi Hihinashvili

The Strategy charts a course for the long-term conservation of Oregon's wildlife and identifies how all Oregonians can become involved through a non-regulatory, statewide approach. It takes the initiative to conserve species and keep them from becoming endangered or threatened. A diverse group of agencies, organizations, and individuals are already implementing the Strategy. The issues facing Oregon's wildlife and habitats are complex and will require innovative, coordinated, and cooperative work to address. Here are some examples:

New Monitoring Team Gets to Work

Dedicated to the goal of implementing the Oregon Conservation Strategy, Oregon Department of Fish and Wildlife (ODFW) staff has put together a statewide Fish and Wildlife Monitoring Team whose mission is to provide oversight to monitoring activities related to the Strategy. About 40 people from around the state representing conservation groups, education, tribes, and state and federal agencies bring impressive expertise to the table.

According to Audrey Hatch, ODFW Conservation Strategy Monitoring Coordinator, "This team is made up of innovative individuals who want to take advantage of advancements in information technology to share knowledge and information so monitoring activities can become more focused." This past summer, the team worked with ODFW stream survey crews to collect amphibian occurrence information, spending only a few additional minutes per site but collecting dozens of valuable observations.

Guidebook for Forest Landowners

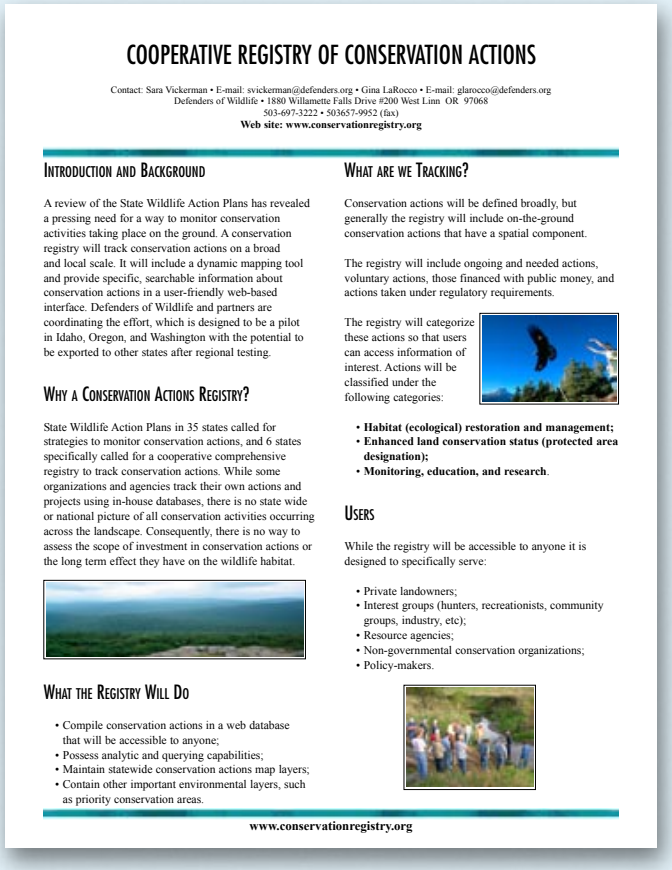
Many of the imperiled species identified in the Oregon Conservation Strategy are found in privately owned forests. While landowners are interested in providing habitat for Oregon's plants and animals, they want to make sure they have up-to-date, comprehensive information. To meet this need, the Oregon Forest Resource Institute partnered with Oregon Department of Forestry, ODFW, Oregon State University's Institute for Natural Resources, and others to produce a beautiful guidebook, *Identifying Priority Plants and Animals and Their Habitats.*

This free 100-page guidebook includes color photos, ecoregion and range maps, habitat descriptions, and other information on 80 priority plant and animal species, including Strategy species and others identified under various state and federal wildlife protection measures. It is also ideal for secondary school teachers for field and classroom use.

Conservation Registry: Connecting People and Projects

The Strategy identifies the need to monitor conservation activities. A conservation registry will allow the tracking of conservation actions on both broad and local scales. It will include a dynamic mapping tool and provide specific, searchable information about conservation actions in a user-friendly web-based interface. Defenders of Wildlife and other partners are coordinating the registry as a pilot project in Idaho, Oregon, and Washington.

The registry will maximize efficiency in conservation efforts by enabling states and other stakeholders to understand what and where conservation actions are happening, identifying areas where actions can generate strategic benefits, determining how well current conservation investments match priorities, facilitating partnerships and information sharing, and recognizing people for their conservation work.



COOPERATIVE REGISTRY OF CONSERVATION ACTIONS

Contact: Sara Vickerman • E-mail: svickerman@defenders.org • Gina LaRocco • E-mail: glarocco@defenders.org
Defenders of Wildlife • 1880 Willamette Falls Drive #200 West Linn OR 97068
503-697-3222 • 503657-9952 (fax)
Web site: www.conservationregistry.org

INTRODUCTION AND BACKGROUND

A review of the State Wildlife Action Plans has revealed a pressing need for a way to monitor conservation activities taking place on the ground. A conservation registry will track conservation actions on a broad and local scale. It will include a dynamic mapping tool and provide specific, searchable information about conservation actions in a user-friendly web-based interface. Defenders of Wildlife and partners are coordinating the effort, which is designed to be a pilot in Idaho, Oregon, and Washington with the potential to be exported to other states after regional testing.

WHY A CONSERVATION ACTIONS REGISTRY?

