



RefugeUpdate

National Wildlife Refuge System

www.fws.gov/refuges



INSIDE: Secretary of the Interior Ken Salazar announced the authorization of the Flint Hills Legacy Conservation Area, a new unit of the National Wildlife Refuge System in eastern Kansas. Story on page 18. (Kansas Department of Commerce, Travel & Tourism Division)

Short-Tailed Albatross Show Signs Of Nesting at Midway Atoll Refuge

By David Patte

An important — and hopeful — milestone in the conservation of the endangered short-tailed albatross was recorded at Midway Atoll National Wildlife Refuge last fall.

On Nov. 16, refuge staff observed an adult short-tailed albatross incubating a freshly laid egg on Eastern Island, one of three small coral islands that comprise Midway Atoll about 1,200 miles northwest of Honolulu.

Since then, the refuge staff members have observed the male and female trading off incubation duties. The adult male was banded as a fledgling in 1987 on Torishima Island, a Japanese possession. The female was banded as a fledgling in 2003, also on Torishima.

If the pair's breeding effort is successful at Midway Atoll Refuge, it would mark the first confirmed hatching of a short-tailed albatross outside of Japan in modern history.

Establishing a new nesting colony is one of several important steps needed to continue the rare bird's recovery because volcanic activity regularly threatens the short-tailed albatross' main nesting grounds on Torishima. The species' recovery also depends on reducing the threats of contaminants, especially oil contamination

Conserving the Future: Communicating on Many Levels

The recommendations presented in the single cohesive vision document are bold. But are they bold enough? And are they the right recommendations to set a strategic vision to guide the National Wildlife Refuge System for the next decade or so?

A major communications campaign is ramping up on a number of fronts to persuade U.S. Fish and Wildlife Service employees, Refuge Friends and other stakeholders to make their viewpoints known by Earth Day, April 22, enabling the Refuge System to present a revised document to the Service Director in late May.

The best avenue for communication is the *Conserving the Future* Web site, <http://americaswildlife.org/>, where people can post comments in forums, found under the "community" navigation button.

Chief's Corner

We Are Waiting to Hear From You



Greg Siekaniec

In 1998, just a year after Congress passed the National Wildlife Refuge System Improvement Act, the Refuge System forged a bold strategic direction contained in a document,

Fulfilling the Promise, which set the stage for an energetic period of implementing our vision.

In the ensuing decade, numerous goals from *Promises* have been fulfilled.

The first three objectives under the category “wildlife and habitat” helped set the stage and define Strategic Habitat Conservation, now the guiding principle of the U.S. Fish and Wildlife Service.

We established numerous policy statements that help guide the administration of refuges, including wilderness stewardship, compatibility and comprehensive conservation planning.

Promises called for new alliances through citizen and community partnerships. Today, the Refuge System has about 230 Friends groups — roughly 80 more than in 1998. We have a host of other alliances, including a very productive partnership with the Cornell Lab of Ornithology.

We continue to make leadership development a priority across the Service through a variety of programs, and have recognized career pathways at many levels of our organization.

Promises was a huge success. The vision and recommendations then identified are still important and in many ways still valid. However, over the past 13 years, many new challenges have emerged upon the landscape of conservation.

Today, as never before, we must plan our conservation strategies through the lens of dramatic landscape change, including habitat fragmentation, changing climate

and dramatic population shifts. Climate change is accelerating in ways we did not recognize only a few years ago. You can say the same for America’s demographics. The Hispanic population, for example, increased from about 35 million in 2000 to more than 48 million in 2010, and is expected to reach nearly 60 million in 2020, according to the Census Bureau. The bureau also predicts that ethnic minorities — African Americans, Hispanics and Asian Americans — will represent more than half of the U.S. population by 2040.

Development has encroached on refuges in numerous locations, and what were once viewed as relatively secure “buffers” of working landscapes have been subdivided into many forms of intensive development. In some areas, water is in critically short supply for conservation purposes and, because of a variety of threats, its quality is of concern.

Add one other fact: We expect a surge of retirements. Survey data tell us that nearly half of all positions in the Refuge System may become vacant in the next 10 years.

