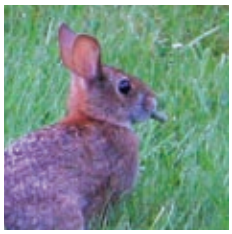
U.S. Fish & Wildlife Service

Fish & Wildlife News

SPECIAL
STRATEGIC HABITAT CONSERVATION
ISSUE

what's inside

In this special edition of *Fish & Wildlife News*, read how the U.S. Fish and Wildlife Service is putting Strategic Habitat Conservation (SHC) into practice. To ensure a bright future for fish and wildlife in the face of such widespread threats as drought, climate change and large-scale habitat fragmentation, the Service first endorsed SHC as the Service's conservation approach in 2006. SHC relies on an adaptive management framework to inform decisions about where and how to deliver conservation efficiently with partners to achieve predicted biological outcomes.



ON THE COVER: Male greater sage-grouse displacing another male on a lek in Nevada.

PHOTO BY TATIANA GETTELMAN

From Good to Great

Most of us are probably familiar with the Teddy Roosevelt quote: "Do what you can, with what you have, where you are."

That saying has a lot in common with Jim Collins' book *Good to Great*, in which he studies the common traits of companies that make and sustain the leap from good to great performance.

In the book, Collins urges companies to focus equally on what to do, what not to do and what to stop doing. He believes that most companies focus too much on what to do and ignore what not to do or what they should stop doing. What are you doing based on tradition? What assumptions or processes have you rested on because they were "good enough"?

"We can probably all point to things we are doing simply because that's how we have always done them. And if it worked for "Ding" Darling and Rachel Carson, who are we to change it?

We can probably all point to things we are doing simply because that's how we have always done them. And if it worked for "Ding" Darling and Rachel Carson, who are we to change it?

Unfortunately, we can't rest on our laurels. Our goal remains what it has always been—the conservation of our nation's fish and wildlife heritage. But we must continue to change and improve how we do that.

Collins warns us in his book that "good is the enemy of great." We cannot be satisfied with good work. We must always pursue excellence.

Especially now.

We face a tough fiscal climate. Our budget will at best be about the same. At the same time, our challenges only grow in scope and complexity.

Maybe I am supposed to say that we will do more with less. But I don't think that's possible.

This organization is already performing at a tremendous level despite being under a significant amount of pressure.

What we need to do is perform differently, so we can do our best with whatever resources are made available to us.

One way we are doing that is by working with our partners to select surrogate species as a means of establishing conservation targets at defined landscape scales. This will help us decide what to do, and even more importantly, what to stop doing. It is important to note that this is not a new strategy; it is the next step in implementing Strategic Habitat Conservation (SHC) as a disciplined conservation framework that will position us to meet our challenges.

With SHC and our strategic budgeting tool, we are well-positioned to make the hard-but-needed decisions that 21st century conservation requires.

We're doing our best to engage our partners, Service employees and the public in this effort to implement SHC by identifying species and other biological outcomes that will drive our work.

Please, take a moment to read about these processes here and join the conservation conversation.

We are building a disciplined conservation framework, and the capacity to implement it, which will take us from good to great, and will sustain that performance over time.

So that we can, as TR said, do what we can, with what we have, where we are. □

HOWARD ZAHNISER/USFWS

Conservation pioneers Aldo Leopold and Olaus Murie rose to the challenges of their era. The Service must continue to do the same.

CHANGING as Conditions Change

The U.S. Fish and Wildlife Service has been entrusted to safeguard the nation's fish, migratory birds, aquatic species, endangered and threatened species, and public lands. But challenges like invasive species, habitat fragmentation, water scarcity, climate change and a tough economic climate mean the Service must change the way it practices conservation. To meet these 21st century challenges, the Service must be better than it has been.

That harsh reality doesn't denigrate anything the Service — or the conservation community as a whole — is doing now or has done in the past.

"I have nothing but respect and admiration for those who went before us," Service Director Dan Ashe says. "We all stand on the shoulders of the visionary leaders and dedicated professionals who have come before us. People such as Aldo Leopold, Olaus Murie, "Ding" Darling, Rachel Carson, and thousands of others rose to the conservation challenges of their day with persistence and courage and made what we do possible."

It just means that the time has come to rise to new challenges by thinking bigger and expanding the Service's vision for conservation, Ashe says.

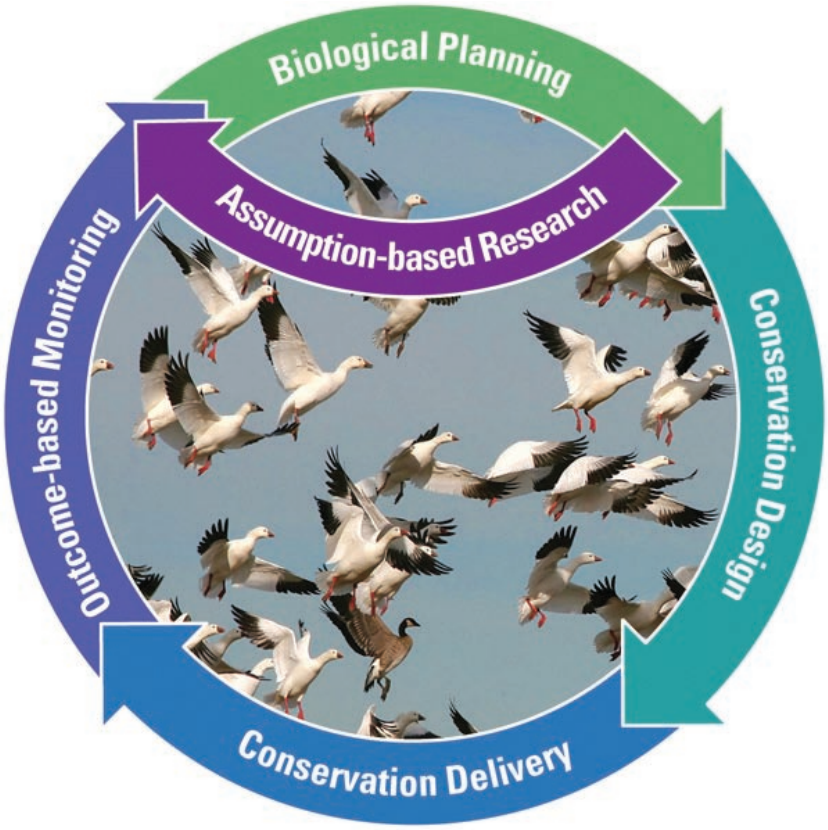
It means embracing Strategic Habitat Conservation, or SHC, as the Service's partnership- and science-driven approach for meeting these challenges.