State Wildlife Action Plans in 35 states called for strategies to monitor conservation actions, and 6 states specifically called for a cooperative comprehensive registry to track conservation actions. While some organizations and agencies track their own actions and projects using in-house databases, there is no state wide or national picture of all conservation activities occurring across the landscape. Consequently, there is no way to assess the scope of investment in conservation actions or the long term effect they have on the wildlife habitat.

WHAT THE REGISTRY WILL DO

- Compile conservation actions in a web database that will be accessible to anyone;
- Possess analytic and querying capabilities;
- Maintain statewide conservation actions map layers;
- Contain other important environmental layers, such as priority conservation areas.

WHAT ARE WE TRACKING?

Conservation actions will be defined broadly, but generally the registry will include on-the-ground conservation actions that have a spatial component.

The registry will include ongoing and needed actions, voluntary actions, those financed with public money, and actions taken under regulatory requirements.

The registry will categorize these actions so that users can access information of interest. Actions will be classified under the following categories:

- **Habitat (ecological) restoration and management;**
- **Enhanced land conservation status (protected area designation);**
- **Monitoring, education, and research**.

USERS

While the registry will be accessible to anyone it is designed to specifically serve:

- Private landowners;
- Interest groups (hunters, recreationists, community groups, industry, etc);
- Resource agencies;
- Non-governmental conservation organizations;
- Policy-makers.

www.conservationregistry.org

The registry is now being developed and a mockup of the website has been released. You can see it at www.conservationregistry.org. The next phase will include development of advanced features such as personalized user accounts, a data entry form, a relational database, and advanced search options.

Ospreys and the Michigan Wildlife Action Plan

by Amy Clark Eagle

Ospreys (*Pandion haliaetus*) were once found throughout Michigan but, along with several other top avian predators, their population was severely depleted in the mid-20th century due to the effects of DDT, PCBs, and other pesticides that caused egg shell thinning. In Michigan, the number of occupied nests declined to just over 60, primarily in the Upper Peninsula. After the use of these chemicals ended in the 1970s, osprey populations across the continent began to rebound. Surveys in 1988 and 2003 located 167 and 220 Michigan pairs, respectively, but again they were restricted almost completely to the Upper Peninsula and northern Lower Peninsula.

The osprey is categorized by Michigan as a "threatened" species and is recognized in Michigan's Wildlife Action Plan as a species of great conservation need. One goal for the long-term sustainability of Michigan's osprey population has been to expand its range back into the southern parts of the state. To address this goal, the Michigan Department of Natural Resources (DNR), with several conservation partners, initiated an osprey reintroduction program in 1998.

After fledging, young ospreys from Michigan fly to Florida and South America. In April of their second or third year, ospreys often return and establish nests in the area where they learned to fly. Biologists take advantage of this behavior by removing 4-week-old chicks from their home nest and raising them in a different location in the wild, to which we hope the birds will return as adults. Adult ospreys continue to migrate annually between their selected northern breeding area and southern wintering grounds.

The transplanted osprey chicks are placed in a large, enclosed "hacking box" where they are provided fresh fish, water, and plenty of room to exercise their wings. As they grow and mature, the hack box is opened and chicks are allowed to leave. Some fly immediately, while others take time to further strengthen their wings. Fish are provided for fledged chicks until they migrate south, by which time the fledglings have learned to catch fish on their own.

The goal of Michigan's osprey reintroduction program is 30 established pairs in the southern Lower Peninsula by 2020. However, due to the long delay between fledging and the return of adult ospreys, similar programs in other states have required 10 years of hacking before seeing real success.

Initially, this program was supported through Michigan's Nongame Fish and Wildlife Fund with matching contributions from partners. But in 2000, the primary source of donations to this Fund (a check-off on the state income tax

An osprey makes use of a nesting platform in Michigan.

David Kenyon/Michigan DNR

form) was removed. The reintroduction program would likely have ended or been severely reduced without the infusion of federal funds through the Wildlife Conservation and Restoration and State Wildlife Grants programs. Instead, reintroduction efforts were able to continue.

The benefits of this program have been greater than we expected. So far, 59 osprey chicks have been successfully reared and released. During the 2006 breeding season, 13 osprey pairs were nesting in Michigan's southern Lower Peninsula. They include identified graduates of Michigan's hacking program and others that may or may not have been hacked in Michigan. Ospreys released in southern Michigan have also been reported in other Midwestern states. Through this program, the DNR has formed new partnerships with Michigan bird researchers, the Detroit Zoo, Huron-Clinton Metroparks, DTE Energy, private landowners, and numerous volunteers.

The reintroduction project has produced new data on the natural history of ospreys in Michigan. For example, the success of chick translocations and the locations of active nests in southern Michigan indicate that ospreys may not be as sensitive to handling and disturbance as previously believed. In 2005, while monitoring osprey nests in northern Michigan to identify appropriate chicks for removal and hacking, biologists observed an unexpectedly high level of chick mortality. Although many factors may have contributed to the deaths, one collected chick carcass revealed West Nile virus as the cause. This virus has not been considered a significant threat to ospreys, but the susceptibility of osprey chicks may need to be reevaluated.

Recreational viewing of ospreys and a desire to assist in their conservation has led to the formation of a new organization, Osprey Watch of Southeast Michigan, an osprey festival, and a feature film documentary. Education and outreach associated with the reintroduction program may have improved the osprey identification skills of southern Michigan residents. Observers report that a few of the newly sighted osprey pairs in southern Michigan do not appear to have leg-bands, making it unlikely that these animals were released through the hacking program. Did these birds nest unnoticed in the area prior to the program, or are they new?

Michigan is considering the possibility of removing ospreys from the state's endangered species list. As part of a current review of the state's list, species experts on the Technical Advisory Committee for birds recommend deleting ospreys because of their increased numbers. The success of the reintroduction program was one of the reasons cited for this recommendation.

