U.S. Fish & Wildlife Service
National Wildlife Refuge System

Refuge Update

July/August 2008 Vol 5, No 3

Inside

It's Not All Natural

The National Wildlife Refuge System spans more than 97 million acres across 548 national wildlife refuges. To see some of the nation's most spectacular wildlife and habitat, Americans need roads, trails, parking lots and even bridges. We've got them:

- More than 4,800 miles of paved and unpaved public roads; 5,400 miles of administrative roads.
- More than 5,125 parking lots.
- 265 public bridges.
- More than 1,500 miles of foot trails and boardwalks

First-Ever Leadership Day Set for October 27

The first-ever Leadership Awareness Day on October 27 will enable Refuge System employees to focus on their own leadership development while supervisors complete leadership assessments in consultation with their supervisors. Pictured here are some members of the Refuge System's leadership team, including Regional Refuge Chiefs, who meet face-to-face three times each year. (USFWS)

When people in the U.S. Fish and Wildlife Service talk about leadership, they point to Paul Kroegel, the first refuge manager, who petitioned President Teddy Roosevelt to establish Pelican Island as the first national wildlife refuge. We recall Ding Darling, Chief of the Bureau of Biological Survey – the precursor of the Service – who jump-started the effort to purchase and restore wildlife habitat. We point to J. Clark Salyer, the first Chief of Refuges, who drove across the country in a battered government-issued car to lead a tremendous expansion of the Refuge System.

Unquestionably, they were all leaders.

But for the past 100 years, Refuge System field employees have given unassuming leadership. They have enlarged the Refuge System – both physically and programmatically – and they are leaving a conservation legacy that a new generation will value.

The Refuge System will celebrate that leadership – and the opportunity to expand professional development – as it declares the first-ever Leadership Awareness Day on October 27, the birthday of President Theodore Roosevelt. On Leadership Awareness Day, Refuge System employees will focus on their own leadership development and become familiar with Service Manual Chapter 230 FW 7, which implements recommendations put forward in the Refuge System's vision document, *Fulfilling the Promise*.

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H. Dale Hall

From the Director
Pain at the Pump

With gasoline running about $4 a gallon, Byron Fortier of the Southeast Louisiana Refuge Complex wondered why he hadn't noticed fewer people applying for RV pads in exchange for volunteer work at the national wildlife refuge – until one visitor gave away the reason. "We're all looking for a beautiful place to stay for a while. These days, we can't afford to drive around."

National wildlife refuges, not unlike the RV community, are feeling the fuel pinch. Whether it's operating heavy equipment for maintenance or building a new boardwalk, refuge managers are watching fuel costs take a hefty bite out of their plans. And it could have been worse if the U.S. Fish and Wildlife Service had not already been working on energy conservation for years.

Last fiscal year alone, 70 field stations implemented remarkable energy efficiency retrofits and renewable energy projects. Nine Service facilities – eight of them on national wildlife refuges – have been designated as Federal Energy Saver Showcases. One of the Showcase winners, Tualatin National Wildlife Refuge in Oregon won the Service's Environmental Leadership Award and now reserves three parking spaces for visitors driving hybrid cars.

In Montana, the 1.1 million-acre Charles M. Russell National Wildlife Refuge launched its environmental management system years ago, addressing everything from upgrading fleet fuel efficiency to creating on-site power generation. And recently, the new administrative and visitor facility at the Nulhegan Division of the Silvio O. Conte National Fish and Wildlife Refuge in New England became the first Service facility to receive national ENERGY STAR designation.

We're making progress, but the ambitious new targets established under the Energy Independence and Security Act of 2007 will require substantial investment. Like other federal agencies, the Service must reduce its energy use by 30 percent by 2015. That level of energy reduction will save some $27 million through fiscal year 2015 – but that goal may cost at least $39 million to reach. However, over the long haul, this investment will give benefits for the Service and the resources we're working to protect.

We're committed to the concepts and mission of the Energy Act. And as conservationists, we can view responsible energy management as an extension of our work to sustain the Nation's natural resources for tomorrow's generations. As always, refuges are leading a way to that brighter future. So let's be inspired by this new direction and innovative spirit as we work toward the goal of energy independence. ◆

Geoff Haskett

Chief's Corner
Making Every Penny Count

When Congress increased the National Wildlife Refuge System's budget by $39 million for this fiscal year, legislators expected we would do great things with the extra money. We have, and we're proud to report on some.

As we turn to renewable energy alternatives, we still don't know how wind turbines will affect wildlife. So, Kulm Wetland Management District in North Dakota has just finished the first year of a three-year survey to see what happens to breeding dabbling ducks.

This is just one step in facing a complex question – but it's a good first step.

In California, San Joaquin River Refuge has undertaken the nation's largest effort to recover the highly-endangered riparian brush rabbit. What's good for one species is often good for others. Thanks to the riparian restoration, San Joaquin River Refuge found a nesting pair of least Bell's vireos, a species that has not been known to nest in the Central Valley for more than half a century.

What's good for species is just as good for the overall quality and quantity of

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Refuge Update

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Restoring the Raptor with the Steel-Gray Feathers

Aplomado Falcons in Southwest Texas

Aplomado falcons now regularly nest and inhabit their former historic range in the coastal prairies of South Texas, including Laguna Atascosa, Lower Rio Grande Valley and Aransas National Wildlife Refuges, as well as the Chihuahuan Desert Grasslands of West Texas and New Mexico. This is a dramatic recovery from the 1950s, when the Aplomado falcon was considered extirpated in the United States.

The falcon was designated an endangered species in 1986. Its recovery is a story of partnership, trial and error, creativity and innovative use of endangered species legislation.

Most agree that the Aplomado's decline was attributed to grassland habitat degradation, but skin and egg collectors (oologists) bear some of the blame for the population decline around the turn of the 20th century. Service wildlife biologist Chris Perez says the falcon was already in serious decline by the time DDT was in widespread use after World War II, but pesticide exposure generally may have prevented recovery.

The Peregrine Fund, a private non-profit group devoted to conservation of birds of prey in nature, is largely responsible for managing restoration of the Aplomado falcon on refuge lands and adjacent private lands. National wildlife refuges provide lodging, vehicles and access to property.

Almost a decade after the Aplomado was listed as endangered, the release phase of the restoration program was initiated. Twenty-six birds were released at Laguna Atascosa Refuge in 1993. Two years later, the first known successful hatching and fledging of a wild Aplomado in the U.S. in more than 40 years was documented on a powerline pole near Brownsville, Texas.

Perez, who, as a graduate student in the early 1990s, was following the Aplomado's survival, movements and habitat use, recalls that both humans and birds learned some lessons the hard way. "Early on," says Perez, "the falcons, which had no parental guidance, would perch on the ground or a fence post where they were vulnerable to predation by coyotes and owls."

Natural productivity was also low because of nest predation by raccoons and caracaras among others. In 2004, Peregrine Fund biologists developed artificial nesting platforms, placed throughout Laguna Atascosa Refuge and Matagorda Island to improve survival rates. Prior to implementing the nest box program on Matagorda Island, productivity for this population of falcons was approximately 0.4 young per nest. "With the nest structures," says Peregrine Fund biologist Paul Juergens, "productivity shot through the roof to 1.9 young per nest. At this rate, population expansion was possible, and we began seeing the falcons on neighboring barrier islands."

With the help of a captive breeding program, Aplomado falcons now regularly nest and inhabit their former historic range in the coastal prairies of South Texas. (Chris Perez/USFWS)

Falcons Thrive on Matagorda Island

At the Peregrine Fund's request, the Service also provided a Safe Harbor Agreement to encourage private landowners to participate in the restoration of the species. The agreement, unusual because of its implementation by a non-governmental organization, protects landowners from the potential liabilities associated with the Endangered Species Act while providing access to high quality habitat essential for the falcon's recovery. Two million acres of private land are covered by the Safe Harbor Agreement.

By 2004, falcons were no longer being released in South Texas because the population was doing so well. Aplomado falcons now appear to occupy all available habitat on Matagorda Island and Laguna Atascosa Refuges. By 2007, 1,393 captive-bred falcons had been released in Texas and New Mexico.

There are now 45 to 50 breeding pairs in the southwest. "I've always felt that the captive breeding and re-introduction of falcons to south Texas by the Peregrine Fund was absolutely the best tool in the conservation toolbox," says Perez. ◆

Border Protection vs. Wildlife

Cabeza Prieta National Wildlife Refuge in Arizona is working closely with the Department of Homeland Security to mitigate the impact of border fencing on the endangered Sonoran pronghorn. (Ryan Hagerty/USFWS)

It is the goal the Department of Homeland Security (DHS) to build 670 miles of vehicle fencing, surveillance towers, movement sensors or solid barriers along the border between the United States and Mexico by the end of this year. The Department of the Interior – including the National Wildlife Refuge System – manages so much of the land along this border that DOI established the position of National Borderland Coordinator.