It means change — but change for the better.

This special issue of *Fish & Wildlife News* will show you how these practices have already helped species from Alaska to Maine to Arizona.

Strategic Habitat Conservation Is Nothing New to the U.S. Fish and Wildlife Service

Service leadership endorsed Strategic Habitat Conservation (SHC) in 2006 as the conservation approach to use in the 21st century. SHC is a landscape approach to conservation that emphasizes planning, science, partnership, monitoring and learning from experience. Indeed, throughout the conservation community, wildlife professionals are using advanced science and technologies to target conservation efforts in ways that best sustain populations of fish and wildlife across the landscape.



The Service is committed to using SHC to work and measure progress toward desired biological outcomes. The purpose of SHC is to coordinate and link actions that various programs and partners perform at individual sites, so that their combined effect can contribute to achieving these outcomes at larger landscape, regional or continental scales. In this way, conservation actions can help recover and sustain species' populations as part of whole communities and systems, together with their ecological functions and processes.

The SHC approach is built on five main components that the Service uses to align expertise, capability and operations across our programs in a unified effort to achieve mutually aspired biological outcomes:

Biological Planning
Working with partners to establish shared conservation targets and measurable biological objectives (i.e. populations) for these outcomes, and identify limiting factors affecting shared conservation targets;

Conservation Design
Creating tools that allow the Service to direct the best conservation actions at the best times, contributing to measurable biological outcomes;

Conservation Delivery
Working collaboratively with a broad range of partners to create and carry out conservation strategies with value at multiple spatial scales;

Outcome-based Monitoring
Evaluating the effectiveness of conservation actions in reaching biological outcomes and to adapt future planning and delivery;

Assumption-based Research
Testing assumptions made during biological planning to refine future plans and actions. Both monitoring and research help the Service learn from and improve conservation actions over time.

USFWS

SHC begins with **biological planning**, which involves setting measurable biological objectives for selected species of fish, wildlife and plants. The first step in this process is to select a subset of species that can serve as surrogates for a broader array of biological outcomes, because it is often impractical and inefficient to consider requirements for all species present on a given landscape. This subset of species is selected because it best represents other species or aspects of the species' environment (e.g., water quality, sagebrush, grasslands, etc.) in conservation designs and strategies. By setting measurable biological objectives, such as population objectives, for this subset of conservation targets, the Service and its partners will be able to carry out conservation actions that also benefit a larger group of species of conservation interest. Biological models for these surrogate species suggest what habitat features or other conditions are limiting their populations—preventing them from existing or thriving—so conservation efforts can address these underlying problems. Working with state wildlife agencies and other partners is critical throughout the biological planning process.

Conservation design involves combining geospatial data with biological information and models to create tools such as maps that evaluate the potential of every acre of habitat to support a species' population. Using these tools, the Service and its partners can determine what the current habitat-acre capability is—and what it needs to be—to achieve the desired biological objectives or outcomes. Decisions can then be made about the kind, quantity and configuration of habitat needed, and what activities to undertake and where.

Conservation delivery involves working strategically to foster a conservation ethic among landowners as well as influence species and habitats across the landscape. It uses the products of conservation design to adjust and target efforts. Conservation strategies, delivery tools and management activities, such as restoring wetlands, acquiring grassland easements and working with private landowners to enhance habitat conditions for priority species (e.g., candidate conservation agreements), can be targeted to those areas that have the greatest benefits for fish, wildlife and plant populations based on landscape-scale models and designs. In this way, site-scale actions are coordinated and linked to landscape-scale habitat objectives and population outcomes using the biological planning and conservation design tools described earlier. Other important conservation delivery tools to foster a conservation ethic and help achieve biological outcomes include communication, environmental education, access to recreational opportunities, regulatory forums and processes, conservation policy development, and targeted law enforcement activities.

Natural resource conservation in America isn't a solo proposition, and SHC recognizes the talents and contributions of all conservation professionals, whether they work for federal or state natural resource agencies, non-profit organizations or private industry.

Outcome-based monitoring and **assumption-based research** help ensure that the work is adaptive—that conservation actions are improved over time. Research that tests the validity of assumptions made in the biological planning stage and their relevance for natural resource management is a high priority. Monitoring actual outcomes offers an opportunity to evaluate the effectiveness of conservation actions and progress toward goals and objectives. Updating biological models and conservation designs and strategies based on information from research and monitoring activities completes the SHC feedback loop. □

Surrogate Species Approach Can Help Many Species

The sheer number of species the U.S. Fish and Wildlife Service, states and other partners conserve makes designing and conserving landscape-scale habitats impractical on a species-by-species basis. As a result, the Service is developing a process to collaboratively identify surrogate species representing other species or aspects of the species' environment such as water quality, sagebrush or grasslands.

GEORGE GENTRY/USFWS

Conserving habitat for these species or conservation targets can at the same time address the needs of a larger group of species. This is a practical step in using the Strategic Habitat Conservation (SHC) approach and the best-available science to conserve landscapes supporting multiple species. Selected surrogate species and targets will be used as the basis for regional conservation planning efforts within a landscape or geographic area.

The landscape conservation strategies and actions identified through such planning processes (such as species or habitat protection or restoration, monitoring, public engagement, research) will inform the Service's management practices and systems—including budget decisions, and evaluations and performance accountability. Ultimately, they will enable the Service to make smarter, more cost-effective conservation decisions and investments in conjunction with partners at a landscape level. And by doing so, the strategies will improve the ability to sustain abundant, diverse and healthy populations of fish, wildlife and plants now and in the future. □

The Service is engaging employees, states, tribes and other conservation partners in refining and improving the technical guidance. Go here to download the draft guidance on selecting species and leave feedback.< www.fws.gov/landscape-conservation/draft-guidance.html>

Considering all the species the Service is responsible for, using surrogate species to help focus conservation efforts makes sense.

TATIANA GETTELMAN

The Plains and Prairie Potholes and Eastern Tallgrass Prairie and Big Rivers Landscape Conservation Cooperatives are examining restoration and management potential along the lower Missouri River.