Once ospreys have been reestablished in southern Michigan, other threats to the population identified in the Wildlife Action Plan must be addressed. The Action Plan will continue to guide use of State Wildlife Grants funds and other funds that target the conservation of wildlife species and their habitats in Michigan.

Amy Clark Eagle, the Wildlife Action Plan Coordinator for the Michigan Department of Natural Resources—Wildlife, can be reached at P.O. Box 30444, Lansing, MI 48909-7944; 517-373-1263 (phone), 517-373-6705 (fax).

David Kenyon/Michigan DNR

David Kenyon/Michigan DNR

Top photo: Lori Sargent and Amy Clark Eagle of the Michigan DNR collect young ospreys in Michigan's Upper Peninsula for release at a hacking site in the Lower Peninsula.

Lower photo: Hacking boxes help the young birds prepare for a life in the wild.

Nevada's Blueprint for Wildlife Conservation

by Larry Neal and
Laura Richards

Nevada's Wildlife Action Plan is a comprehensive blueprint that outlines the key roles of all land and resource management agencies and non-governmental organizations with a primary stake in the conservation goals of the Silver State.

Nevada's diversity of life results from its geography; its many mountain ranges are effectively isolated from one another by arid, treeless basins. Among the 50 states, Nevada is ranked eleventh in biological diversity and fifth in the number of historical species extinctions. Nevada also is challenged in developing effective wildlife conservation programs, in part because its arid climate, geography, and relative scarcity of water have produced many endemic species (those found nowhere else) that are vulnerable to a variety of threats. Water in Nevada is a scarce and valuable resource for both people and wildlife. Nevada is one of the fastest growing states in the nation, and its rapidly expanding human population creates a demand for water and destruction of wildlife habitat. Invasive, exotic, and feral species comprise another critical problem for both terrestrial and aquatic species and their habitats in Nevada. For example, the degradation of sagebrush, Mojave, and shadscale (a perennial shrub of the Great Basin) habitats by aggressive invasive plants such as cheatgrass and red brome following wildfire threatens many of Nevada's native species.

To develop Nevada's Wildlife Action Plan, the Nevada Department of Wildlife (NDOW) recruited the Nature Conservancy's Nevada Chapter, the

The American avocet (above), peregrine falcon (right), and collared lizard (next page) are among the species receiving special attention under the Nevada Wildlife Action Plan.

NDOW photos

Lahontan Audubon Society, and the Nevada Natural Heritage Program as partners. With the help of experts from all taxonomic fields, the Wildlife Action Plan Team identified a total of 263 "Species of Conservation Priority," including 72 birds, 49 mammals, 40 fish, 20 reptiles, 7 amphibians, 74 gastropods, and 1 bivalve. Using data from the Southwest Regional Gap Analysis Project, the most up-to-date land cover (i.e., vegetation) map currently available in Nevada, the Team organized Nevada's various ecological systems into 27 key habitat types. It then devised multi-level strategies for these habitat types that integrate conservation needs for species assemblages as well as for individual species. Each strategy includes a list of key partners, programs, and projects to fulfill the conservation objectives of each key habitat and preliminary focal areas for action.

Because 87 percent of Nevada's landscape is federally owned, it is imperative that NDOW seek collaborative solutions to meet the goals of the Wildlife Action Plan. NDOW recognizes this must take place within the partners' existing land use planning processes, which include Bureau of Land Management resource management plans, U.S. Forest Service forest plans, the Natural Resources Conservation Service's Wildlife Habitat Incentives Program (WHIP) implementation plan for Nevada, tribal resource planning, U.S. Fish and Wildlife Service refuge comprehensive conservation plans, endangered species recovery plans, and county resource planning.

Since the Fish and Wildlife Service approved Nevada's Wildlife Action Plan in December 2005, NDOW has actively solicited discussions to integrate the Wildlife Action Plan into the partner plans. In recent months, Nevada's Wildlife Action Plan has been integrated into a Tribal Wildlife Summit that NDOW co-sponsored with the Pyramid Lake Paiute Tribe. Action Plan support is being provided to the Bureau of Land Management through its Winnemucca Resource Management Plan revision, and integration of Action Plan goods and services has been provided for the Clark County Multi-Species Habitat Conservation Plan. The Wildlife Action Plan Team is now working on a wetlands conservation priority process to guide the implementation of the Nevada Wetlands Plan, and it is beginning to construct a conservation assessment at the "watershed level" for the Steptoe Valley region in eastern Nevada.

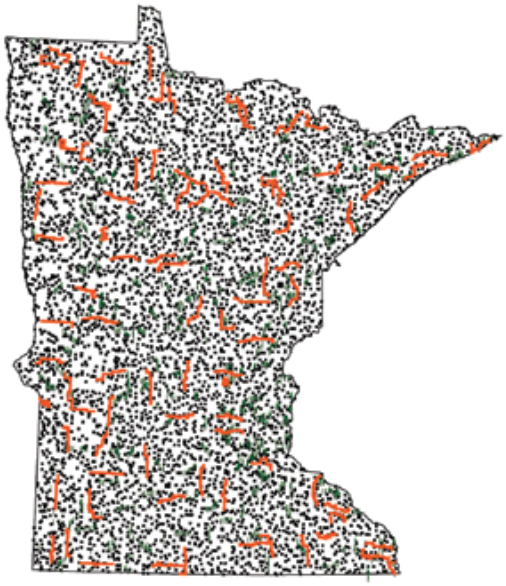
Specific projects associated with Nevada's Wildlife Action Plan include peregrine falcon (*Falco peregrinus*) nest territory surveys in southern Nevada to document the expansion of this once-endangered species. A comprehensive bird monitoring program that will help conserve Nevada's birds for future generations continues and will be expanded. Various bat surveys continue around the state to inform mine closure activities and document use of critical riparian habitats.