Rick Schultz, former Chief of the Division of Natural Resources and Planning, now holds that position. In testimony in April before the House Subcommittees on National Parks, Forests and Public Lands and Fish, Wildlife and Oceans, he said the barriers pose particular challenges because of the "extremely compressed time frame, the use of several contractors and subcontractors and the complexity of issues." There is also the REAL ID Act, which allows the Secretary of Homeland Security to exempt the barriers from environmental assessments or legal challenges because of national security.

The complexity of the border issues confronts refuge managers on a daily basis. Roger DiRosa, recently retired manager of Cabeza Prieta National Wildlife Refuge in Arizona, and his assistant manager Curt McCasland say border issues take up to 70 to 85 percent of their time everyday. "It's a war zone," DiRosa was fond of saying last year. "We're into triage in deciding what to sacrifice in the environment to achieve border security."

Issues are Tough, Discussions are Cordial

Many months after DiRosa's statements, circumstances are changing to some degree. Schultz testified in April that there is "a positive relationship between DHS and DOI," adding that, "DHS has shown a positive commitment in recognizing its environmental stewardship responsibilities for endangered species, wetlands and cultural resources."

On the local level, McCasland agrees: "DHS wanted two access roads to the border, which would have meant five miles of road construction in the wilderness. We got them to use one route where there was only ¾ mile impact and construction staging was moved entirely out of the designated wilderness area." Construction is scheduled to begin in the fall.

DHS' commitment to environmental stewardship includes $50 million in mitigation funding for threatened and endangered species. In the case of endangered Sonoran pronghorn, DHS is providing $811,980 to the U.S. Fish and Wildlife Service for wells, forage enhancement plots and associated water supplies to begin developing a second pronghorn population in southern Arizona.

McCasland is also participating in negotiations about surveillance towers proposed for the middle of the pronghorn range. "The towers would have to be maintained, requiring generators running in wilderness areas and trucks driving in supplies. Most interdiction of illegal migrants will come near the towers. Pronghorn avoid areas of high activity and we could lose the population on the western part of the refuge." But McCasland says discussions are cordial and negotiations over the towers continue. They are scheduled to be built in 2010.

"It will not be possible to provide wildlife access to water over or through a flood protection wall," says Winton. "More refuge lands will be impacted and there will be more habitat loss." For now, he says, "We are marking time…we have decent communication with DHS even though we feel somewhat powerless."

Confronting Urgent Issues

Refuge managers acknowledge the urgent need to confront border issues. Refuge volunteer Bruce Davis, a retired UPS driver, joins McCasland for a 72-mile, four-and-a-half day hike across Cabeza Prieta Refuge each year to catalog the debris – from clothing and water bottles to backpacks – left behind by migrants.

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After Stunning Losses, Changes for the Cranes' Future

After a 2007 winter storm killed 17 young whooping cranes, the Whooping Crane Eastern Partnership has a plan for avoiding future such disasters. (WCEP)

In response to the stunning losses of February 2007, when an unusually severe winter storm killed 17 of the 18 young cranes that had migrated behind ultra-light planes from Necedah National Wildlife Refuge to Chassahowitzka Refuge, the Whooping Crane Eastern Partnership (WCEP) announced that it hopes to split the Class of 2008 into two groups after they arrive in Florida this fall.

Since 2001, young whooping cranes have been raised at Necedah Refuge in Wisconsin, where they are trained to follow the ultralight aircraft that lead them along their 1,250 mile migration route to Florida.

The crane partnership still has a number of operational, logistic and financial matters to sort out. But under a plan announced in February, one group of whoopers would winter at Chassahowitzka Refuge and the other group at St. Marks Refuge, also in Florida.

"Wintering the young cranes at two separate sites in Florida will require greater effort and expense but will protect the tremendous investment of dollars and hope invested in the these magnificent birds," the partnership said in a statement. Dividing the flock would also increase opportunities for young cranes to socialize and form pair bonds on their winter grounds. At the same time, the responses of the cranes would advance the WCEP's understanding of whooping crane ecology and help shape future management.

Other changes are already in place. The young birds killed in February 2007–members of the "Class of 2006"–had been confined in a pen that was enclosed on top to keep predators at bay. The partnership's report on the incident called for new protocols at the pen site, including installation of a fencing system that releases the birds if waters rise. The new fencing was already in place when the 17 young cranes in the Class of 2007 arrived at Chassahowitzka Refuge on January 28.

At St. Marks Refuge, in Florida's panhandle region, a salt water marsh would be closed to the public to accommodate the cranes, and a pen site would have to be established. Permits from the Florida Department of Environmental Protection are required for the planned modifications. Comments from people in communities near St. Marks are being sought in connection with the project.

Meanwhile, at Necedah National Wildlife Refuge, the Class of 2008 is starting to fill up. If all goes well, the cranes usually begin flying south during the first or second week in October. You can follow the young birds' progress at an Operation Migration Website, http://www.operationmigration.org/Field_Journal.html ◆

Where Botulism is Killing Waterbirds

by Mark Breederland and Joyce Daniels

Thousands of waterbirds – among them common loons, piping plovers, red-necked grebes and long-tailed ducks – have been killed by type E botulism poisoning over the past two years along the shores of northern Lake Michigan. The die-offs were the latest in a stream of similar events that have occurred in the Great Lakes region with increasing frequency since 1999.

In October and November 2007, a nonprofit research group surveyed nearly 100 miles of Lake Michigan shoreline and documented more than 2,000 bird moralities, including 520 common loons. Most of the loons were adults. Among their discoveries was a color-banded adult common loon from Seney National Wildlife Refuge.

"Our loon population is a source of pride and identity for the refuge, its staff and volunteers," says Seney Refuge project leader Tracy Casselman. "We are very concerned about the impacts of botulism outbreaks. In a species with low reproductive rates, such as loons, this type of mortality could have a devastating impact on the population in a relatively short period of time."

Botulism is a neuromuscular disease caused by the bacterium *Clostridium botulinum*. Botulism spores, the resting stage of the bacteria, occur naturally in many North American lakes. Under certain environmental conditions, the spores germinate, multiply and produce a highly-potent toxin, which is then passed up the food chain.

Scientists, who have been collecting information on type E episodes since the early 1960s, are still puzzling over the exact cause of the outbreaks and specifics of how the toxin is transmitted to birds.

Role of Invasive Species

At least part of the blame is assigned to invasive species. The fish-eating birds that die often are found to have eaten the invasive round goby, a fish that now occurs in large numbers in some parts of northern Lake Michigan. When gobies ingest the toxin, they change color, possibly providing a visual clue to waterbirds that they are weakened. Other birds are afflicted after they eat invasive mussels.

At the same time, excess phosphorus contained in runoff has stimulated growth of *Cladophora* algae, which now forms thick mats in some near-shore areas of Lake Michigan. When the algae dies in summer, the decomposition process depletes oxygen. As these environmental factors converge, they create a nutrient-rich, anaerobic habitat that allows botulism spores to germinate and produce the toxin.

Type E botulism outbreaks appear to follow a similar pattern in other Great Lakes locations that begins with small-scale die-offs of gulls, cormorants and terns in mid-late summer. Later, migrating shorebirds such as sanderlings, plovers and sandpipers can be affected after they eat insects that have fed on the carcasses. Large-scale die-offs in the thousands may begin in late September, peak in late October and November, and involve primarily predatory fish-eating species.

Wildlife managers have been encouraged to assist in early detection of a type E botulism event. This is extremely important because testing and confirmation of type E botulism must be done on "fresh" bird (or fish) carcasses. In some cases, depending on the remoteness of the shoreline, this may involve preserving a carcass on ice during transport to a wildlife testing laboratory.

Thousands of water birds have been killed by type E botulism poisoning over the past two years along the shores of northern Lake Michigan. The die-offs have been occurring in the Great Lakes region with increasing frequency since 1999. (USFWS)

For responding to public inquiries about suspected die-offs, consistent messages are being developed by managers that include contact information as well as safety precautions pertaining to collection and disposal of carcasses. If left on shore, the carcasses themselves can become a source for the botulism toxin. ◆

Mark Breederland and Joyce Daniels are with the Michigan Sea Grant Program.

Annual Funding Agreement for Bison Range Complex

The U.S. Fish and Wildlife Service and the Confederated Salish and Kootenai Tribes of the Flathead Reservation signed an annual funding agreement on June 19, outlining the activities the Tribes will perform at the National Bison Range in Montana during fiscal years 2009-2011.

One of the oldest refuges in the nation, the Bison Range lies within the boundaries of the Flathead Indian Reservation.

"With this agreement, the Fish and Wildlife Service and the Confederated Salish and Kootenai Tribes are entering into a new era of partnership and cooperation that will enhance National Bison Range and its fish and wildlife resources for all Americans," said Interior Secretary Dick Kempthorne. "I commend Service and Tribal staff for moving forward and building on the expertise and strengths of both organizations to conserve this special place."

"The Bison Range occupies a special place in the hearts of Tribal members. I know the passion that they have for the land of their ancestors, and for the wildlife that sustained them. Fish and Wildlife Service employees also care passionately about the future of Bison Range, and I strongly believe this agreement will serve to bring everyone together to accomplish great things for the refuge," said Service Director H. Dale Hall.