USFWS

Landscape Conservation Cooperatives

Bringing Partners Together to Shape the Future of Conservation

The conservation challenges of the 21st century are too large for the U.S. Fish and Wildlife Service or any single organization to meet alone. It will take a combined effort involving many public and private organizations to deal with the landscape-scale issues facing everyone.

LANDSCAPE CONSERVATION COOPERATIVES

Landscape Conservation Cooperatives (LCCs) provide a forum for states, tribes, federal agencies, non-governmental organizations, universities and other groups to work together in a new way and ensure that efforts and resources go where they will do the most good.

LCCs are applied conservation science partnerships with two main functions. The first is to provide the science and technical expertise needed to support conservation planning at landscape scales—expertise beyond the reach or resources of any one organization. Through the efforts of in-house staff and science-oriented partners, LCCs are generating the tools, methods and data managers need to design and deliver conservation using the Strategic Habitat Conservation (SHC) approach. The second function of LCCs is to promote collaboration among their members in defining shared conservation goals and efforts.

With these goals in mind, partners can identify where and how they will take action, within their own authorities and organizational priorities, to best contribute to the larger conservation effort. LCCs don't place limits on partners; rather, they help partners to see how their activities can "fit" with those of other partners to achieve a bigger and more lasting impact.

The benefits of LCC partnerships don't stop there. The 22 individual LCCs are working together to promote connections among conservation efforts across even wider geographic and political boundaries. Whether it's a shared interest in conserving a species across its entire range or addressing a threat that extends beyond a single region, LCCs band together to deal with widespread conservation problems—including those beyond their own borders.

Though relatively new, LCCs already are providing invaluable support to the Service in meeting some of the most intractable conservation challenges. They bring a new level of scientific capability to the table that the Service and its partners will continue to draw upon as they develop landscape-scale conservation plans and strategies. Equally important, LCCs promote the exchange of plans, coordination of activities and combination of resources among conservation partners so together they can create landscapes capable of supporting self-sustaining fish and wildlife populations for current and future generations. And, after all, isn't that the bottom line? □

pacific

Focal Species Help Columbia Plateau Ecoregion

In the Pacific Northwest, recent efforts by the Arid Lands Initiative, a diverse partnership of public, private and tribal interests, and the associated Washington Connected Landscapes Project demonstrate how a set of focal or representative species can be assembled and used to put Strategic Habitat Conservation (SHC) into practice.

Focal species are a type of surrogate species.

In 2010, the Washington Connected Landscapes Project produced a statewide analysis that found broad patterns in the connections among various ecosystems for Washington and neighboring areas in British Columbia, Idaho and Oregon. This analysis highlighted the Columbia Plateau as an ecoregion where native vegetation communities were severely fragmented, thus hindering the ability of plants and animals to interconnect and adapt to changing habitat conditions. The project then completed a more detailed and comprehensive connectivity analysis for the Columbia Plateau (which occupies Eastern Washington, North Central Oregon and a small portion of Central Idaho).

The working group (composed of governmental and non-governmental technical experts) leading the landscapes project decided to look at connectivity both through the lens of landscape integrity (identifying connections between areas of relatively low human disturbance) and through the lens of focal species. Karl Halupka, a biologist with the Central Washington Field Office in Wenatchee, Washington, represents the U.S. Fish and Wildlife Service on the working group's core team. He noted that the group initially struggled with whether the focal species approach was warranted. "We found the landscape integrity and focal species approaches were complementary, and I just find it easier to talk about connectivity in terms of specific species' needs rather than the lack of human disturbance."

The Columbia Plateau is dominated by the Columbia River and its tributaries, and is bordered by the Cascade Range and the Rocky and Blue mountains. A complex geologic history of volcanic activity, glaciations and glacial floods has created a landscape of glacial deposits, coulees, channeled scablands and rolling areas of deep soil. The semi-arid climate of the Columbia Plateau supports native shrub-steppe vegetation as well as other drought-tolerant plants. The impact of human activity is high here: More than half of the shrub-steppe has been converted to agriculture, while other areas have been altered by development and infrastructure. The remaining native habitat is often fragmented and on shallower soils less amenable to agriculture. Hydroelectric energy production is important to the area's economy, and in recent years wind energy production has become more common. A substantial number of Washington's Species of Greatest Conservation Need are found on the plateau.

The decision to pursue a focal species approach brought with it the challenging task of selecting which species to include. The process began by assembling a vertebrate species database that

WASHINGTON DEPARTMENT OF FISH & WILDLIFE

The Washington ground squirrel, a focal species for the Columbia Plateau, is a candidate for the Endangered Species List.

included information on conservation status and risks related to loss of habitat connectivity. This initial list considered special factors such as species vulnerability to wind energy development. Similarly, a list of vegetation types was developed for the ecoregion. A focal species subgroup, with lots of help from species expert panels, then applied a series of analytical filters to narrow the initial list of candidate focal species using criteria designed to favor species best representing the Columbia Plateau's vegetation types, representation of key threats such as climate change, ability to serve as an "umbrella" for other candidates, and availability of information.

Ultimately, 11 focal species were selected:

- sharp-tailed grouse,
- greater sage-grouse,
- black-tailed jackrabbit,
- white-tailed jackrabbit,
- Townsend's ground squirrel,
- Washington ground squirrel,
- least chipmunk,
- mule deer,
- Western rattlesnake,
- beaver,
- tiger salamander.

Modeling habitat connectivity based on these focal species considered factors such as resistance (how hard it is for the species to move across the landscape), habitat value (reflecting habitat suitability for the species across the landscape), habitat concentration areas (where suitable habitat for the species is most dense), and linkage networks (habitat concentration areas and the linkages connecting them, following paths of least resistance for the species between neighboring habitat areas).

Once the working group modeled habitat connectivity using both the landscape integrity and focal species frameworks, similar patterns emerged. The resulting maps helped create an initial vision for a connected Columbia Plateau in Washington and recommendations for maintaining and restoring connectivity to achieve this vision. This aim with common conservation objectives will guide future conservation efforts by the Service through programs such as Partners for Fish and Wildlife and other Arid Lands Initiative partners. Monitoring and other field data, a key part of SHC, will help validate and adapt use of the connectivity framework.

For more information about the Columbia Plateau Ecoregion focal species and habitat connectivity analysis, the Working Group's February 2012 report can be found online at <www.waconnected.org> and go to Resources and Information. □

Applying SHC to the Pacific Lamprey Conservation Initiative

What fish species boasts a 400 million-year ancestry, lacks bones, scales and jaws, and benefits from the Strategic Habitat Conservation (SHC) framework?