Our conclusion? While *Promises* propelled the Refuge System forward in countless meaningful ways, it’s time for us to address the myriad challenges we face with a new, invigorated vision statement and implementation plan.

The result is a process we call *Conserving the Future: Wildlife Refuges and the Next Generation*. This process already has garnered a lot of attention within the Service and among our partners. Now, we’re at the public stage of building a new strategic vision, which began last summer with the naming of five Core Teams whose work will be consolidated into one vision document.

Whether you are a Service employee, a member of a Refuge Friends group or someone strongly interested in the Refuge System, we want to hear your ideas well before the July 2011 *Conserving the Future* Conference in

Refuge Update

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Since the 1980s, about 400 Pacific walrus have plunged to their deaths off a cliff at Togiak National Wildlife Refuge in Alaska, and no one really knows why. Page 4

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National Realty Awards

2010 recipients are Lois Lawson of the Great Lakes/Big Rivers Region, Chuck Pyle of the Huron Wetland Management District and Jerry Gibson of the Iowa Department of Natural Resources. Page 20

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Water Resources Survey Gets Underway

By Susan Morse

The first comprehensive national inventorying of the National Wildlife Refuge System's lakes, rivers, wetlands and streams begins its first full year in 2011, as population growth and climate change increase competition for water resources.

"We will look at the quantity and quality of water available to wildlife habitats and species through the System," says Mike Higgins, national water resources coordinator based at the new Natural Resources Program Center in Fort Collins, CO. "That will help us prioritize our efforts in a strategic way, so that if it looks like a refuge is not going to have enough water in 10 years to meet its conservation needs, we can explore what we can do to assure that refuge gets additional resources."

Among the first refuges to provide data to the Water Resource Inventory and Assessment was Hamden Slough National Wildlife Refuge in Minnesota, which completed its inventory and draft report last November. The Great Lakes/Big Rivers Region gave the refuge priority because it had three projects under way — a comprehensive conservation plan (CCP), a contaminant assessment process and a hydrogeomorphic analysis — that would benefit from the data gathered, says regional hydrologist Josh Eash.

Hamden Slough Refuge, now about 3,000 acres of prairie wetland used by migratory and nesting birds, lies within the Red River Basin, which has experienced increased flooding in recent decades. Wetland restorations completed by refuge staff for wildlife benefits are also reducing flood damage for people living nearby. At "full pool," the refuge's nine actively managed wetlands hold more than 800 acre feet of water, the new report shows. Acquiring the remaining 3,000 acres within the refuge boundary would permit additional restorations to benefit wildlife and further relieve downstream flooding.



Hamden Slough National Wildlife Refuge in Minnesota was among the first refuges to complete its water inventory and a draft report. (USFWS)

Eash calls the inventory "extremely useful" both in culling available information and in highlighting data gaps. "This is the information we need to evaluate biological objectives on the refuge. Almost everything we do is tied to water, and without having an understanding of what we know and what we don't know about our water resources, as well as specific threats and needs, it's often difficult to meet those biological objectives."

The inventory of water resources is expected to take at least five years. By mid-2011, the Natural Resources Program Center hopes to start entering data on water quantity, quality, legal rights and infrastructure into a new national database. Survey data will also identify water-related needs, trends and threats for each of the 553 refuges.


Quivira Refuge in Kansas, Shiawassee Refuge in Michigan, Alamosa Refuge in Colorado, Aransas Refuge in Texas and Cahaba River Refuge in Alabama are among the next in line for water inventories based on regional prioritization.

One challenge will be the immense scale of the project, Higgins says. "There's no way we can inventory every small stream and wetland in Alaska's millions of acres

of refuge lands; we've accepted that," he says. Seasonal variations present another challenge. Some wetlands, for example, hold water only three months of the year; others have been dried up for years by drought.

"How do we capture threats imposed by climate change?" asks Higgins. "One way we've chosen is to look at long-term trends, long-term data for stream flow, for example. Is it decreasing or increasing? Are water temperatures decreasing or increasing? In addition, where we have appropriate data from climate change models, we'll incorporate those into our assessments.