The U.S. Fish and Wildlife Service and the Confederated Salish and Kootenai Tribes of the Flathead Reservation have signed an annual funding agreement that outlines activities the Tribes will perform at the National Bison Range in Montana during fiscal years 2009-2011. (USFWS)

The agreement was negotiated under the 1994 Tribal Self-Governance Act. Under the Annual Funding Agreement (AFA), the CSKT will assume a substantive role in managing mission-critical programs at the Bison Range. The Bison Range manager, who will continue to be a Service employee, will have final authority on management direction, approval of plans, refuge uses and priorities. A refuge leadership team, composed of wildlife and land management professionals from both organizations, will inform those decisions.

Examples of the activities CSKT will perform at the Bison Range include the annual bison round-up, migratory non-game bird surveys, waterfowl pair counts, bird banding, vegetation monitoring, GIS mapping and invasive plant control.

The AFA creates a government-to-government relationship and is not a move toward privatizing the Bison Range, which will remain a unit of the National Wildlife Refuge System. The Service will maintain ownership of and management authority over all lands and buildings, and will retain law enforcement authorities.

The AFA was transmitted to the Senate Indian Affairs Committee and the House Natural Resources Committee for a 90-day Congressional review. Following review by the committees and any other interested member of Congress, the AFA will be phased in during the first quarter of fiscal year 2009. ◆

Leadership Day – *continued from pg 1*

Fulfilling the Promise developed a whole chapter to leadership. The Manual chapter, adopted in April 2004, can be found online at: http://www.fws.gov/policy/230fw7.html. The Leadership Development Program embodied in the chapter seeks to define critical leadership skills for the Service, which, like so many federal government agencies, is facing high retirement rates. The program also works to prepare a cadre of effective leaders.

During Leadership Awareness Day, supervisors in the Refuge System – right up to the top of the leadership ladder – are being asked to complete leadership assessments in consultation with their own supervisors. The leadership assessment uses questionnaires and other tools, as well as personal observations, to evaluate leadership effectiveness and promote self-awareness among employees. Such assessments take place throughout an employee's career to help individuals get to know their leadership strengths and their developmental needs. ◆

Strategic Habitat Conservation:

Fulfilling Our Mission in a Rapidly Changing World

by Kathryn Owens
introduction by Dan Ashe

SHC is a tool and a philosophy that will help us overcome conservation challenges.

After I was asked to write about Strategic Habitat Conservation, *I had two thoughts: Pull out my well-worn copy of* Fulfilling the Promise *and talk with someone in the field. Re-reading* Fulfilling the Promise *is always inspiring. Nearly a decade after we laid the foundation of this vision, its words remind us of why we are now embracing a population-based approach to landscape conservation.*

The document tells us that "Refuges are places where wildlife comes first." And that within the Refuge System, "An emerging philosophy … will emphasize habitat and species population objectives based on a broader view that considers not only refuge purposes, but national, regional and ecosystem level priorities." Refuge acquisition and management will have a landscape context, reflecting "the spatial and biological relationship of the station with surrounding public and private lands." The time and opportunity has now come to fulfill this promise and embrace this emerging philosophy.

I reached out to Kathryn Owens, deputy manager at Virginia's Back Bay National Wildlife Refuge. Kathy, a graduate of the Service's Stepping Up to Leadership Program, has assisted the National Technical Advisory Team for Strategic Habitat Conservation. We began with the goal of coauthoring this article, but when I read her contribution, I knew that it should stand on its own.

Ensuring a Rich Inheritance

Having recently moved near the Atlantic Ocean, I take every opportunity to appreciate the great expanse of open water and sky. This view inspires questions about where we are, where we are headed and how to adjust our compass when we get off course. Of late, a not-so-subtle haze has crept across my view – a miasma of urban growth, climate change and other human influences. How do we manage for these increasingly complex challenges? How do we ensure that a rich inheritance of fish and wildlife will be the legacy that we pass to our children and grandchildren?

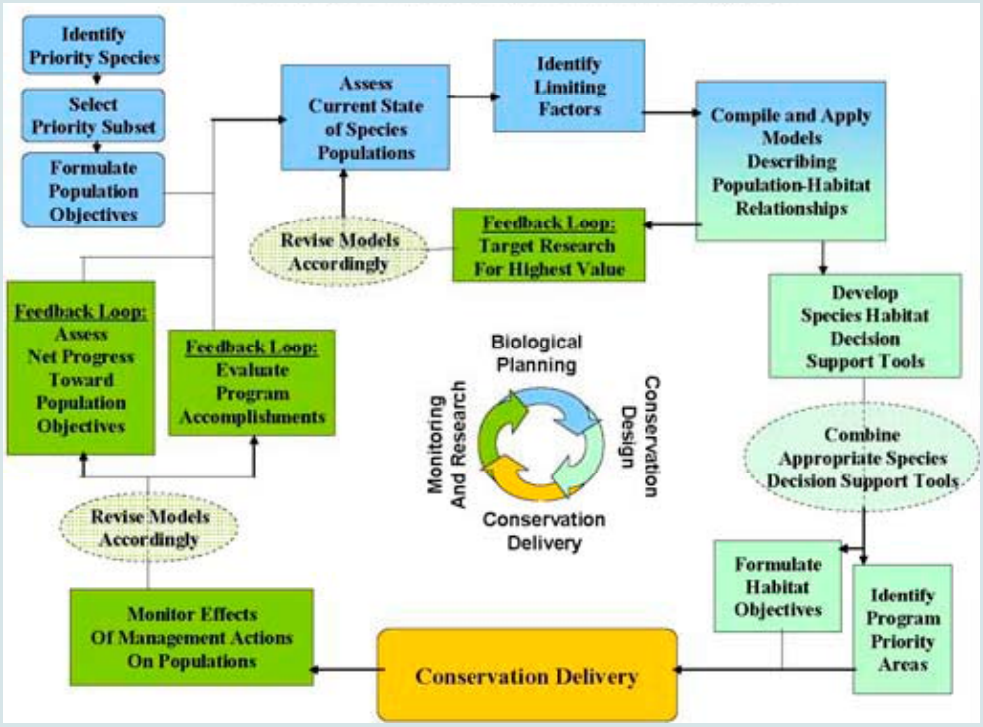
Clearly, our profession is struggling to keep pace with these challenges, which demand not just willingness but also passion for change. In the Service, we have an opportunity to change our approach through the application of Strategic Habitat Conservation (SHC).

During my 18 years with the Service, I have worked with the best and the brightest. Our calling is bold, and we take pride in our duty, continually striving to help "save the planet." In times of difficulty, we come together.

I recently had the opportunity to

Looking to the future: How can we ensure that we pass on to our children and grandchildren a rich legacy of fish and wildlife? (USFWS)

Delivering Conservation Effectively



Strategic Habitat Conservation is a thoughtful and deliberate approach to conserving the species that have been placed in our trust and the habitats that sustain them.

meet with the national SHC Technical Advisory Team and the Executive Oversight Committee to begin to address our future direction. The Advisory Team promotes communications about landscape-level conservation and the effective implementation of SCH. The Oversight Committee, whose members are the Service Directorate and members of the U.S. Geological Survey Executive Leadership Team, oversees the Technical Advisory Team.

As I interacted with these biologists, project leaders and Directorate members, I heard how far we've come with this approach to conservation.

Thus far, the concepts and directions of SHC have been delivered to refuges through the *Final Report of the National Ecological Assessment Team* and a technical handbook produced by the Advisory Team. In Region 5, we have general fact sheets and other informational products, a concept plan and a draft of a document called *Identifying NWRS Resources of Concern and Management Priorities for a Refuge* that highlights SHC. The latter aids in the development of refuges' Habitat Management Plans and Comprehensive Conservations Plans. Written to help steer management decisions, the plans provide us with opportunities to specifically integrate the elements of the SHC framework into strategies.

Seeking a common goal of landscape level population sustainability, we have searched for opportunities within the Service and among partners to improve understanding and encourage the use of the SHC framework. A new communications strategy recommends a strong emphasis on consistent internal and external communications. Among other venues, we're discussing cross-programmatic workshops and site visits to encourage two-way dialogues with field staff. Toward those ends, informative material such as Fact Sheets, Frequently Asked Questions and an improved website are now in the works.

Growing Pains

As with any transformational change, there is understandable skepticism and concern. Over the course of our careers, we have seen waves of change come and go – some bringing treasure, others simply moving the sand to and fro (or out from under our feet). We share the occasionally overwhelming frustrations of budget shortfalls, never-ending emails, administrative demands and increasingly sticky red tape.

But this wave of change brings hope; it is about proactively addressing complex challenges, in spite of our daily frustrations. Challenges such as climate change will progressively test our conservation efficacy and there will be high prices to pay for our mistakes. By using the framework and guiding principles of SHC to identify priorities, set population objectives, monitor and adaptively manage on a landscape level, we can minimize those mistakes while working to achieve our mission.

Strategic Habitat Conservation is science. It's a tool, and it's a philosophy. It's a thoughtful and deliberate approach to conserving the species that have been placed in our trust and the habitats that sustain them. The more we take advantage of this opportunity, the greater our chances of overcoming conservation challenges and ultimately accomplishing what we're striving to do – help save our planet – one strategic step at a time. ◆

Kathryn Owens is deputy manager at Virginia's Back Bay National Wildlife Refuge. Dan Ashe is science advisor to the Director.