If you guessed Pacific lamprey, you're right.

The lamprey is a native anadromous species that, like salmon, historically returned to spawn in large numbers into watersheds along the West Coast. It has experienced population declines and restricted distribution throughout Washington, Oregon, Idaho and California.

Human activities that use or are near water, such as agriculture, irrigation, hydropower generation or flood control, can put lamprey at risk during their 7- to 10-year lifespan. Threats include restricted fish passage, stream and floodplain degradation, declining water quality and quantity, and changing marine and climate conditions. These threats affect spawning, rearing and migration in both fresh and saltwater environments.

"The Service is very concerned about the status of Pacific lamprey," says Howard Schaller, project leader for the Columbia River Fisheries Program Office and Western Lampreys Conservation Team Lead. "That's why we're working with [West Coast] tribes and state and federal agencies to put together a conservation initiative."

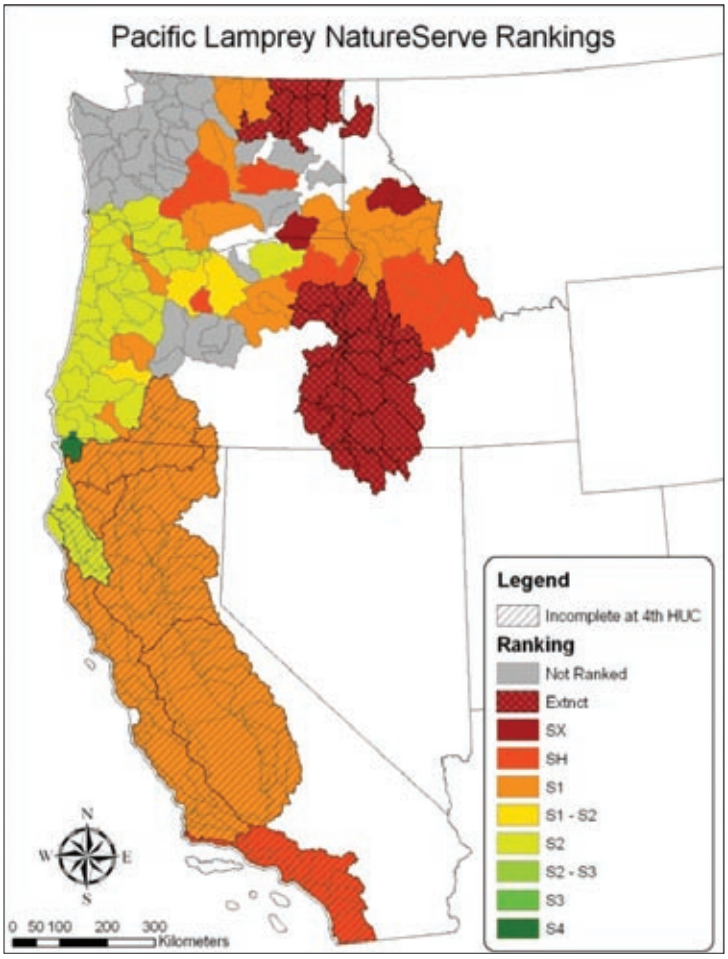
Lamprey are important on their own, but "Pacific lampreys are excellent indicators of healthy river systems," says Schaller. The initiative is "about restoring river systems for all species."

The initiative seeks to improve the status of Pacific lamprey throughout their range by implementing research and conservation. Taking a landscape-level approach, the initiative's three-part process involves crafting an assessment, developing a conservation agreement and establishing regional implementation plans to guide how and where conservation actions are carried out.

The assessment, completed in October 2011, incorporates two elements of the SHC approach: biological planning and conservation design. Developed to track

JEREMY MONROE/FRESH WATERS ILLUSTRATED

A biologist watches a Pacific lamprey in river substrate.



Relative risk ranks for Pacific Lamprey. SX and SH = highest risk; S1 –S2 = medium risk; S3 and S4 = lowest risk.

the current knowledge of Pacific lamprey, the plan also describes threats and factors for the species' decline, and identifies conservation actions and research, monitoring and evaluation needs.

The plan also does something unique: It details information about Pacific lamprey populations in a manner never done before. Current and historic distribution of the species is outlined both at a rangewide scale and into nine discrete geographic units, or regions. Assembling lamprey population data across such a wide scale entailed interviewing local field biologists and experts and an extensive literature search.

The need justified the effort – lampreys are among the most poorly studied groups of fishes on the West Coast and no one had previously attempted such broad-scale research. Furthermore, in order to establish future measurable population objectives and prioritize conservation actions, the Service and its initiative partners needed to know what population data were available and where gaps existed.

The overall scarcity of Pacific lamprey data sometimes made it necessary to estimate demographic factors using methods applied to better-studied anadromous species like steelhead, whose populations have ranges similar to lamprey. Collecting lamprey population information that was current, available and reliable took about two years.

But the work is paying off. For the first time ever, each identified region now has a consistent approach to gauge Pacific lamprey population.

The initiative also classified the scope and severity of threats to lamprey populations. Using a diagnostic tool adapted from NatureServe and existing demographic and threat information collected through a series of regional meetings with partners, individual watersheds were ranked by the relative risk of extirpation.

"Most Pacific lamprey populations rangewide are all at relatively high risk [of extirpation], so there aren't a lot of areas that are doing well," according to Christina Luzier, the assessment's lead author and member of the Western Lampreys Conservation Team. "And the threats to various populations are different: urbanization, stream degradation, channelization, irrigation withdrawals, point source pollution and passage, to name a few."

The assessment shows that the cumulative effect of these threats, as opposed to a single threat is causing the decline in Pacific lamprey population and is increasingly restricting lamprey distribution throughout Washington, Oregon, Idaho and California. The majority of watersheds are at relatively high risk, with very few that are relatively secure.

After publishing the assessment, the Service and partners moved to the initiative's next step: developing and committing to a conservation agreement that includes efforts such as conserving, enhancing and restoring Pacific lamprey habitats, improving upstream fish passage specifically for lamprey, and re-establishing lamprey to streams where they historically occurred. The agreement is a voluntary commitment by interested parties to collaborate on efforts to reduce or eliminate threats to Pacific lamprey to the greatest extent possible. It aims to achieve long-term survival and support traditional tribal cultural use of Pacific lamprey throughout their range as well as enable stakeholders to collaborate, pool available resources, and expeditiously implement conservation actions.