For the coming year, proposed projects include rehabilitation of sagebrush, riparian, and aspen woodland communities devastated by extensive wildfires in northeastern Nevada during the summer of 2006, development of a statewide comprehensive reptile monitoring program, placement of bat gates on mine shafts and adits (horizontal mine entrances) to protect important bat roosting sites across northern Nevada, intermountain stream restoration to enhance Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) habitat, and habitat restoration to benefit species that depend on sagebrush.

Larry Neal and Laura Richards, members of the Nevada Wildlife Action Plan Team, are with the Nevada Department of Wildlife (1100 Valley Rd., Reno, NV 89512; 775-688-1996).

Monitoring Wildlife Action Plans: Minnesota's Approach

by Daren Carlson



Map of wetland sample plots (small, black dots), Breeding Bird Survey (orange lines), and Frog and Toad Survey (green dots) routes

A central challenge facing the implementation of State Wildlife Action Plans is how to monitor the effectiveness of these plans over time. How do we measure short-term results when we're implementing long-term solutions? At what scale do we approach monitoring? What monitoring efforts currently exist, and how do we build upon them? This article describes Minnesota's approach to monitoring its Wildlife Action Plan, specifically addressing the issues of scale and integrating existing information.

Monitoring should have three main components: collecting information, analyzing that information, and drawing conclusions in order to act on the information. Additionally, a monitoring program should be developed in relation to a set of goals or objectives. That is, monitoring should help answer questions like "How are we doing?," "Have we achieved our desired outcomes?," and "How can we improve?"

Scale: The Critical Ingredient

The issue of scale is critical when considering monitoring. For State Wildlife Action Plans, four scales seem particularly relevant: project, species, habitat, and system.

Across the nation, the numbers of "species in greatest conservation need" identified by individual states range from 60 to 1,240 species. Such a dazzling array of species creates considerable challenges for information collection as well as for management. To address these challenges, states often identify actions at the level of habitats that are key for multiple species. In addition to these two levels of scale (species and habitats), it is also important to consider monitoring at the level of individual projects. Lastly, we need to bring all these as components together into a context so that we track the full system and understand how the individual projects work together to support species, habitats, and ecosystem processes.

Minnesota's Wildlife Action Plan is committed to monitoring at these four levels of scale. However, for each level of scale, we want to be explicit about how the information will be used to help guide resource management:

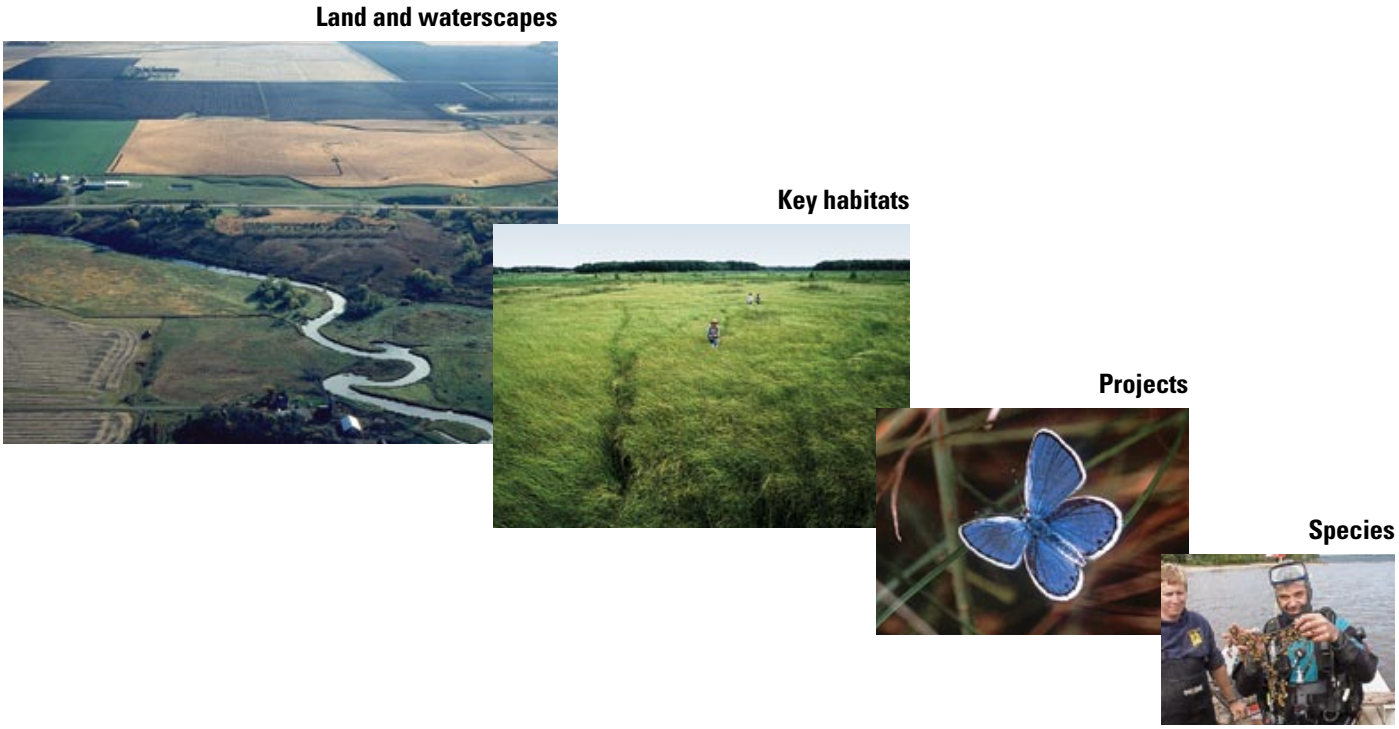
Project-level monitoring helps guide adaptive management, which involves planning, management, monitoring, evaluation, and adjusting wildlife management practices.