"There's a huge data gap there that needs to be filled," he says.

While the water inventory primarily involves extracting data, mapping and assessment, Eash says, the process includes a field visit, refuge tour and some basic field observations and surveying. He estimates fieldwork will take from one to five days. Once the national database is up and running, he anticipates experts will need two to four weeks to complete each refuge inventory. 

Susan Morse is a writer-editor in the Refuge System Branch of Communications.

Togiak Refuge Works to Prevent Fatal Walrus Plunges

By Jennifer Anderson

No one really knows why Pacific walrus are plunging to their deaths off a cliff in Alaska's Bristol Bay, but U.S. Fish and Wildlife Service biologists say the phenomenon is probably natural and not a result of humans altering the ecosystem.

So, should we intervene?

"That was a big question we faced: should we even do anything," says Paul A. Liedberg, manager of Togiak National Wildlife Refuge, a 4.7-million-acre sanctuary encompassing 600 miles of coastline, including Cape Peirce, a peninsula more than 100 miles from refuge headquarters and the site of the perilous cliff.

Because Native Alaskans harvest Pacific walrus for subsistence and the animals are under consideration for endangered species listing as a result of global warming's effect on Arctic ice habitat, "I decided it was worth trying to protect them," Liedberg says.

The Pacific walrus' range extends throughout the shallow continental shelf waters of the Bering and Chukchi Seas. In a joint survey in 2006, the United States and Russia counted at least 129,000 Pacific walrus. The population is thought to have reached a peak of about 250,000 in the 1980s, says Jonathan Snyder, a Service biologist based in Anchorage. It's unclear whether there is a downward population trend because survey results are not directly comparable, he says, adding that a decision on whether to list the species should be announced early in 2011.

Walrus spend most of their lives "hailed out" on floating chunks of ice. They use their flippers and tusks to drag themselves up onto the ice, where they rest, give birth and nurture their young.

Beginning in April as the ice melts, most of the walrus migrate north, sometimes as far as 700 miles, to the Chukchi Sea. Thousands of the males stay in Bristol Bay and haul out on land, including Cape Peirce.



Approximately 400 Pacific walrus have died in recent decades after plunging off a cliff at Cape Peirce at Togiak National Wildlife Refuge in southwestern Alaska. (USFWS)

This was not a problem decades ago when sand dunes at Cape Peirce provided a natural barrier to a circular path leading to the rocky summit. Refuge biologists say a heavy concentration of walrus in the 1980s might have eroded vegetation, causing the sand dunes to blow away. By the 1990s, the walrus had access to the cliff.

"You wouldn't think an animal that weighs 3,000 pounds would want to 'walk' on land," says Pat Walsh, supervisory biologist at Togiak Refuge. "We've had walrus ascend up to 300 feet and travel more than a mile on top of these hills where there's really a cliff in all directions."

The walrus usually get back down safely. Michael Winfree, a biologist at Togiak Refuge, says he suspects some, in looking for a way down, get too close to the edge. All told since the late 1980s, the refuge has recorded approximately 400 fatalities at Cape Peirce, with a record 128 in 2009. Cape Peirce is the only known place in Bristol Bay where walrus are plunging to their deaths, but Winfree has heard of similar incidents elsewhere.

To deter the walrus, first the refuge tried attaching a blue tarp to a cable strung across the trail leading to the cliff. The tarp's flapping in the wind turned away some walrus, but others went right underneath.

Then, in September 2010, the refuge installed an electric fence able to withstand 1,200 pounds of pressure. At first the walrus just pushed through. So the refuge reinstalled the fence. Biologists since have seen tracks indicating walrus approaching the fence and turning around, but it's too early to tell if this fence actually will work.

Directly behind the electric wire, the refuge also has installed a "sand fence," a series of lumber-and-wire fences placed in three rows, 15 feet apart to recreate a natural barrier to the cliff trail. The goal, in addition to cutting down on fatal plunges, is to keep the walrus from trampling the sand and preventing the reconstruction of the dunes.

"It's an experiment," Walsh said. "This whole effort remains an evolution." 🦋

Jennifer Anderson is a frequent contributor to Refuge Update.