The agreement redoubles efforts to focus limited resources to conserve lamprey. Tribes still harvest the species as a food source and consider Pacific lamprey a "first fish." Lamprey are also ecologically important—when adult and juvenile lamprey are present, many predators target them instead of faster-moving salmon and steelhead. And like salmon, lamprey carcasses provide marine-derived nutrients to waterways, while larval lamprey filter feed on the bottom of rivers and streams.

"The Native American tribes really expressed concerns [about lamprey] because they are the ones who track what lamprey are doing; they noticed first that lamprey populations were disappearing or were greatly reduced in their catches, "said Schaller. "Their concerns raised the consciousness of everyone."

To date, close to 30 partners have solidified their commitment to Pacific lamprey by signing the agreement and answering the call for restoration actions. These include 11 tribes, four state fish and wildlife agencies, and seven federal agencies.

Conservation delivery for Pacific lamprey is next, and will be advanced by the development and deployment of regional implementation plans. Implementation plans will be built upon the assessment and agreement as well as other existing reference documents.

The goal is for regional implementation plans to align with the SHC Conservation Delivery, Monitoring and Adaptive Management phases. Developed by partners locally, these plans will prioritize actions of greatest need to boost lamprey populations, such as modifying fish ladders and entranceways at dams, building lamprey-friendly passage structures at tributary barriers, restoring lamprey habitat and considering lamprey during in-stream work.

Guided by biological planning and conservation designs in the assessment, these plans will call for monitoring actual outcomes of conservation actions to evaluate the effectiveness and progress toward conservation initiative goals. In addition, the results of this monitoring will allow the Service to update biological models and conservation designs. The SHC feedback loop will continue to guide Pacific lamprey conservation now and into the future.

The Pacific lamprey conservation initiative's SHC-driven approach represents a watershed moment for the species. Not bad for an almost-forgotten West Coast native fish whose value sometimes gets overshadowed by the reputation of its invasive Sea lamprey cousin in the Great Lakes.

"It would be unthinkable to let something this important disappear," says Schaller. □

southwest

Interagency Cooperation Helps Save Arizona's Apache Trout

There's a fish tale out of Arizona that tells the remarkable restoration of the threatened Apache trout. It's a story worth telling because it serves as a model of how effective public-private partnerships and the Strategic Habitat Conservation (SHC) approach are contributing to successful recovery of a species. And it's the kind of story that foreshadows further successes elsewhere under the Endangered Species Act.

This particular tale also has the virtue of being true. Rather than the proverbial "one that got away," this is the story of "one that didn't get away."

Arizona's official state fish, Apache trout can only be found in deep, cool streams that flow down the high country of the White Mountain Apache homelands in eastern Arizona. For thousands of years this trout occupied 600 miles of streams in the headwaters of the Salt and Little Colorado rivers. But due to overfishing and habitat infringement, by the 1940s the trout was found in only 30 miles of streams.

"The White Mountain Apache Tribe had recognized that the populations were declining in the 1950s and began to take conservation action before the Endangered Species Act was even passed," said Service Fish Biologist and Project Coordinator Jeremy Voeltz.

"They closed areas to angling and to the public. They quit stocking non-native trout species and stopped cutting forests that were surrounding these streams," he said.

Despite the tribe's efforts, the Apache trout's status remained perilous, and by 1967 it became one of the first species to be federally listed as endangered.

The U.S. Fish and Wildlife Service has stewardship responsibilities for federally protected wildlife living on millions of acres in many of Arizona's most wild and scenic places. Tasked with the challenge of reversing trends that have pushed species to the brink of extinction, the Service, in partnership with a Native American tribe and state and federal agencies, collaborated to rescue the once-endangered (now threatened) Apache trout in the White Mountains of Arizona.

At the heart of this project's success is SHC. This approach uses biological planning, conservation design, conservation delivery, and assumption-based monitoring and research in a feedback loop to achieve shared biologically based conservation goals.

Working with its partners, the Service defined biological objectives for the species and identified what water and habitat management practices were needed to achieve those objectives. Using information gathered through collaborative scientific monitoring, partners have successfully brought the Apache trout very close to recovery under the ESA.

Following the listing of the species, collaboration efforts took shape as the Arizona Game and Fish Department, the White Mountain Apache Tribe, the Service and the USDA Forest Service established the Apache Trout Recovery Team. The team's mission required a strategy that laid out a recovery and long-term survival plan for the Apache trout in its historic range.

Using the "conservation design" step in the SHC process, the team identified key habitat areas for

By late 1975, the Apache trout was down-listed from endangered to threatened.

CRAIG SPRINGER/USFWS

Apache trout protection. The team put up fencing along stream banks, worked with ranchers to modify livestock grazing practices and built fish barriers in those areas. "The goal was to use those structures to create artificial dams that prevent the brown or rainbow trout that are downstream from swimming upstream," said Voeltz.

Both brown or rainbow trout compete with Apache trout. Closely related rainbow trout also interbreed with Apache trout, which dilutes the genetic stock. The team monitored results, and realized their management actions were bearing results.

By late 1975, the recovery team's conservation work led to the down-listing of Apache trout from endangered to threatened. The objective for the recovery team, and for the tribal, state and federal entities that support recovery, was to have Apache trout completely delisted, which the team defined as when 30 self-sustaining populations exist in their native waters.

Continuing efforts to achieve that goal, the team identified other key streams in which to implement conservation actions. Scientific monitoring from Crooked Creek in 2006 revealed that brown trout outnumbered Apache trout nearly three to one. "Our conservation plan and design included restoration that required the mechanical removal of brown trout in several streams," said Voeltz, a member of the team.

By 2011 that ratio had radically changed to more than 53 to one in favor of Apache trout in Crooked Creek. The recovery team successfully tested their hypothesis that Apache trout population would respond positively when brown trout were removed.

"The current Apache trout recovery strategy fits very nicely in the SHC approach of planning, design, delivery and monitoring," said Voeltz. "For instance, biological planning guided the recovery partners to create the 2008 business plan with the National Fish and Wildlife Foundation (NFWF) that outlines desired outcomes over the next 10 years and beyond," he said. NFWF provides significant funding to implement conservation programs designed to meet objective criteria over time, he added. "Finally, the Service's five-year review in 2010 evaluated the monitoring data and showed that our initial biological assumptions were being met, something we expect to continue to see into the future," Voeltz said.