Species-level monitoring uses a combination of multiple species and individual focal species (tied to key habitats and ecosystem processes) as indications of the effectiveness of multiple management actions and of habitat conditions.

Key habitat-level monitoring includes tracking the amount, status, and condition of these habitats. Our initial focus will be on wetlands, prairies and savannas, lakeshores, and streams. Current monitoring varies depending on the habitat in question. This information will depict the cumulative effectiveness of project- and species-level actions, as well as the effectiveness of policy and program direction.

System-level monitoring uses components at a larger scale, such as habitat connectivity, patch size, and watershed condition, which influence the func-

Four levels of scale for monitoring species and their habitats:



tion and interaction of key habitats and species populations. Such information can guide management actions, influence policy and program direction, help prioritize geographic-based efforts, and inspire new social attitudes.

Integrating New Information

A lot of monitoring projects already underway are expected to be important components of the action plan's "information stream." Developing a framework and methods to integrate these efforts will be a first step, followed by new efforts to fill information gaps.

For example, Minnesota's Wildlife Action Plan will tie into a monitoring effort already underway for wetland habitats. The Comprehensive Wetland Assessment and Monitoring Project is an EPA-funded effort collaboratively run by the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and Minnesota Board of Soil and Water Resources. The main objective of this project is to determine if Minnesota is achieving the "no net loss" goal imposed by the state's wetland conservation laws. The project spans multiple scales, from updating the National Wetland Inventory (NWI) to developing a statistically rigorous random sampling survey composed of 5,490 plots to track change in wetland area, using a subset of the sampling scheme for assessing wetland condition, and developing an online wetland permitting and accounting system. In addition, existing species surveys, such as the U.S. Geological Survey's Breeding Bird Survey and the federal-state Frog and Toad Survey, may be used to assess species response to wetland changes and conditions (see map on opposite page).

Assessing these existing information streams shows that additional species surveys, which may either be target taxa (such as dragonflies) or certain focal species that reflect key system processes (such as species dependent on large wetlands), may be necessary to paint a more complete picture of wetland conditions and species response. Such a picture will help guide management, provide program guidance, and set policy. In addition, monitoring guidelines and protocols that aid adaptive management are needed for individuals involved in wetland management projects. Our State Wildlife Action Plan monitoring workgroup will soon begin a process to identify additional species survey needs and develop monitoring protocols.

We are just beginning to explore existing monitoring efforts and identify monitoring gaps. As the wetland example shows, many current efforts will assist in the development of a monitoring framework. The current effort varies by habitat. Monitoring information for prairies and oak savannas, for example, is lacking at almost all levels of scale. Implementing these monitoring programs will require a significant commitment, but because of the importance of these habitats and their landscape systems, it is vital that we gauge our management performance. In 5, 10, or 50 years, we hope to be able to answer the questions, "Have we been successful?," What have we learned?," and "What else do we need to do?"

Daren Carlson is an ecologist and GIS analyst with the Minnesota Department of Natural Resources (Box 25, 500 Lafayette Road, St. Paul, MN 55155-4025; 651-259-5079).

Partners For Fish and Wildlife and State Plans

by Leopoldo Miranda-Castro

A top priority for the Fish and Wildlife Service's Partners for Fish and Wildlife Program is to help states and territories implement State Wildlife Action Plans in ways that meet broader management goals. In coordination with other Service programs and external stakeholders, the Partners Program is identifying geographic focus areas based in large part on the state plans. We are giving high priority to areas where Service funds could be leveraged to fulfill the goals identified by these state plans and where benefits to federal trust species (included both listed and "at risk" species) are maximized.

One of the most common needs identified in State Wildlife Action Plans is to restore and enhance fish and wildlife species habitats on private, city, and county lands. The Service already gives direct assistance to private landowners, townships, county governments, and others for projects that benefit important fish and wildlife resources. The Service's private lands programs exemplify its commitment to help implement actions identified in these state plans. Through our Partners Program, the Private Stewardship Grants Program, and the Coastal Program, the Service provides technical and financial assistance for locally-led projects that benefit federal trust species.

Due to its proven success in recruiting and engaging private landowners as partners, together with its presence in every state and territory, the Partners Program is the Service's most important "hands-on" tool to deliver habitat restoration projects on private lands in support of the state plans, as well as other state and federal conservation programs that benefit candidate, threatened, and endangered species.

The Partners Program does not set priorities by itself, but compiles and summarizes habitat priorities set by its partners who work directly with the scientific community and other stake-

The great blue heron* (Ardea herodias) *though relatively common in many areas, is of special concern in some states and territories because colonial nesting sites are being displaced or destroyed.

Leopoldo Miranda-Castro

holders. It uses established conservation plans, such as the State Wildlife Action Plans, to guide its actions. The Partners Program analyzes information provided at the regional, state, and local levels and decides where the Program's help is most likely to produce the greatest benefits. It has short-term habitat restoration objectives that are measured by recording the number of acres and miles of habitat restored every year in partnership with private landowners, state agencies, and other partners. The integration of fish and wildlife conservation strategies and habitat restoration actions implemented by programs like Partners for Fish and Wildlife are a win-win situation in times when financial resources are limited and efficiencies are needed.