At Waccamaw Refuge, “Estuary Creep” Is a Rising Concern



The salt stress has decimated forest wetland habitat along the Sampit River, left. Along the less-saline Waccamaw River, right, the forest is healthier and more uniform. (Bill O'Brian/USFWS)

This is the second of two articles about how sea-level rise is affecting two refuges in the South Carolina Lowcountry Refuges Complex in different ways. The first article, about Cape Romain National Wildlife Refuge, appeared in the November/December 2010 issue of *Refuge Update*.

By Bill O'Brian

When Craig Sasser, the refuge manager at Waccamaw National Wildlife Refuge, wants to transform the concept of sea-level rise from the abstract to the real in the mind of a visitor, he takes him for a boat ride.

First, Sasser takes the visitor up the Sampit River from its mouth in Winyah Bay, an Atlantic Ocean estuary. In recent decades, the Sampit has changed from a freshwater-blackwater river to a brackish-blackwater river. When Sasser was growing up nearby in the 1970s, he fished the Sampit. It was a great freshwater spot for largemouth bass. Now, fishermen are catching red drum and flounder — saltwater species. Cypress trees are dying of salt stress. The vegetation along the Sampit looks emaciated.

Next, Sasser takes the visitor up the larger Waccamaw River, which also empties into Winyah Bay. As the boat travels upriver onto the refuge and away

from the ocean's salinity, the adjacent habitat changes. There are more healthy trees and fewer dying cypress. The forest is more uniform.

The Sampit River could portend the future of the Waccamaw River on the refuge. “Sea-level rise and climate change have increased the reach and duration of salinity swings in the rivers and creeks that flow through the refuge,” Sasser says. “The lower half of the refuge is transforming to a brackish ‘intermediate’ marsh system, which is indicative of saltwater, or ‘estuary creep,’ up through the refuge.”

Such creep makes managing habitat in traditional ways difficult. And this creep is exacerbated by drought, human consumption and upstream dams, which negatively affect the rivers' freshwater outflow and allow the tidal inflow of saltwater to increase.

The problem for Waccamaw Refuge is that its best-laid plans of 15 years ago are almost useless because of this freshwater-to-saltwater change, which alters the refuge's vegetation, fish and wildlife. The challenge for Sasser and other coastal refuge managers is: How do you manage so that your current plan soon won't be as out of date as original plans are now?

Sasser cites swallow-tailed kites as an example. Just before Waccamaw Refuge was established in 1997, the original

environmental impact statement (EIS) focused on this neotropical migratory bird whose northernmost nesting areas are on the refuge in spring and summer. Swallow-tailed kites require large-scale river corridors and old-growth forest wetlands. These needs helped define the refuge's original shape and size. Now, says Sasser, “as sea-level rise modeling continues, we are learning that much of what we outlined in the original EIS will go through accelerated conversions, which means that much of the habitat conserved for this species will be lost.”

Sasser expects that loss will extend to black bears, osprey and wood storks — all of which use kite habitat within the 23,000-acre refuge.

To plan for sea-level rise, in 2008 Sasser and staff took the then-rare step of including a Sea Level Affecting Marshes Model (SLAMM) in the refuge's comprehensive conservation plan (CCP). Soon, Waccamaw Refuge was partnering with governmental and nongovernmental entities to study the long-term effects of sea-level rise on refuge habitats. Currently, the refuge is participating in at least three related analyses.

The first study involves the National Oceanic and Atmospheric Administration (NOAA) and the use of LIDAR (light detection and ranging) to obtain the most accurate elevation data possible and revise the refuge's

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Waterfowl Have a Night Life, Too