"We were pretty close (to achieving 30 self-sustaining populations) toward the end of 2010," Voeltz said," and then the Wallow Wildfire in 2011 impacted some of our recovery populations."

The Wallow Wildfire was the largest fire in Arizona history, burning more than 841 square miles in eastern Arizona and western New Mexico. The fire, believed to have been caused by an abandoned campfire, consumed more than 522,000 acres in the White Mountains—home to Apache trout.

While the fire delayed the delisting of Apache trout, Voeltz said the project continues to move forward and the recovery team is working on creating a new timeline.

Apache trout play an important cultural and economic role, and are a key recreational focus for the White Mountain Apache Tribe and the state of Arizona. The SHC approach helps support these objectives as well. Specific goals are delineated for recreational populations, separately managed from the populations protected in species recovery areas. Hatchery production is the major tool to support fisheries at those recreational sites, adapting stocking rates and times to address changing conditions and management goals that consider both short-term and long-term variables.

The Alchesay-Williams Creek National Fish Hatchery on the White Mountain Apache Reservation supports captive production of Apache trout. With data and feedback from federal, tribal and state agencies, the fish hatchery produces eggs, and hatches and raises catchable-size Apache trout. Several million Apache trout have been nurtured and stocked in the nearby streams for recreational fishing. It's a success story for both conservation of the species and economic development for the tribe, allowing the creation of jobs and revenue from recreational tourism.

According to Voeltz, Apache trout play an important part in the overall ecology puzzle. "It is the only native trout found in that part of Arizona, the only place in the world where Apache trout exist and it is part of the food chain as a prey for birds and mammals and as predator of insects and small creatures. And like the Apache people, the Apache trout have existed in this area since time immemorial." □

southeast

Birds of a Feather Linked to an Open Pine Forest

At least 86 bird species are found in open pine communities, including what's left of the majestic longleaf pine forests that once carpeted the Atlantic and Gulf coasts. Just six were chosen by a bird conservation partnership to determine the best places to restore longleaf and similar open pine ecosystems.

"To me, it simplifies the complexity of the biological planning when you work with a smaller group of species, rather than all of the species," said Catherine Rideout, coordinator of the East Gulf Coastal Plain Joint Venture. "It would be difficult to make progress on planning if we attempted to incorporate all species and their habitat requirements."

The Joint Venture calls the six bird species their "umbrella species" for the longleaf habitat, and the concept is related to the surrogate species approach, the

Catherine Rideout is coordinator of the East Gulf Coastal Plain Joint Venture.

next step as the U.S. Fish and Wildlife Service embraces Strategic Habitat Conservation (SHC).

The Joint Venture, a public-private partnership focused on bird conservation across the East Gulf Coastal Plain, worked with 10 technical experts from state and federal agencies to pare down the bird list. The ultimate goal is to direct longleaf conservation efforts to the highest priority areas, "to help us do the right things in the right places," Rideout said.

The six species were chosen for their close association with the habitat features specific to longleaf and open pine ecosystems, including openness in the canopy that allows sunlight to hit the ground, a diverse understory and regular fire. They include Bachman's sparrow, a ground-nesting bird that prefers a dense, herbaceous understory in open pine savannas, and the red-cockaded woodpecker, a federally endangered bird that nests in mature pine trees that are generally 70 years and older. The other species are Henslow's sparrow, Southeastern American kestrel, Northern bobwhite and brown-headed nuthatch.

Another factor in choosing the six species was how much is known about them. Rideout said "It's helpful to use umbrella species that are fairly well-studied and understood in terms of their habitat requirements."

Working with Dr. James "Barry" Grand of the U.S. Geological Survey, the Joint Venture developed an Open Pine Decision Support Tool that uses information about the six bird species from various sources to prioritize conservation areas, using a mathematical equation to factor in variables such as the presence of sustainable bird populations; the feasibility of prescribed burning; suitability for growing longleaf; and long-term potential for continued conservation.

The results have been used to generate a series of maps prioritizing the best places for conserving and restoring the longleaf pine forest to meet bird population objectives.

Recently, Grand extended the reach of the Decision Support Tool to the historic range of longleaf east of the Mississippi River, well beyond the Joint Venture's borders. He also broadened the species represented by adding two terrestrial species to the model, the gopher tortoise and Louisiana pine snake. In addition, Grand substituted the red-headed woodpecker for the American kestrel, because the woodpecker's distribution is better understood.

Interestingly, the changes were barely noticeable on the landscape scale.

"It tells me that birds do a pretty good job of representing habitat requirements for those herps. They were good surrogates," said Grand, who is located at Auburn University along with Rideout.

The tool is still awaiting peer review, but already it's made an impact. The state of Alabama and the Service's Partners for Fish and Wildlife in Alabama used a prototype of the Decision Support Tool to prioritize funding proposals, and the National Fish and Wildlife Foundation, which is leading a campaign to restore millions of acres of longleaf forest, used a version of the Joint Venture tool to solicit funding proposals in high priority areas. □

Bachman's sparrow is a ground-nesting bird that prefers the sparse understory of open pine savannas.

ERIC SOEHREN

northeast

Service Cultivates Young Forests to Conserve New England Cottontails, Other Species

Oh, to be young again. For most people, being young means a time full of energy and activity; a period that's vibrant, teeming with life and rich with possibilities. It's the same for forests.

A young forest contains trees that are a long way from reaching maturity, as well as shrubs, thickets and other dense growth. Thick vegetation grows because sunlight reaches the ground, unlike in older forests with their dense overstories of leaves. Young forests provide essential homes for a wide variety of native wildlife, including dozens of birds, mammals, reptiles and insects.

The New England cottontail, a candidate for protection under the Endangered Species Act, is one of the species that rely on young forests for food and shelter. The cottontails need thick shrubby places to provide food and cover to protect themselves from predators. The species exists in less than 14 percent of its former range in the Northeast, as much of its young forest habitat has either matured into older forests or been developed.

Though forests dominate the landscape in the Northeast, many of them are mature. The good news is that young forests can be maintained through carefully managed logging, prescribed burning and mowing. These forest management practices mimic natural processes like wind and fire, which allow mature forests to regenerate into young forest areas.

USFWS

Planting native shrubs on Cutts Island in May 2009. Planting these helps create habitat for the New England cottontail, which uses thickets, young forest and shrubland for its home.