One example of habitat restoration programs supporting state plans is the Foothills Stream Restoration Project in Pickens County, South Carolina. This is a stream restoration initiative encompassing several streams in watersheds of the Foothills region in the state's northwest corner. It is a cooperative effort of private landowners, the South Carolina Department of Natural Resources, the Foothills RC&D Council, the Natural Resources Conservation Service, Trout Unlimited, and the Service. The objective is to restore degraded cold water streams and promote the benefits of land stewardship by protecting and enhancing water quality, aquatic resources, and stream integrity.

Stream degradation in the Foothills region is the result of riparian habitat loss, certain agricultural practices, and the damming of small tributaries. Restoration work involves adapting pond structures with devices that release cool water from the pond bottom into the streams, establishing riparian buffers, stabilizing banks, performing in-stream work to stabilize channels, and creating in-stream fish habitat structures. The work is planned, administered, and monitored by a team that includes biologists, an engineer, a soil conservationist, and a leading community landowner. The Service's Partners Program state coordinator, Joe Cockrell, provides important technical assistance. The project is resulting in cooler water temperatures, increased dissolved oxygen, decreased turbidity, decreased stream bank erosion, and improved habitat for many fish and aquatic species. As an added value, the establishment of riparian forest buffers provides feeding, cover, and nesting habitat for migratory passerine birds, travel corridors for mammals such as the black bear, decreased flooding of agricultural land, and increased recreational opportunities for the public. Hundreds of projects like this are being developed in partnership with state and territorial agencies in support of their wildlife strategies.

An emerging management philosophy is that all conservation actions should be tied to clear and proven biological outcomes. We all know that this is not an easy task when working with biological systems, but many State Wildlife Action Plans include measures to evaluate their effectiveness. If programs such as Partners for Fish and Wildlife focus their actions on the goals identified by the state plans, the effectiveness of habitat restoration actions can be measured by the status of target species. On the other hand, if the biological outcome goals are not met, then the programs can use this information to adapt or refocus its conservation strategies.

The Partners Program is increasingly active in integrated fish and wildlife conservation planning to achieve nationwide management strategies. In this era of cooperative conservation, the Partners Program will continue to provide state-of-the-art biological and technical expertise to complement habitat initiatives implemented through the various State Wildlife Action Plans.

Leopoldo Miranda-Castro is a wildlife biologist in the Service's Partners for Fish and Wildlife and Coastal Programs (4401 N. Fairfax Drive, Rm. 400, Arlington, VA 22203; Leopoldo_Miranda@fws.gov).

Leopoldo Miranda-Castro

This Puerto Rican boa* (Epicrates inornatus) *was photographed in a restored coffee plantation. Endemic to the Commonwealth of Puerto Rico, it is endangered by habitat fragmentation and destruction. The Puerto Rican boa could benefit greatly from habitat conservation under the Wildlife Action Plan program.

Integrating State Wildlife Action Plans and INRMPs

by L. Peter Boice

© Greg Lasley

The red-cockaded woodpecker, an endangered bird, is found on or near DoD installations in the Southeastern United States.

The Department of Defense (DoD) has management responsibility for approximately 30 million acres (12 million hectares) throughout the United States. The Sikes Act (16 U.S.C. 670a et seq.) requires DoD to prepare and implement an integrated natural resource management plan (INRMP) for each military installation that has significant natural resources. These plans coordinate natural resource conservation and military operational readiness requirements, and they are prepared in coordination with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency, with input from other interested stakeholders.

In May 2006, the Office of the Deputy Under Secretary of Defense (Installations and Environment), with support from the DoD Legacy Resource Management Program, convened a State Wildlife Action Plan (SWAP) and INRMP Workshop in Atlanta, Georgia. The purpose of this workshop was to bring together natural resource managers from military installations, state wildlife agencies of four states (Florida, Georgia, North Carolina, and South Carolina), and the Fish and Wildlife Service to integrate the state and DoD natural resource management plans—SWAPs and INRMPs—by identifying common issues. The workshop goal was to establish regional partnerships and pilot projects that would facilitate coordinated natural resource management in the southeast.

Featured presentations by Alex Beehler, Assistant Deputy Under Secretary of Defense for Environment, Safety and Occupational Heath, and Secretary Bill Ross of the North Carolina Department of Environment and Natural Resources described the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) created in the summer of 2005, and possible linkages between the partnership and this workshop. Following these opening remarks, presentations were given by Dave Chadwick (Association of Fish and Wildlife Agencies), Peter Boice (DoD Conservation Program), Scott Van Horn (North Carolina Wildlife Resource Commission), Pete Campbell (Fish and Wildlife Service), and John Townsend (Marine Corps Base Camp Lejeune) describing their respective organizations and their approaches to cooperative regional planning.

The rest of the day was spent in breakout groups answering fundamental questions relating to the integration of SWAPs and INRMPS. During a working dinner, participants were encouraged to sit with members from their respective regions and consider possible pilot projects. Groups generally broke into groups by state, and they crafted a variety of project ideas.

On the second day, participants identified four projects and divided into groups to identify key issues and the next steps needed to ensure implementation. A summary of each pilot project follows:

Carolina Species at-Risk

The goal of the Carolina Species at Risk project is to promote conservation actions for these species and their habitats on and near military installations in North and South Carolina to help eliminate the need for Endangered Species Act protection. The project will identify, map, and assess the region's most important species at-risk and develop a conservation partnership. This approach will help state agencies focus on target species and habitats

contained in their SWAPs. As appropriate, the group may develop a Candidate Conservation Agreement (CCA) or CCA with Assurances (CCAA).