By K.C. Summers

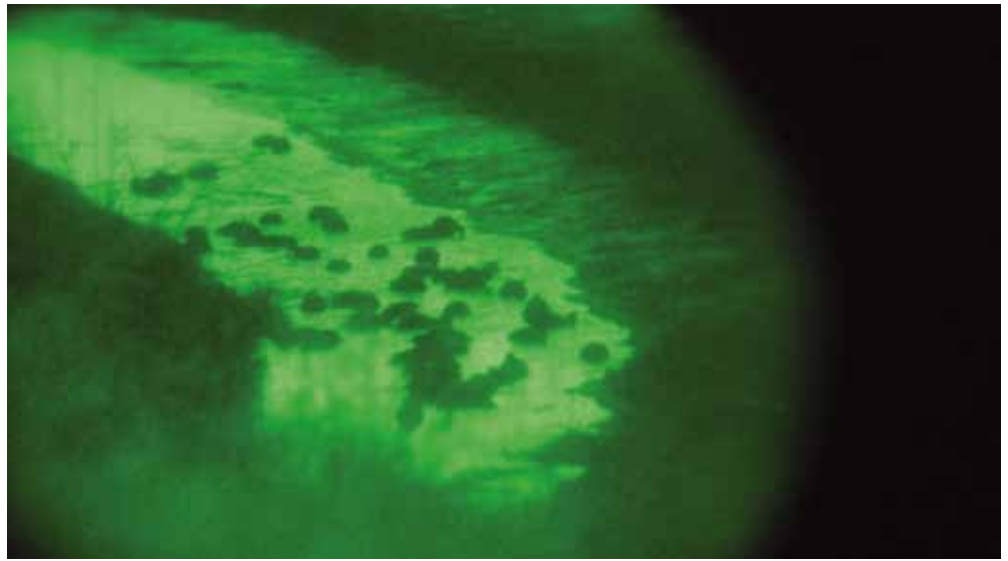
The idea came to Chris Williams while he was watching CNN. Specifically, night footage of the war in Iraq. As the eerie, green-hued images flickered across his TV screen, he thought: Night-vision technology works for the military. Why not for studying wildlife?

Williams, a professor of wildlife ecology at the University of Delaware, was concerned about the lack of data on the nocturnal behavior of the American black duck and Atlantic brant. Large numbers of the migratory waterfowl overwinter in the salt marshes, coves and bays of coastal New Jersey. While their daytime activity was well-documented and their nighttime movements had been tracked electronically, what the birds actually did at night was anyone's guess.

"We anecdotally knew birds were being active at night, but no one was watching them to know exactly how active," Williams says. "It was one of those things that was very much limited by technology."

The Edwin B. Forsythe National Wildlife Refuge, six miles north of Atlantic City, is where much of the bird action takes place. With more than 47,000 acres of protected coastal wetlands, the refuge hosts one of the greatest proportions of American black ducks and Atlantic brant in the Atlantic Flyway, according to deputy manager Brian Braudis. "It's a crucial overwintering area for black ducks and brant," he says, "so it provides a unique opportunity to study both these species at once."

After consulting with law enforcement and military sources, Williams got his night-vision optics and lined up partners for the study: Forsythe Refuge; the Black Duck and Arctic Goose Joint Ventures of the U.S. Fish and Wildlife Service; the Atlantic Flyway Council; and the New Jersey Division of Fish and Wildlife. The project, in its second year, is part of a multi-agency effort to determine if there are enough food resources along the Atlantic coast



Researchers are using night-vision optics to observe the behavior of black ducks (and brant) at Edwin B. Forsythe National Wildlife Refuge in New Jersey. (Orrin Jones)

to support the optimal number of wintering waterfowl.

Critical to determining an area's "carrying capacity" — the number of birds for which the landscape can provide food over the winter — is knowing how much energy an individual bird expends each day to stay alive. Traditionally, researchers have relied on extrapolated diurnal data, simply assuming that the birds' nocturnal behavior was similar. Williams wanted to test that big assumption.

"It Amazes Me"

With the project's partners in place, all that remained was to find someone dedicated enough to spend six hours a night, five nights a week, observing the birds in the depths of winter. Enter Jeremiah Heise and Orrin Jones, grad students at the University of Delaware. Both are avid duck hunters with plenty of experience sitting in blinds for hours. But nothing, they say, fully prepared them for this.

"Everything is much more difficult in the dark," says Jones. "You can't see anything. The wind gets you." He and Heise frequently take their boats out during the day on practice runs. "It's tough," Heise says. "We need to go out in all tides, and sometimes we end up walking the boat where we need to go."