The U.S. Fish and Wildlife Service is among numerous public and private entities working together to create young forest areas to support the New England cottontail and other wildlife species. A goal of the partnership is to create and manage enough suitable habitat for the cottontail population to grow and ensure its future.

New England cottontails are getting a helping hand at Ram Island Farm, a sprawling Maine estate that includes several family residences, a horse farm, hay fields, orchards, hundreds of acres of forest land and even beaches and dunes. The historic farm's owners are working with the Service and its partners to manage and maintain large areas of young forest on the property. Three 25-acre parcels are maintained through patch cuts (timber harvests that are smaller than clear cuts), mowing, removing invasive species and allowing unproductive fields to become overgrown.

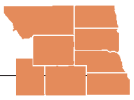
The effort, which began in 2007, is paying off. The area has the largest concentration of New England cottontails in Maine.

In Connecticut, Tom McAvoy is another private landowner joining the effort to restore the cottontail population. Over the years he's helped turn a family dairy farm, the appropriately named Cottontail Farm, from mostly open space into acres of young forest.

These two young forest projects focus on helping the New England cottontail, but other species also reap benefits, including many types of birds. The American woodcock combs the rich soil of young forests in search of earthworms—a staple of its diet—and uses the cover of thick brush to nest and provide protection for newly hatched chicks. Golden-winged warblers also nest on the ground, often finding a spot at the base of a shrub hidden by foliage.

Predator-prey relationships play out in young forests. The habitat is important for the hunters — bobcats and lynx for example; and the hunted — deer, turkeys, rodents, snakes and turtles.

By working with partners to identify the conservation actions that do the most good, the Service hopes to ensure populations of wildlife and their habitats are around for many years to come. Partnership efforts like the New England cottontail and young forest initiatives identify potential conservation sites and provide financial and technical assistance to landowners. These efforts are helping to keep young forests, and the species that depend on that habitat, a part of the landscape in the Northeast. □



mountain-prairie

Landscape-Scale Collaboration Helps Black-Footed Ferret Bounce Back

The black-footed ferret is considered one of the most endangered mammals in the United States. Its historic range spans much of the western North America's intermountain and prairie grasslands extending from Canada to Mexico. Once thought to be extinct, they were rediscovered in 1981 in Northwest Wyoming. These last remaining 18 ferrets became the genesis of the captive breeding program that has saved the species from and given hope that the species could be recovered in the wild.

Given the ferret's dependence on prairie dogs as food and their burrows for shelter, black-footed ferrets are entirely vulnerable to prairie dog habitat loss. European settlement across the North American prairie dramatically altered the landscape through farming and prairie dog eradication efforts. As their habitat and primary food source diminished, so did the black-footed ferret. In addition, sylvatic plague, an invasive disease lethal to black-footed ferrets and prairie dogs, has ravaged both species.

Despite these adverse impacts, vast areas of western rangeland suitable for strategic conservation of sufficient prairie dog habitat to recover the ferret remain across of the expansive landscape of the American West. Purposeful prairie dog (and ferret) management with specific conservation goals will be required, in collaboration with diverse stakeholder interests, to ensure the conservation of these species and many associated species.

Since 1991, state and federal agencies, Native American tribes, private landowners, non-profit organizations, and the North American zoo community have reintroduced thousands of black-footed ferrets into the wild. Beginning in Wyoming, reintroduction efforts have expanded to eight states, as well as Canada and Mexico.

Because ongoing recovery efforts encompass a broad landscape, the black-footed ferret has been identified as a possible surrogate species that could represent the health of the mid- and short-grass prairie ecosystem. Protecting and conserving the prairie landscape for the black-footed ferret will support many other species that call the western grasslands and sage-steppe prairie home. These species include eagles and other raptors, mountain plovers, burrowing owls, swift fox, three species of prairie dogs and the more than 100 species that live in close association with prairie dog communities.

RYAN HAGERTY/USFWS

The current Black-footed Ferret Recovery Implementation Team includes partners from 12 state agencies, Canada, Mexico, six tribes, eight federal agencies, six zoos and seven non-governmental organizations. Different subsets of these partners are actively involved in different states and for different reintroduction sites.

The U.S. Fish and Wildlife Service's Strategic Habitat Conservation (SHC) approach relies on an adaptive management framework and shared conservation goals. The Recovery Implementation Team, involving a broad conservation community, has been applying SHC principles to restore the black-footed ferret population.

Recovery of the black-footed ferret is attainable — from those 18 original ferrets, the total wild population of black-footed ferrets numbers about 800–1,000 individuals at 20 locations, according to the Black-Footed Ferret Recovery Implementation Team. But obstacles such as disease and prairie dog population management remain. As the Service continues working with partners to address the needs of the black-footed ferret, it will also be conserving many other prairie populations of fish, wildlife and plants. □

A Service biologist watches a black-footed ferret at the Black-Footed Ferret Recovery Program in Colorado.

Greater Sage-Grouse Conservation Benefits Many Species

Conserving the greater sage-grouse is an important effort throughout the West, and it comes with an added bonus: If the sage-grouse is managed properly, 150 to 200 other species that occupy the same habitat will also thrive.

The greater sage-grouse is a large landscape species found in 11 Western states and two Canadian provinces (Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota and North Dakota, and Alberta and Saskatchewan).

One of the most interesting aspects about the greater sage-grouse is its nearly complete reliance on sagebrush throughout much of its lifecycle. Many factors including energy development, wildfires and invasive plant species have contributed to the loss and fragmentation of the sage-grouse's primary habitat. The bottom line is that greater sage-grouse cannot survive in areas where sagebrush no longer exists.

The greater sage-grouse was designated as a candidate species in 2010 after the U.S. Fish and Wildlife Service determined that protection under the Endangered Species Act was warranted but that listing would be delayed while other listings of higher priority were addressed. This finding was a call to action.

Because the greater sage-grouse requires large expanses of sagebrush, addressing the ongoing threats to the species and its habitat is a landscape-level issue and requires the collective conservation efforts of the Service, the states, other federal agencies and local communities.

State fish and game agencies have been concerned about long-term declines in greater sage-grouse populations for more than a decade. In response, the Service joined with the Western Association of Fish and Wildlife Agencies (WAFWA), representing all of the Western state wildlife agencies, in 2006 to develop the Greater Sage-Grouse Comprehensive Conservation Strategy. The release of this strategy marked a true turning point, enabling a shift from conservation planning to conservation implementation incorporating adaptive management principles to inform and guide future management practices.