Florida SWAP-INRMP Integration

Participants have already met several times to develop model SWAP-INRMP objectives. They have agreed to meet annually near Eglin Air Force Base Naval Air Station Jacksonville and Avon Park Air Force Range to assess INRMP implementation and compliance with the Sikes Act, and to discuss integration of State Wildlife Action Plans and INRMPs.

SERPPAS Georgia Conservation Forum

This group will organize workshops focused on creating a statewide collaborative conservation partnership involving military installations, state organizations, and nongovernmental organizations. It will initially support the SERPPAS initiative with specific conservation actions and partnerships in Georgia. It will then foster state-level collaboration, and provide an information sharing venue to crossfeed ideas, develop partnerships, and work together. A potential focus area is threatened and endangered species and species at-risk, including the gopher tortoise.

USFWS

Northern pine snake, another species at-risk that will benefit from INRMPs and State Wildlife Action Plans.

Pete Pattavina

Above: Gopher tortoises dig their burrows in open pine habitats.

South Carolina Invasive Species Group

The goal of this group is to identify potential sites for habitat conversion to clear invasive species while not harming native species. Test projects likely will focus on replacing invasives on airfields to reduce bird-aircraft strike hazards. The first meeting was held in August 2006.

Next Steps for the SWAP-INRMP Initiative

DoD has established space on its Defense Environmental Network and Information Exchange web site for information posting. See https://www.denix.osd.mil/denix/Public/Library/NCR/inrmp.html?fm-natres.

A follow-up meeting of the larger Southeastern group and additional regional SWAP-INRMP workshops are planned for the Southwest and Northwest within the coming year.

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by Connie Rutherford

Bees and the Lane Mountain Milk-vetch

Cindy Hopkins

A bee in the species* Anthidium marginatum *in the act of pollinating a Lane Mountain milk-vetch.

The cool, quiet air of a spring morning gives way to the wakening of jackrabbits, quail, ground squirrels, and horned lizards as the sun quickly warms the Coolgardie Mesa in the western Mojave Desert of California. Along with these animals, a host of insects set out to gather pollen and nectar from the shrubs and wildflowers in bloom. Cynthia Hopkins, a biologist with an eye for microfauna, has already staked out the plots where she will observe the insects at work over the course of the day. Of particular interest to Cynthia and the U.S. Fish and Wildlife Service are those insects that visit an endangered plant, the Lane Mountain milk-vetch (*Astragalus jaegerianus*).

An herb in the pea family (Fabaceae), Lane Mountain milk-vetch has some interesting life history traits. Due to foliage that dries up with the onset of the hot, dry summer weather, the aboveground part of the plant behaves more like an annual. However, by tagging plants and tracking them over a period of years, we have found that individuals may live for as long as 15 years. Their taproot enables them to persist underground during the non-growing season, and it can maintain them through several years of unfavorable weather. But as researchers from the University of California, Los Angeles (UCLA), have found, the conditions in a favorable year still may not be good enough for the plants to produce flowers, attract pollinators, and successfully set a new batch of seed. If the seed bank is exhausted through germination of plants that are unable to set new seeds, populations may disappear over time.

So why are the pollinators important? Cross pollination is one of two ways that genetic material is exchanged within and between populations of plants (the second way being through the dispersal of seed by ants, birds, and small mammals). In other milk-vetch species, the amount of seed produced, and the viability of that seed, is greater when it results from insect-facilitated pollination compared to self-pollination. Maintaining pollinators is therefore important to ensure a seed bank large enough to carry the species through years of unfavorable conditions.

The pollination study, along with long-term monitoring and research on the plant's life history traits, genetic characteristics, and the effects of dust, are part of a suite of studies that are being undertaken or funded by Service partners, including the Department of Defense (DoD), Bureau of Land Management (BLM), U.S. Geological Survey's Biological Resources Division, UCLA, California State University at San Bernardino, and various biological consultants. Most Lane Mountain milk-vetch populations occur on lands managed by two federal agencies. About half are on the DoD's National Training Center at Fort Irwin; a portion of these populations will be affected by military training in the future, and others are on sites being designated as conservation areas. The other half of the populations are on BLM lands near the city of Barstow; the BLM has established Areas of Critical Environmental Concern there for the

milk-vetch and has initiated efforts to restore habitat affected by unauthorized off-road vehicle use and mining. Information gleaned from these studies will help the agencies manage the plant's habitat.

Back on Coolgardie Mesa, Cynthia shifts her focus to some insects that have approached Lane Mountain milk-vetch flowers. She and Denis Kearns, another researcher, have observed that the most common pollinators of Lane Mountain milk-vetch are bees from the same genera known to pollinate other milk-vetch species. These bees are well-suited to pollinate milk-vetches because they are the right size and weight to land on the specialized keel petal of these flowers, which then exposes the pollen-bearing anthers that are enclosed within the keel.

Two of the most common visitors are the "leaf-cutter" or "wool carder" bees from the genus *Anthidium*. These names result from their practice of lining their nest cavities in the soil or within shrub stems with shredded leaves. They are solitary bees, though their nests may be in close proximity to each other. The female bees, which have hairs on their abdomen perfectly suited to holding pollen, gather pollen from the milk-vetch flowers, while the male bees gather nectar, bask on the ground while waiting for a chance to mate with the females, and patrol the area to make their presence known to other insects.

Two other insects appear to be important pollinators of Lane Mountain milk-vetch. One, a leaf-cutter bee in the genus *Osmia,* is in the same family (Megachilidae) as the *Anthidium* bee and has similar traits. The other is a digger bee in the genus *Anthophora* (family Anthophoridae), so named for the nests they dig in the ground. *Anthophora* bees are also social bees, though their nests tend to be more dispersed over a larger area than those of the *Anthidium* bees.