Making Sense of the Acronyms

by Michael C. Runge

We're hearing a lot these days about SHC, ARM and SDM. What are these things, how do they relate and what do they mean to national wildlife refuges? To explain, we need to start from the bottom and end up with SHC.

Structured Decision Making (SDM) breaks a decision down into components (objectives, actions and models), analyzes those separately and then integrates them to arrive at a recommendation. It also puts a premium on value-focused thinking, that is, starting out with clear objectives. For instance, a refuge that wants to improve an impounded wetland could use SDM to evaluate whether and how to proceed, taking into account all the costs and benefits.

Application of SDM within U.S. Fish and Wildlife Service and the U.S. Geological Survey emerged from the interests of a small group of ecologists and other scientists. It is becoming an important approach across programs and regions. The National Conservation Training Center (NCTC) offers a course on SDM.

Adaptive Resource Management (ARM or just AM) is a special case of SDM that recognizes that many decisions are repeated, giving the Service the opportunity to improve management by applying the learning that occurs through experience. ARM is as formal a process as SDM; it adds the element of monitoring to provide the feedback that reduces uncertainty For instance, a refuge (and its landscape partners) might use ARM to improve prairie restoration practices over time, by explicitly focusing on how different practices affect the desired management objectives.

The beginnings of ARM trace back to fisheries management in the 1970s, when there was a desire to use monitoring data

We are hearing a lot these days about SHC, ARM and SDM. What are these things, how do they relate and what do they mean to national wildlife refuges? (USFWS)

Resources need to be strategically allocated to measures that will matter most to trust species.

Evaluating Conservation Delivery

Managing Habitat: What Works Best?

by Melinda Knutson and Hal Laskowski

National wildlife refuge managers need to know whether or not their management actions are achieving the resource objectives they have set. Evaluating management practices is especially important in the face of future climate change. What works today in one location is not necessarily what will work there in the future; we need more efficient systems for tracking how management affects the resource and under what conditions. That is why devising ways of evaluating the conservation delivery phase of Strategic Habitat Conservation through monitoring is so important.

Monitoring can take many forms and can be costly in terms of staff time. Designing efficient biological monitoring to evaluate management actions requires the expertise of refuge managers, biologists and partners.

During fiscal year 2008, national wildlife refuges in Regions 3 and 5 are focusing on six specific management problems as case studies for evaluating management practices through monitoring. We have assembled project teams for each of the problems and held workshops, called Adaptive Management Consultations, as a part of the effort.

We are using a new process – Structured Decision Making (SDM) – to clarify management objectives, select among possible management actions and evaluate resource responses. SDM provides a set of tools used widely in manufacturing and the corporate world to make 'smarter'

to resolve fundamental uncertainties about how fish stocks responded to harvest. Recently, it has become a focus for the Department of the Interior. Both the Service and USGS have a fair amount of expertise in applying ARM. A new course on ARM will be offered in September at NCTC.

Strategic Habitat Conservation (SHC) is, in part, adaptive management for habitat conservation at the landscape level. By focusing on the landscape level, SHC recognizes that for the Service (and other conservation agencies) to be effective, it needs to be strategic about allocating resources to measures that will matter most to trust species; this requires taking a broad view of habitat requirements and limitations.

By having at its core ARM (and by connection, SDM), SHC recognizes that the Service needs (1) a structured process for conservation planning; (2) to be objective-driven; (3) predictive models for managed systems, including acknowledgement of the uncertainties that challenge our decisions; (4) to use monitoring wisely to improve our management, and (5) in the end, effective means of delivering conservation, which often means extensive partnerships and collaboration.

What does this all mean to refuges? Many of the elements of SDM, ARM and SHC are integral to *Fulfilling the Promise*. Comprehensive Conservation Plans (CCPs) are objective-driven; they emphasize the development of overarching objectives for a refuge and place all management decisions in that context. Habitat Management Plans that step down from CCPs acknowledge that habitat management is the means by which refuges most effectively deliver conservation. Finally, the function of the Annual Habitat Work Plans is to place habitat management in an adaptive context.

Clearly, refuges are already engaged in structured decision making and adaptive management of habitats. Does that make it Strategic Habitat Conservation? Not quite yet. The next step comes in recognizing how individual refuges sit in the landscape and region, and participating as a partner in a larger context. How do the habitat management decisions made at the station level enhance the ability of the Service (and its partners) to achieve its objectives at the landscape level?

In many regions, refuges are participating in such discussions by identifying regional objectives and priorities for management. The USGS Refuge Cooperative Research Program, a competitive funding program, and the Biological Monitoring Team, a partnership between the Northeast and Great Lakes-Big Rivers regions, have funded a number of multi-refuge research projects to develop predictive models and decision frameworks that will support SHC (*see article by Melinda Knutson and Hal Laskowski, below*).

These three concepts–SDM, ARM, and SHC–are reinforcing approaches to land management. Each places a premium on clear objectives, provides a management

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National wildlife refuges in Regions 3 and 5 are focusing on six specific management problems as case studies for evaluating management practices through monitoring. (USFWS)

decisions. We are modifying the tools for application to land management and natural resources decisions. This is a U.S. Fish and Wildlife Service cooperative project with biologists from the U.S. Geological Survey. Workshops that included a dozen or so refuge staff and partners were held to initiate adaptive management projects on these six management problems or issues:

Salt marshes and fire. Salt marshes at Blackwater National Wildlife Refuge in Maryland have been managed with fire for decades; we are evaluating the effects of different burn frequencies on vegetation, birds and changes in open water and elevation.

Invaders and native grasslands. Non-native grasses such as brome are invading native grasslands in the Midwest. We are evaluating alternative management practices designed to maintain or restore high quality native grasslands in Minnesota.

Nesting seabirds on islands. We explored ways to improve habitat structure on intensively managed islands at Maine Coastal Islands National Wildlife Refuge and apply what we learn to islands that are not now being managed. *(A story on Maine Coastal Islands Refuge's managed islands appears on page 14.)*

Invaders and shrublands. Invasive shrubs complicate efforts to restore and maintain native shrub communities. We are comparing low- versus high-cost management strategies at four field stations in Region 5.

Sediment excavation and small wetland restoration. Removing sediment from a basin during restoration is costly, but preliminary evidence indicates that it could greatly improve quality. We designed a project to evaluate this practice at field stations and private lands in Region 3 to determine the cost effectiveness.

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Taking Broader Views for Migratory Birds

A growing number of Refuge System managers are using the Strategic Habitat Conservation framework to obtain a broader view of migratory bird movements and resource needs. (USFWS)

by Patricia Heglund, Tony Leger, Hal Laskowski and Socheata Lor

All around America, the changing land use practices and developments that are closing in on national wildlife refuges have been accompanied by large-scale habitat alterations along traditional migratory bird flyways.

A case in point: Large numbers of migrating canvasback regularly stopped at Lake Christina in Douglas County, MN. Things began to change in the late 1940s. As the lake became excessively murky, the aquatic vegetation that had provided highly nutritious food for waterfowl no longer flourished.

By the late 1950s, few canvasbacks stopped at Lake Christina. Instead, most of the ducks flew farther along their migration pathway to find food and places to rest. In the process, the birds shifted their main staging area from west central Minnesota to the Upper Mississippi River.

Scenarios like this one are played out at refuges (and other public lands) as resources and migration pathways evolve. Refuge System managers focus on providing birds with high quality food and access to undisturbed areas for resting and refueling and *hope* that birds are finding similar resources elsewhere along their migration routes.

Many refuges regularly monitor waterfowl and shorebird use-days. But this monitoring only reveals information about a particular location and little or nothing about conditions at other points along the flyway. Hope is not good enough.

That is why a growing number of managers are using the Strategic Habitat Conservation (SHC) framework to obtain a broader view

Where SHC Has Been a 'Natural Fit'

By Mike Bryant and Pete Campbell

In the early 1990's, the U.S. Fish and Wildlife Service began to apply the principles of Ecosystem Management to an area in eastern North Carolina and southeastern Virginia that includes four river basins and 11 national wildlife refuges. The refuges subsequently worked with more than a dozen federal, state and private partners – all members of an 'ecoteam' on research and habitat management projects that mostly focused on the Roanoke, Tar, Neuse and Cape Fear River (RTNCF) Basins.

After the Service endorsed the SHC framework, the RTNCF ecoteam members agreed it was important to continue working together. After an introductory SHC workshop this past spring, the Ecoteam became the Eastern North Carolina/Southeast Virginia SHC Team. It was immediately clear to us that applying the SHC framework to address short- and long-term challenges makes sense. Increasing pressure from incompatible development, the rapid spread of invasive species and altering river flows and hydrologic regimes all have serious implications for sustaining public trust species both on and off refuge lands. SHC provides a tool for us to evaluate and implement conservation strategies to maximize benefits for the resources in our care.

of migratory bird movements and resource needs to identify bottlenecks or gaps in protected migration habitat. SHC has been endorsed by both the U.S. Fish and Wildlife Service and the U.S. Geological Survey.