In addition to the overall conservation strategy, every state within the range of this species has, or is developing, its own state management plan to address localized issues with long-term solutions.

An example, the Wyoming sage-grouse core area conservation strategy is designed to ensure a population objective of maintaining up to 85 percent of the breeding sage-grouse in the state.

Since most of the greater sage-grouse habitat is on federal lands, the Bureau of Land Management and the U.S. Forest Service are also working with the states to address sage-grouse conservation on federally managed lands.

The Bureau of Land Management is aggressively addressing management for greater sage-grouse with the modification of 98 area plans. The Forest Service has adopted a similar approach by modifying

STEPHEN TING/USFWS

The greater sage-grouse cannot survive in areas where sagebrush does not exist.

21 national forest management plans to conserve key habitats.

The Natural Resources Conservation Service, with its long history of working with farmers and ranchers, is providing incentives for these landowners to conserve sage-grouse on private lands. To date the agency has invested more than $100 million in private land conservation for the benefit of sage-grouse, while maintaining the viability of large ranching operations.

Tribal participation in overall sage-grouse planning efforts has also been significant. Many tribes with sage-grouse resources are participating in local and state conservation efforts.

The Service is also revisiting management options on national refuge lands to ensure refuges are contributing to long-term conservation of this species.

WAFWA, state partners, the Service, the Bureau of Land Management, the U.S. Forest Service, tribal entities, the Natural Resources Conservation Service and the Farm Services Agency have cemented a true partnership that has begun to produce results for the sage-grouse.

And for the species it represents.

As Dr. David Naugle of the University of Montana and National Resources Conservation Service has said, the Brewer's sparrow, a fellow sagebrush inhabitant, will never get its own initiative. But it doesn't need one because of a focus on the sage-grouse. If the sage-grouse management succeeds, then the Brewer's sparrow and others that require sagebrush will benefit from the conservation efforts. □

alaska

STA meets SHC: Albatross Conversation Follows the SHC Model

Using Strategic Habitat Conservation (SHC), the U.S. Fish and Wildlife Service and partners, both national and international, are working to ensure recovery of the endangered short-tailed albatross (STA).

Survival threats are nothing new to the albatross. It has faced down extinction before and survived.

By the turn of the 20th century, millions of these majestic seabirds—with their golden head and distinctive bubble-gum pink bill arguably the handsomest of the three albatross species that inhabit the North Pacific—had been harvested for their feathers and eggs. By the 1930s the species was believed extinct. A few breeding pairs were found in the 1950s, and the short-tailed albatross population is now estimated at 3,100 individuals (500–550 breeding pairs) worldwide.

But recovery is far from assured.

Part of the problem is that the birds, which forage extensively along Alaska's Aleutian Island chain, nest in only two places: the Japanese island of Torishima, which hosts approximately 85 percent of the world's breeding population, and the Senkaku Island group.

Japan, China and Taiwan all claim title to the Senkaku Islands, contributing to management instability. And Torishima is an active volcano, with the main breeding site perched on a steep eroding slope.

One catastrophic natural event, such as a volcano, flood or hurricane, or political turmoil could severely hurt the species' chances.

Now, SHC is coming to STA's aid.

Biological Outcomes

The first step in SHC is to establish targets or biological outcomes to work toward.

The Short-tailed Albatross Recovery Plan, completed in 2008, set a goal of reducing threats and increasing population numbers to the point that protection under the Endangered Species Act is no longer necessary. One goal is the establishment of at least one additional breeding colony in a safe and protected location. An established colony consists of at least 50 breeding pairs and, at a minimum, a three-year running average growth rate of at least 6 percent for seven years or more.

Conservation Design

The Short-tailed Albatross Recovery Team had to determine how to reach those outcomes. One way was by "jump-starting" new colony formation by translocating chicks to a safe colony site. But this had never been done before with the short-tailed albatross, so key uncertainties needed to be addressed before full-scale implementation could occur.

Conservation Delivery

Pilot studies in 2006 and 2007 showed some success in translocating and rearing the two more abundant albatross species native to the North Pacific, the Laysan and black-footed albatrosses. The studies also allowed the team to refine its techniques.

GREG BALOGH/USFWS

A short-tailed albatross chick "meets" a decoy (left) on Mukojima Island.

YAMASHINA INSTITUTE FOR ORNITHOLOGY

Translocated short-tailed albatross chicks check out their new home on Mukojima Island.

So in February 2008, the Yamashina Institute for Ornithology (YIO) transported 10 short-tailed albatross chicks to Mukojima, a historical short-tailed albatross nesting island about 215 miles south of Torishima. Here, an artificial colony had been set up, with realistic decoys, artificial eggs and a solar-powered sound system playing vocalizations recorded at the Torishima breeding colony. All 10 of these chicks fledged in May 2008.

This effort was so successful that YIO has moved and reared 15 chicks each year since, and all have fledged.

Monitoring

The success of this effort is measured by how many chicks are successfully fledged and how the chicks behave post fledging. All 55 chicks translocated to Mukojima since 2008 were successfully reared to fledging. Satellite telemetry data from a sample of fledglings tracked each year have shown comparable movements of hand-reared versus parent-reared fledglings from Torishima. In 2011, six subadults that had been hand-reared in 2008 and one from 2009 were observed on Mukojima. Although these birds were still too young to breed, some were observed practicing courtship dancing, confirming that at least some hand-reared chicks survived, recognized their own species, and may consider Mukojima a breeding site.

After the fifth and last translocation in 2012, both Torishima and Mukojima will be monitored annually to determine short-tailed albatross population status and inform planning for future actions.

Refinements

Refinement is a key part of SHC. The Service must go where the science leads.

In the case of the short-tailed albatross, food-preparation and chick-handling procedures were revised, significantly reducing the potential for spread of disease among translocated chicks.

Moving 15 chicks not just 10 was another refinement, which greatly boosted the output of fledglings from the new colony site.

The future looks brighter for the short-tailed albatross, and the STA has SHC to thank. □

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parting shots

A group interested in conserving and restoring the longleaf pine forest to meet bird population objectives used a Decision Support Tool, which used six birds to help find the most important areas of forest. Later, the tool was broadened by adding the gopher tortoise. Birds are apparently good surrogates for the tortoise, though. The changes were barely noticeable on the landscape scale. Read about the project in "Birds of a Feather Linked to an Open Pine Forest" on page 12.

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