Solitary bees may produce only 15 to 20 offspring per year, and the abundance of each pollinator species may vary from year to year. Maintaining a suite of pollinators will help ensure that the plants can set seed. Understanding the needs of pollinators emphasizes the importance of maintaining fully functioning ecosystem processes in the habitats that are being conserved for Lane Mountain milk-vetch. Through our partnerships with universities, federal agencies, and biologists like Cynthia Hopkins, we are learning how human uses can be managed in these areas to allow for the survival of unique natural resources.

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Cindy Hopkins

David Silverman

by Brian Czech

Complexities of Conservation: the Giant Garter Snake

The giant garter snake (*Thamnophis gigas*) inhabits wetland areas in the Central Valley of California. Adults feed primarily on amphibians and fish, while young fall prey to the same species. This snake needs emergent vegetation for cover, open areas for basking, and uplands for dormancy. Wetland habitats of the Central Valley have been thoroughly altered by economic activities, and the snake has become increasingly dependent on 10 refuges and wildlife management areas (see table). Suboptimal habitats off the National Wildlife Refuge System are found primarily along rice fields, irrigation ditches, and drainage canals.

National Wildlife Refuge System units occupied by the giant garter snake.

- Colusa
- Delevan
- Grasslands Wildlife Management Area
- Merced
- North Central Valley Wildlife Management Area
- Sacramento
- San Luis
- Stone Lakes
- Sutter
- Willow Creek-Lurline Wildlife Management Area

Conservation professionals associated with the giant garter snake are understandably hesitant to provide population estimates. With a secretive and evasive species such as the giant garter snake, estimating population size to the nearest order of magnitude is often the most prudent approach. Pete Sorensen of the Fish and Wildlife Service (with the Sacramento Fish and Wildlife Office at the time) was involved in the listing of the snake. He estimated that the adult garter snake population was in the low tens of thousands.

Glenn Wylie of the U. S. Geological Survey in Dixon, California, has noted that hundreds of refuge system acres in California are known to be occupied by the snake, and thousands of acres of apparently suitable habitat in the refuge system are unoccupied. This suggests that, in terms of limiting factors, the problem is not exclusively an absence of "welfare factors," to use Aldo Leopold's classic terminology. "Decimating factors" such as winter flooding and predation (especially by non-native species such as bullfrogs) may be limiting in some areas.

The giant garter snake is an example of a species for which the distinction between welfare factors and decimating factors is not always clear and thorough. For example, predation (a decimating factor) is partly a function of habitat (a collection of welfare factors). Refuge system properties that are intensively managed for wintering waterfowl, as

Suzanne L. Collins/Center for North American Herpetology

with the Central Valley refuges, have habitat features that are problematic for giant garter snake conservation. The life history of the snake suggests that a climate conducive to summer flooding and winter drying would be optimal. Management for wintering waterfowl, on the other hand, entails winter flooding and summer drying. Predators are particularly effective along narrow levees and dikes if snakes are forced out of hibernation during a flood.

The difficulty inherent to conserving the snake on wintering waterfowl areas suggests that a more promising approach to snake conservation would be the purchase of snake habitat or land that can be restored to snake habitat. For example, the Colusa National Wildlife Refuge acquired 449 acres (181 hectares) of fallow rice fields in 1995, and subsequent restoration of ecological integrity has proven beneficial to the snake. Several such properties on other refuges would constitute an "insurance policy" to protect the snake from potentially devastating population swings induced by climate variability.

Alternatively, the intensity of winter waterfowl management could be modified for the purpose of snake conservation. The downside would be waterfowl populations declining to the extent of such modification. Such are the complicated compromises faced by biologists, planners, and managers of the National Wildlife Refuge System.

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BOX SCORE

Listings and Recovery Plans as of November 15, 2006

GROUP	ENDANGERED U.S.	ENDANGERED FOREIGN	THREATENED U.S.	THREATENED FOREIGN	TOTAL LISTINGS	U.S. SPECIES W/ PLANS
MAMMALS	69	255	13	20	357	52
BIRDS	76	175	15	6	272	71
REPTILES	14	65	23	16	118	34
AMPHIBIANS	13	8	10	1	32	16
FISHES	75	11	62	1	149	98
SNAILS	24	1	12	0	37	30
CLAMS	62	2	8	0	72	69
CRUSTACEANS	19	0	3	0	22	17
INSECTS	47	4	10	0	61	34
ARACHNIDS	12	0	0	0	12	5
ANIMAL SUBTOTAL	411	521	156	44	1,132	426
FLOWERING PLANTS	570	1	143	0	714	605
CONIFERS	2	0	1	2	5	3
FERNS AND OTHERS	26	0	2	0	28	28
PLANT SUBTOTAL	598	1	146	2	747	636
GRAND TOTAL	1,009	522	302	46	1,879*	1,062

TOTAL U.S. ENDANGERED: 1,009 (411 animals, 598 plants)
TOTAL U.S. THREATENED: 302 (156 animals, 146 plants)
TOTAL U.S. LISTED: 1,311 (567 animals**, 744 plants)

* Separate populations of a species listed both as Endangered and Threatened are tallied once, for the endangered population only. Those species are the argali, chimpanzee, leopard, Stellar sea-lion, gray wolf, piping plover, roseate tern, green sea turtle, saltwater crocodile, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

** Eleven U.S. animal species and five foreign species have dual status.

ENDANGERED Species BULLETIN

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