By applying the SHC framework, we can expand our effectiveness from simply managing individual sites to coordinating broad flyway and continental actions. This is the central driving factor behind Strategic Habitat Conservation – linking management objectives, ideas about how an ecological system works and strategies for improving habitat quality in a way that helps improve management. SHC is about efficiently deciding where and how resources are expended for species that are limited by the amount or quality of available habitat.

Managing Strategically

There is no overstating the value of being able to think and manage strategically. Scientists and managers in the USGS and the Service are examining migration habitat at several scales–continental, flyway-wide, regional and local, a process that requires sometimes complex coordination. Three different teams of research scientists and land managers in different parts of the country are using the SHC framework to address various aspects of migration habitat management and conservation.

Acting within the Biological Planning and Conservation Design areas of the framework, one group is examining a number of energetic demands (e.g., the food and rest requirements needed to fuel migratory flight) on migrating birds. They want to know "where, when and how" these demands influence stop over behavior. The team is developing flyway-wide models that simulate birds' movements under a variety of energetic conditions, climatic conditions and disturbances (e.g., available foods, hunting pressure, bird watching, feral pets).

Another group is focusing on how best to apportion land acquisition, land management and restoration activities along entire flyways. In other words, this team wants to know how far apart stop-over sites should be and what sorts of foods and resting opportunities they should provide. This group is functioning under the Conservation Delivery area of the framework. A third group, also working in the Conservation Delivery area, is considering how individual sites should be managed to provide the best quality habitat possible.

By coordinating their work, the three groups will provide lower- and upper-level managers with precise information on the resources available to migrating birds and identify where the gaps in migration habitat exist. Managers will benefit from a broader understanding of the importance and needs of individual locations within and among flyways as environmental conditions change from year to year. The ultimate winners in this exercise are the birds. They will benefit from on-the-ground actions that are based on conservation planning and design and measured with monitoring and research. ◆

Patricia Heglund is regional refuge biologist in the Great Lakes-Big Rivers Region. Tony Leger is refuge chief in the Northeast Region. Hal Laskowski, a wildlife biologist based at Prime Hook Refuge in Milton, DE, leads the Biological Monitoring Team. Socheata Lor, assistant regional refuge biologist in the Great Lakes-Big Rivers Region, is a member of the Biological Monitoring Team.

In eastern North Carolina and southeastern Virginia – an area that includes 11 national wildlife refuges – SHC provides a tool that the field stations and their partners can use to evaluate and implement conservation strategies. (USFWS)

On reflection, it was natural for us to embrace Strategic Habitat Conservation and its five elements–biological planning, conservation design, conservation deliver, monitoring and research. Members of the team have always seen the benefits of working together across programs and with partners; SHC seems to be a natural fit to our way of doing business. Though the team's focus traditionally has been weighted toward the conservation delivery element of SHC – protecting or restoring wetlands, uplands acres and long stretches of rivers – we also understand that progress made on the habitat front must be related to a beneficial biological outcome for species populations.

Before SHC was endorsed as the Service's conservation model, the team had secured Science Support Partnership funding through the U.S. Geological Survey (USGS) that enabled us to work with North Carolina State University's Biodiversity Spatial and Information Center, the North Carolina Gap Analysis Program and USGS to help us step-down national population and habitat objectives to the refuge level, select focus avian and aquatic federal trust species and develop species-habitat models that could become decision-support tools. Working with Service and partner subject matter experts, we picked the king rail to represent fresh and brackish wetlands, the Swainson's warbler to represent

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Shaping new habitat management strategies for colonies of nesting seabirds.

Devising a Laughing-Gull Strategy

by Janith Taylor

Maine Coastal Islands National Wildlife Refuge, established to protect migratory birds, principally colonial nesting seabirds, manages nearly 50 coastal islands. Six of the islands are major nesting grounds for Arctic, roseate and common terns.

One of the most successful management strategies used in recovering tern populations has been preventing herring and great black-backed gulls from nesting on the seabird-managed islands. Laughing gulls, however, continued to nest on the islands.

Initially, the laughing gulls coexisted well with the terns. However, as laughing gull populations grew, they began to exclude terns from preferred breeding habitat, preyed on tern eggs and chicks, and stole food from the terns. Although the refuge began a nest destruction program in 2001, the laughing gull colony grew by 41 percent.

An evaluation of seabird colony data and projected trends of the laughing gull population suggested that new strategies were needed. This decision was a significant change to the Comprehensive Conservation Plan and so required development of an environmental assessment to evaluate alternatives, which led to an assessment of cumulative impacts based on ecoregional planning.

The Mid-Atlantic/New England/ Maritimes Working Group, a regional partnership working to conserve waterbird populations at eco-regional scales, developed *The Mid-Atlantic New England Waterbird Plan (2008),* which evaluated the status and distribution of water birds throughout this ecoregion. In the process, the Working Group determined that more than 205,000 pairs of laughing gulls were breeding in 275 colonies. The Working Group plan, which also identified the need to manage laughing gull conflicts with terns, provided essential information for a re-evaluation of refuge-specific management on the islands and work with partners to meet productivity objectives on Maine's seabird nesting islands.

How Many to Remove

How do we know how many laughing gulls can be removed without threatening the regional population targets? An

At the USGS National Wetlands Research Center in Louisiana, a new kind of relationship model for natural resource scientists and decision-makers has taken shape. It is called a "science alliance." (USFWS)

Improving Scientist-Decision Maker Collaborations

by Gaye S. Farris

There's a growing feeling that scientists and decision-makers at the U.S. Fish and Wildlife Service, the U.S. Geological Survey and other natural resource agencies need a new way of doing business, especially when long-term projects are involved.

In the past, partnerships and other short-term relationship models borrowed from the world of business have been useful as agencies define how they work together and doubtless will play a role in future agency interactions. Gregory J. Smith, director of the USGS National Wetlands Research Center, is a leading advocate for a new kind of relationship model for scientists and decision-makers. He calls it a "science alliance."

Dr. Smith's research center, based in Lafayette, LA., performs biological research and spatial analyses related to wetlands. Its customers include the Department of the Interior agencies.

Off the coast of Maine, nesting terns were threatened by surging populations of laughing gulls. Refuge System managers applied key elements of Strategic Habitat Conservation to determine the number of gulls that could be removed without impacting regional populations of the birds. (USFWS)

analytical tool developed by U.S. Geological Survey scientists helped the refuge and its partners determine the impacts of the removal over a broad geographic area.

Drawing on information from the USGS tool, biologists determined the number of gulls on major tern nesting islands could be reduced to 1,450 pairs by 2012 without impacting the regional laughing gull population.

The USGS analytical tool identified the level of cumulative take that would be sustainable, given a certain amount of risk. But to get to a finer resolution of specific management objectives for each island, Maine Coastal Islands Refuge continued to work with National Audubon Seabird Restoration Program, the Maine Department of Inland Fisheries and Wildlife and the U.S. Fish and Wildlife Service Migratory Bird Program to determine where and how many gulls needed to be removed to meet tern productivity objectives. Consequently, three islands were targeted for adult laughing gull reduction by 2012: Petit Manan, 500 pairs; Matinicus Rock, 350 pairs; and Eastern Egg Rock, 600 pairs.

The refuge has been monitoring tern and laughing gull nest density with a standardized approach used by seabird managers in the Gulf of Maine, which provides the essential benefit of evaluating results on a landscape scale in addition to individual independently managed islands.

And, lastly, an adaptive management study was initiated this year that will continue to test habitat management strategies that may further eliminate negative gull/tern interactions with alterations in nesting vegetation structure. This is Strategic Habitat Conservation at its finest: planning, conservation design, conservation delivery and monitoring. ◆

Janith Taylor is a regional refuge biologist located at Great Bay National Wildlife Refuge in New Hampshire.

In 2007, questions about working efficiently with DOI agencies and setting research priorities in an era of stagnant budgets and growing natural resource challenges prompted the National Wetlands Research Center to conduct a workshop. After several meetings, the "Science Alliance Model" emerged. The approach has resonated with many.

"Alliance" suggests a long-term commitment or bond among groups to work together strategically, a key element of Strategic Habitat Conservation. The Science Alliance Model is based on sustained commitments, financial and otherwise.

"The model has been extremely useful for researchers working with the Service because all are interested in addressing complex population and habitat problems over large areas and long spans of time," Dr. Smith says.

Effective alliances include, on one hand, managers and decision makers whose fundamental missions require the involvement of scientists and, on the other hand, scientists from many disciplines whose information can shape conservation and restoration programs and policies.

"Science thus shared goes beyond products such as publications and fact sheets or a single question answered for a refuge. It is ultimately judged by its influence on conservation and restoration thinking and approaches," Dr. Smith says.

Co-location can help establish close working relationships between scientists and decision-makers. Gulf Coast Joint Venture employees, for example, are housed at NWRC, where they work collaboratively with the center's scientists on population modeling and regional habitat planning for birds that depend on water. At the same time, other USGS specialists are stationed at the Lower Mississippi Valley Joint Venture

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Other Views: Refining SHC

A more efficient way of ensuring stable populations of trust species?

A more complete range of habitat requirements are likely to be met and sustained by initially focusing on ecosystems. Consider tallgrass prairie, an endangered ecosystem – the greater prairie chicken requires unique conditions within the prairie ecosystem. (Illinois Department of Natural Resources)

by Pauline M. Drobney, R. Gregory Corace III and Jeanne I. Holler

To help ensure the conservation of species of migratory birds, certain fish and federally threatened or endangered species – the trust species – the U.S. Fish and Wildlife Service has forwarded Strategic Habitat Conservation (SHC) as a business model.

SHC is a far-sighted and progressive approach; conservation actions are promoted across a range of scales and landowner partnerships. Through research and monitoring, the results of management are better understood, and refined strategies can be adapted to more effectively reach goals and objectives.

However, SHC's focus on species management and population-based goals and objectives ignores the basic underpinning of trust species

Evaluating Conservation Delivery

– *continued from pg 11*

Waterfowl use of temporary wetlands. Temporary wetlands lose their habitat value for waterfowl if they become choked with vegetation. We are evaluating several low-cost management practices designed to alter the habitat structure to attract waterfowl at FWS stations in Region 3.

Over the next year, each project team will prepare monitoring protocols and design databases and evaluation tools. Subsequently, each team will implement specific management actions or treatments, evaluate the effectiveness of alternative treatments through monitoring and update models to improve future management decisions. Refuge managers want to learn how to manage better in the future by tracking the results of their current practices; the case studies will provide valuable lessons about how to evaluate the Conservation Delivery phase of Strategic Habitat Conservation through Monitoring. ◆

Melinda Knutson is a wildlife biologist with the Biological Monitoring Team, working for Region 3 and Region 5 Refuges, based in La Crosse, WI. Hal Laskowski, a wildlife biologist based at Prime Hook Refuge in Milton, DE, leads the Biological Monitoring Team.

populations: healthy and functioning ecosystems. Using species or populations as a starting point for SHC and working toward broader ecosystem perspectives seems backwards. The inclusion of ecosystems as a starting point would strengthen SHC for several reasons.

Many kinds of ecosystems are now rare and require urgent conservation action in and of themselves. Fortunately, some ecosystems (or some of their components) can be conserved, reconstructed or rehabilitated.

Diversifying Our "Conservation Portfolio"

We propose that a more efficient way of ensuring the stability of trust species populations is having two starting points for SHC: 1) trust species and populations as currently proposed in SHC and 2) ecosystems. Employing a two-tiered approach diversifies our "conservation portfolio" and provides us with more options for success.

Focusing on one or more trust species with the view that supplying their habitat needs will suffice for long-term conservation of the host ecosystem and *all* its species is a gamble. We risk choosing the wrong species to base ecosystem management upon and losing species and simplifying ecosystems with our management. There is also the possibility that as we focus on a set of species presently of special concern, many more species currently considered common will become rare.

A more complete range of habitat requirements are likely to be met and sustained long-term for trust and other species by initially focusing on ecosystems. Consider tallgrass prairie, an endangered ecosystem, and three species that depend upon it – the Henslow's sparrow, grasshopper sparrow and greater prairie chicken. Each requires unique conditions within the prairie ecosystem.

Rather than trying to create specific structural habitat conditions for each trust species, one could think more broadly and use the ecosystem itself as the point of departure. In this case, management would be focused on factors such as restoring natural processes such as periodic fire and grazing. In the end, a variety of habitat conditions would be present, sustaining trust grassland species in their natural environment.

Managing for the full range of function of a native ecosystem – including suites of species – and considering the capability of the land itself will serve our wildlife and plant conservation mission well. However, critical habitat needs for trust species cannot always effectively be met using this approach alone. The exclusion of ecosystems can be the right choice if the need is urgent and the distribution, size and quality of natural landscapes is severely limited.

Species- and population-based starting points for SHC clearly are still critically important; what we seek is a balance that is more realistically inclusive of the needs of the entire Refuge System. ◆

Pauline Drobney is the Land Management and Research Demonstration biologist at Neal Smith National Wildlife Refuge, IA. R. Gregory Corace is a forester at Seney National Wildlife Refuge, MI. Jeanne I. Holler is deputy refuge manager at Minnesota Valley National Wildlife Refuge. Several Refuge System biologists also contributed to this article. They are Frank Durbian, Karen VisteSparkman, Michelle McDowell, Richard S King and Wayne Brininger.

Making Sense of the Acronyms – *continued from pg 11*

context for research and monitoring and emphasizes the respective roles of partners. By building capacity within the Service and USGS in each of these methods, we will strengthen our ability to undertake all three.

The Service will be most successful in making these concepts operational for refuges if we see them as integrated and synergistic, not as competitive. And if we recognize that these approaches build on the existing traditions within the National Wildlife Refuge System. ◆

Michael C. Runge is a research ecologist at the U.S. Geological Survey's Patuxent Wildlife Research Center in Laurel, MD.

We must be strategic about allocating resources to measures that will matter most to trust species. (USFWS)

Around the Refuge System

California

It took only a few days for several hundred goats to clear several acres of thick brush and grass at Sacramento National Wildlife Refuge. Normally, refuge managers remove brush and small limbs using manpower and heavy equipment. Goats, however, are less expensive, they don't burn fossil fuels and they reduce the refuge's carbon footprint.

Refuge land and fire managers examined several options to reduce the buildup of vegetation and thereby reduce the risk of wildfire. Everyone agreed it was worth giving the goats a try. Refuge manager Kelly Moroney said neighboring landowners and local government officials were pleased with the results.

Goats are a cost-effective way to reduce the buildup of vegetation and reduce the risk of wildfire at Sacramento National Wildlife Refuge Complex in California. (Joe Silveira/ USFWS)

Goats first grazed on the refuge in June 2007, clearing about 35 acres. This year, Moroney says the goats will browse through 50-60 acres. The goats will clear the ground cover under shrubs and trees. They will be followed by student work crews who will cut the higher limbs (ladder fuels).

Goats are also under contract at Stone Lake National Wildlife Refuge and may be considered for use on additional acreage at Sacramento Complex and throughout the region.

Delaware

Visits by birds rarely seen in North America gave Bombay Hook and Prime Hook National Wildlife Refuges something to, well, crow about this spring. News of the sightings quickly spread around the online birding world, and visitors came flocking.

At Bombay Hook Refuge, a little egret was first sighted on June 7. At one point, the bird – a small white heron that looks strikingly like a snowy egret except for the two plumes at the back of its head that are visible during the breeding season – seemed to prefer the grassy portions of Shearness Pool. The bird, last seen at Bombay Hook on June 16, hasn't been spotted in Delaware since the late 1990s.

For three weeks in May, a wood sandpiper, a migrant shorebird rarely seen on this side of the Atlantic, stopped over at Prime Hook Refuge. The bird was positively identified on May 7. "Interestingly, when the bird was first located, it stayed near a sign that read, 'Important Bird Area'," says George F. O'Shea, refuge operations specialist. Wood sandpipers typically breed across the north of Europe and Asia, mostly in Scandinavia, the Baltic countries and Russia; during cold-weather months, they are usually found in Africa and South Asia. The last recorded sighting of the bird in the continental United States was in 1990.

National Trails

In honor of the 40th anniversary of the National Trails System, five trails on national wildlife refuges in Nebraska, New Mexico and North Dakota have been designed as National Recreation Trails by Interior Secretary Dirk Kempthorne. In total, the Secretary added 24 trails in 16 states to the National Trails System.

The five newly-designed National Trails in the Refuge System are:

- **Funk Peterson Wildlife Trail** (Funk Waterfowl Production Area in Nebraska) – 3-mile backcountry loop trail with habitat for whooping cranes and least terns.
- **Canyon Trail** (Bosque del Apache National Wildlife Refuge in New Mexico) – 2.2-mile interpretive trail offers school groups and visitors the ability to study tracks in the shifting sands.
- **Chupadera Wilderness Trail** (Chupadera Wilderness Area of the Bosque del Apache Refuge) 9.5-mile backcountry trail takes hikers through a range of landscapes culminating in a 360-degree view of several mountain ranges.
- **Arrowwood National Wildlife Refuge Leg of the Historic Fort Totten Trail (North Dakota)** – a 9-mile backcountry trail that

offers hiking, mountain biking, and horseback riding.

- **Sullys Hill Nature Trail (North Dakota)** – 1.5 mile scenic trail in one of only four units of the U.S. Fish and Wildlife Service managed to preserve bison.

The National Trails system includes more than 1,000 trails covering more than 12,000 miles. The program is administered by the Rivers, Trails and Conservation Assistance Program of the National Park Service and the U.S. Forest Service along with such non-profit partners as American Trails, which hosts the National Recreation Trail Web site at www.americantrails.org/nationalrecreationtrails.

Alaska

Yukon Flats National Wildlife Refuge, the Council of Athabascan Tribal Governments and the Yukon Flats School District worked with students from the Fort Yukon School to create a large painted mural about moose to help educate citizens about moose management in the Yukon Flats region. Specifically, the mural addresses the importance of hunting only bulls and leaving cows so the local moose population is more likely to grow. There are too few moose in the area for local residents to meet all their subsistence needs.

The mural was designed and created by students at the Fort Yukon School and is prominently displayed in the school's cafeteria. The Gwich'in Athabascan words for cow - *dizhuu*, calf - *ditsik*, and bull - *ch'izhir* are written next to each animal.

A contest was held to select the educational message for the mural: "Leave the Cow Moose, Leave Our Future Healthy." The winning slogan was submitted by 5th grader Frederick James. The moose mural now serves as a permanent reminder of the crucial role that local residents play in managing the moose population.

Nevada

For a brief time in the 19th century, Nevada was known for booming mineral discoveries and railroad speculation. The Las Vegas and Tonopah Railroad rumbled past Corn Creek Ranch until it ceased operation in 1919. That is when a ranch owner used abandoned railroad ties to build a cabin on land that is now Desert National Wildlife Refuge. It was a residential cabin until 1939, when the U.S. Fish and Wildlife Service bought the ranch and used the cabin for storage – including a collection of big horn sheep skulls.

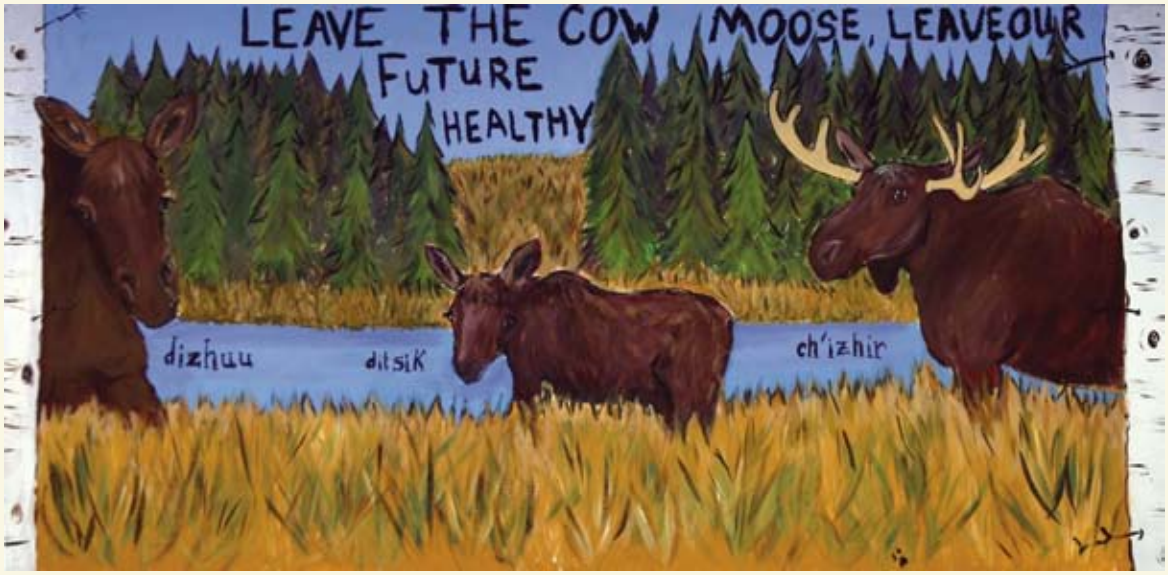
A proposal to restore the cabin was approved and funded through the Southern Nevada Public Lands Management Act. Removing the skulls and cleaning the cabin were among the first steps taken. The cabin will eventually become a stop along a refuge trail.

Remembering a Volunteer

Billy Warren, who died March 23, began volunteering at Cape Romain National Wildlife Refuge in 2003 as a member of the loggerhead sea turtle crew.

In the past five years, Billy accrued over 1,100 volunteer hours, assisting with the sea turtle nesting project, invasive species control, shorebird surveys, and posting and maintaining seabird nesting areas. Early in 2008, he enthusiastically attended boat operation training classes to enhance his ability to assist with Refuge programs. Billy's dedication and enthusiasm were crucial to continuing the sea turtle nesting surveys on Lighthouse Island as well as initiating a new sea turtle program on Bull's Island.

Billy's presence and involvement with all of Cape Romain's biological programs and his commitment to the South Carolina Aquarium were nothing short of amazing. Billy will remain an inspiration to all of us who knew and worked with him and will be greatly missed.



Yukon Flats National Wildlife Refuge in Alaska helped local students create a mural about the importance of protecting cow moose. (USFWS)

Search for Ivory-billed Woodpecker Continues

The 2007-2008 search for the ivory-billed woodpecker focused on forested wetlands in Arkansas and six other Southern states. For the first time, helicopters equipped with high-tech photographic and sensing gear took part. (Larry Chandler)

The search for the illusive Ivory-billed Woodpecker continues. State coordinators and U.S. Fish and Wildlife Service representatives will meet in Atlanta for three days in September to review the 2007-2008 search, which covered flooded bottomland in parts of seven Southern states, and discuss plans for 2008-2009.

Topics on the preliminary agenda include techniques that were used in the just-concluded search season; one was the first-time deployment of helicopters – loaded with high-tech photographic and sensing gear – which flew over nearly 250,000 acres of public land in Arkansas and Louisiana. Conference participants will also discuss any recently reported but unconfirmed ivory bill sightings or sound recordings and the need for any follow-up action.

The matter of where to focus future searches will be another topic. In addition to Arkansas and Louisiana, the 2007-2008 search also covered likely woodpecker habitat in Texas, South Carolina, Florida, Tennessee and North Carolina.

Organized searches were sparked by the dramatic rediscovery of the highly distinctive bird in February 2004 by a kayaker in eastern Arkansas' Cache River National Wildlife Refuge. Before that sighting, the big, raucous woodpecker–which once ranged from Texas through the southeast and then on to Cuba–had been thought to be extinct in the United States for more than 60 years.

"Enough credible information has surfaced that leads the Service to believe that isolated populations of the species may still exist," says Laurie Fenwood, the Service's Ivory-billed Woodpecker coordinator. "In any event, there is a bigger payoff than locating Ivory-billed Woodpeckers. The conservation that is taking place as a result of this rediscovery is helping us reconnect and restore some of this region's most diverse wild places."

Fenwood says that a report on the 2007-2008 expeditions will be posted on the FWS Web site (www.fws.gov/ivorybill).

Though the Service helps underwrite the states' search teams, the teams are usually organized by state fish and wildlife agencies working with non-governmental groups and universities. The Service allotted $1.2 million for Fiscal Year 2008, roughly half to underwrite grants to search teams and the other half to map habitat and develop predictive models. Other federal funds may be requested for resource development if a breeding pair of ivory-bills is located.

As it has from the start, the Cornell Laboratory of Ornithology continues to play a major role. The Lab, which has coordinated large-scale surveys in Arkansas, is also maintaining a database of possible sightings. In addition, the Lab manages an equipment loan program that provides search teams with sophisticated recording units and cameras. ◆

Improving Scientist-Decision Maker Collaborations

– *continued from pg 15*

headquarters in Vicksburg, MS, where they fashion geospatial and modeling approaches for setting habitat objectives and population goals for migratory birds.

The alliances produce award-winning work. A recent "Wings Across the Americas" award for research, presented by the Forest Service, recognized the accomplishments of the Lower Mississippi Valley and Central Hardwoods Joint Ventures and the USGS in monitoring and modeling the habitats of 40 priority songbird species.

"Proximity promotes planning together and daily interaction, but it is not the only model. Trust, frequent interaction and sincere commitment can make a virtual alliance work," Dr. Smith says. ◆

Gaye Farris is acting assistant director at the U.S. Geological Survey National Wetlands Research Center in Lafayette, LA. For further information on science alliances, contact Gregory J. Smith, nwrcdirector@usgs.gov.

Major Acquisition Approved for Glacial Ridge Refuge

The Migratory Bird Conservation Commission at its June meeting approved $4 million to purchase more than 18,000 acres of prime prairie wetlands and associated grasslands for Glacial Ridge National Wildlife Refuge in northwestern Minnesota.

The land will be acquired from The Nature Conservancy (TNC) in one of one of the largest land purchases ever using dollars generated from Federal Duck Stamp sales and import duties on firearms and ammunition. To ensure that there would be no loss of local tax revenue after the transfer to the U.S. Fish and Wildlife Service, TNC has established a $2 million endowment to generate tax revenue; interest generated by the endowment will be used to make up any difference between what the federal government will pay and what the private taxes would have been.

The refuge, established in 2004, is the focal point of a substantial effort to restore tallgrass prairie and wetlands. The refuge will become a major waterfowl breeding and nesting area, supporting populations of mallards, northern pintails, blue-winged teals, ring-necked ducks, Canada geese and tundra swans.

"The purchase . . . symbolizes the tremendous investment our nation's sportsmen and women have made to natural resource conservation through their purchase of Federal Duck Stamps, and through the import duties paid on firearms and ammunition," said Secretary of the Interior Dirk Kempthorne. "Their contribution helps ensure the songs and sounds of waterfowl and other wetland dependent wildlife will be enjoyed by all Americans for years to come." Secretary Kempthorne chairs the commission, which is composed of members of Congress, the Secretary of Agriculture and the Administrator of the Environmental Protection Agency. The commission also approved purchase of another 3,000 acres of waterfowl habitat for the Refuge System:

The Migratory Bird Conservation Commission has approved $4 million to purchase more than 18,000 acres of prime prairie wetlands and associated grasslands for Glacial Ridge National Wildlife Refuge. (USFWS)

- Tualatin River National Wildlife Refuge (OR): 180 acres to support tundra swan, mallard, northern pintail, canvasback, ring-necked duck, lesser scaup and Canada goose.
- Great Dismal Swamp National Wildlife Refuge (NC): 1,481 acres to protect wetland forests that provide important nesting, feeding and resting habitat for waterfowl .
- Lake Umbagog National Wildlife Refuge (ME): 1,129 acres to protect wetland habitat for the American black duck, ring-necked duck, common goldeneye, wood duck and common and hooded merganser. ◆

Chief's Corner – *continued from pg 2*

water in a region that has long struggled with the problem. The San Joaquin River Refuge restoration is reducing soil erosion, trapping sediments and contaminants, and maintaining biological diversity.

In Arkansas, Felsenthal National Wildlife Refuges will release 60,000 triploid grass carp as they work to bring back the thousands of anglers who saw their sport ruined by vegetation that was choking lakes. By conservative estimates, the problem cost the southern Arkansas community about $5.4 million in lost tourism revenue. And we're not just releasing carp, but we're also tackling the plant problem as we help the community reach its economic potential.

In every region of the country, we can point with pride to use of taxpayer dollars that directly helps not only wildlife, but also taxpayers and the communities they call home. We don't know what decisions Congress will make about the fiscal year 2009 budget or what the next President will propose for the fiscal year after that. But we do know one thing: whatever funding refuges receive, they make every penny count. ◆

First Get –Together for Those Who Hold Alaska Together

In snow and rain, sunshine and winter darkness, Alaska's 31 refuge wage grade employees are a vital body of talent that keep all things operating in extreme conditions. (USFWS)

In snow and rain, sunshine and winter darkness, Alaska's 31 refuge wage grade employees are a vital body of talent that keep all things operating in some of the most extreme and harsh conditions. Heavy equipment operators, mechanics, ship captains, deck hands, cooks and laborers build remote cabins, maintain roads and trails, keep boiler systems running efficiently, operate and maintain heavy equipment, airplanes, boats, ships and other machinery; and repair and construct buildings – all without a Lowe's or Home Depot nearby.

So, when the region hosted the first-ever Wage Grade Workshop at Kenai National Wildlife Refuge during the week of April 14, it was the first most of the wage grade employees had ever met one another. Although some were reluctant about leaving work for a week, they made the trip – most of them from very rural areas. "It was time to bring these guys together," said regional heavy equipment coordinator Thomas Siekaniec, who helped organize the workshop.

Aimed at providing information on career development, national and regional policy and procedures, field techniques, equipment demonstrations, the Maintenance Action Team (MAT) program and safety issues, the workshop also served as a forum for expressing frustrations as well as successes. Alaska's regional refuge chief Todd Logan kicked off the workshop acknowledging the important work of the wage grade employees and challenging them to be leaders in reducing the carbon footprint of field operations.

Present throughout the week to speak and show support from the national level were Jim Kurth, Refuge System deputy chief, Steve Flanders, national heavy equipment coordinator, and Liz Fritsch from the National Conservation Training Center. Regional director Tom Melius joined the group for a special luncheon, where he presented each wage grade employee with an appreciation award.

At the end of the week, *M/V Tiglax* ship captain Billy Pepper commented, "By keeping us better informed on policies and including us on decisions related to our jobs, we really feel like we're a part of the team, and that's a boost to our morale."

One highlight was the discussion of implementing the MAT program in the region. Some are already working cooperatively without a formal program. Others found the idea of a formal program exciting, offering the opportunity to learn new skills and visit other refuges while saving money that could be applied to other projects.

"Wage grade employees have a great amount of pride in their work and feel really good about what the Fish and Wildlife Service represents" said refuge supervisor Tracey McDonnell, who led the charge in organizing the workshop. "We hope to organize follow-up workshops every few years." ◆

Look It Up at Blackwater's New Library

Now, visitors who come to see the wildlife at Maryland's Blackwater National Wildlife Refuge—and especially its spectacular array of birds—can also read about many of them. A new wildlife and natural history research library—a project of the Friends of Blackwater and other refuge supporters—is open for business.

The library is located on the second floor of the visitor center in a 31' x 17' room flooded with light from six windows. In addition to its mahogany stained shelves, the room includes a desk as well as six chairs around a table, all donated by supporters of the refuge.

The library is in a great location. It's only a few steps away from an observatory designed for bird watchers. The observatory, whose features include an outdoor deck and an indoor, class-walled viewing room, was underwritten by a $100,000 grant from a non-profit conservation fund. The grant was made to commemorate the 100th anniversary of the National Wildlife Refuge System.

In the library, a wall plaque recognizes the all-important contributions of Richard C. Kleen, a retired teacher and a globe-trotting birder. Kleen helped the library get off to a strong start by donating its first 450 books. In an interview, Kleen said that he's been an avid birder since he was nine years old. "My family was living in Freeport, New York, on the south shore of Long Island. One day my dad and I were walking in the woods, and I saw a bird. Neither of us had any idea what it was, so we looked it up—it was a prairie warbler. That got me hooked," he recalled.

His interest in birding would subsequently take him to all 50 states and to 32 countries, where he added sightings to his U.S. and world life lists. Altogether, he has recorded sightings of nearly 1,000 species of birds. ◆

At Maryland's Blackwater National Wildlife Refuge, a new wildlife and natural history research library—a project of the refuge's Friends group–is open for business. (USFWS)

Where SHC Has Been a 'Natural Fit'

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bottomland and upland hardwoods and the blueback herring to represent the aquatic habitats in our ecoregion that are necessary to sustain anadromous fish. We have hundreds of thousands of acres of these habitats in our region and within our refuge boundaries, so it benefits each program to do, in SHC terms, this biological planning and conservation design work.

We are now looking for opportunities to increase our capabilities to do more monitoring and assumption-based research and to secure stable funding for the Geographic Information System-modeling capabilities needed to fully implement SHC in our corner of the world. ◆

Mike Bryant is project leader for the North Carolina Coastal Plain Refuges Complex. Pete Campbell is a wildlife biologist in the Raleigh, NC, Ecological Services office.

Border Protection vs. Wildlife

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"There's been a big increase in debris in the past three years," says Davis.

Ninety percent of Cabeza Prieta Refuge's 800,000 acres are designated wilderness, but there are now 400 miles of illegal roads and another 800 miles of unauthorized foot trails. Since the vehicle fences have been erected, Davis has been involved in vertical mulching, in which vehicle tracks in the wilderness are covered with gravel and dead plant material. Within two years, Davis says you wouldn't know there was a road, though he remains frustrated it isn't really pristine wilderness anymore either.

McCasland is frustrated too because he'd rather be spending time meeting the other refuge's real conservation goals. But he doesn't want all the news out of Cabeza Prieta Refuge to be negative, because "even with all this, we are still managing a wildlife refuge, and there are positive things going on."

He talks with enthusiasm about the wildlife that brought him to the refuge in the first place. "We have an awesome pronghorn program. We currently have 47 pronghorn in the pen; there were only 20 Sonoran pronghorn in the entire U.S. in 2002 before the captive breeding program began." ◆

A Look Back . . . Lucille Farrier Stickel: Research Pioneer

"**Here she was the director of the research center** and her husband a prestigious biologist, and in evenings and on weekends, you would see the two of them going around with little bags picking up trash and gum wrappers along the side of the entrance road." So recalls Gary Heinz, a U.S. Geological Survey research biologist whose career was nurtured by Lucille Stickel at Patuxent Wildlife Research Center.

Stickel was honored with the Wildlife Society's Aldo Leopold Memorial Award in 1973, the year after she became director of the Patuxent Research Center. Listed in *American Men of Science,* she was among the highest ranking career women in the federal government, receiving the Distinguished Service Award from the Department of the Interior and the Federal Women's Award.

Altogether Stickel wrote 44 scientific papers on the effects of contaminants on wildlife; she prepared her first paper on the subject in 1946 – a study of the then new pesticide DDT. Her research formed the basis of much of Rachel Carson's book *Silent Spring.*

In between earning master and doctoral degrees from the University of Michigan, Lucille Farrier married William Stickel and accompanied him when he accepted a position at Patuxent. The couple worked and lived at the research center for almost 40 years.

Lucille Farrier Stickel (USFWS)

The Stickels did not have children, but Heinz says she mentored research staff members as though they were her children. Stickel once told Heinz she had had a domineering supervisor when she was a young biologist and never wanted her younger scientists to be in that situation. "We had a very long leash," Heinz remembers.

When Lucille Stickel died in 2007, the current director of the Patuxent Wildlife Research Center, Judd Howell, said, a "soul has moved from individual to icon. We can mourn her passing but not her legacy." ◆

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