But they wouldn't have it any other way. "It amazes me every night these birds are out there," Jones says. "I'm very happy to crawl into bed in the morning, but the black ducks are still out there living their lives."

The nocturnal behavior study at Forsythe Refuge concludes in late February, and the researchers hope to publish their findings in a peer-reviewed scientific wildlife journal in spring 2012. Williams expects new research will further explore factors affecting wintering waterfowl carrying capacity. He emphasizes that the study couldn't have taken place without the support of each partner. And this project may be more synergistic than most, says Paul Castelli, a scientist with the New Jersey Division of Fish and Wildlife. He collaborated with Williams on the proposals to fund the study, and marvels at the degree of cooperation.

"If any one of those partners hadn't stepped up to the plate, this project wouldn't have happened," he says. "All the easy questions have been answered. Now we're dealing with the big, complex ones." 🦋

K.C. Summers is a Virginia-based writer and editor.

Wood Ducks and Black Bears and Moose! Oh, My!

By Tylar Greene

I never thought I would find myself seven hours from home, thrashing through the woods of New Hampshire, mapping Global Positioning System waypoints. Certainly not in a setting that is known for minks, otters, muskrats and beavers, not to mention black bears, bobcats and moose.

After all, I am a young woman from the Bronx with a healthy fear of remote places and furry creatures.

But last summer, mapping waypoints at Umbagog National Wildlife Refuge was the beginning of a three-month journey as an intern, one that helped me connect with nature and validate my desire to pursue a career in environmental law.

When I received an offer from the U.S. Fish and Wildlife Service to work as a Conservation Intern Program intern at a national wildlife refuge in New Hampshire, I imagined something relatively civilized — maybe in the suburbs of Manchester — not an out-of-the-way place that straddles the border with Maine and is much closer to Canada than to Boston. Not a serene town with few general stores, no cell phone service and moose crossing signs along the road.

Simply put, I faced culture shock when I arrived.

Errol, NH, is a long way from the busy streets and high-rise housing that I was used to. My comfort zone was nowhere in sight. It would take all of my strength to push through my fear and skepticism. Before long, though, with the help of the refuge staff and mind-occupying

projects, I began to let my guard down and enjoy myself.

One of my first projects on Umbagog Refuge was to give the Youth Conservation Corps an orienteering presentation. Members of the YCC do a lot of off-trail fieldwork at the refuge, so I had to construct a course in the woods to test what they learned from my presentation.

And I had to do it alone!

cartography skills by crafting some pretty impressive maps. I represented the refuge at public festivals. I produced newsletters, digital image slideshows, displays and brochures.

The internship opened a new world for me. I was able to get close to wildlife I had never seen before. I saw a cow moose protecting her calf, common loons building a nest, a black bear munching on blueberries, wood ducks scavenging for food, bald eagles, osprey and other birds soaring. And I had faced my fears head on.

The entire summer cemented my desire to pursue a career in environmental justice. Now that I've experienced a piece of America's public lands, I want to do what I can do to make sure those lands are here for future generations to enjoy. 🦋

Tylar Greene is a senior at George Washington

University in Washington, DC. To see a video about her Umbagog Refuge experience, go to <http://www.refugewatch.org/2010/10/11/video-monday-a-conservation-intern-at-umbagog-nwr/>.



The author last summer at Umbagog National Wildlife Refuge in New Hampshire. (Mike Sharon)

I was beyond nervous. Something about thousand-pound mammals in a dense forest made me more than a little hesitant. However, I got past the fear and panic of being out there by myself, and I set up a fairly challenging course. For members of the YCC, the course was a way to hone their orienteering skills. For me, setting up the course was my first indication that I could be truly comfortable at Umbagog Refuge and in its environs.

Soon I was giving presentations on North Woods tree identification and white-nose syndrome in bats, not only to the YCC members but also to the general public as part of Umbagog Refuge's Summer Presentation Series. In the field, I was assisting with loon, rusty blackbird and waterfowl brood surveys. I honed my

A California Cabin With a Colorful Past

By Sean Brophy

It's not every day that a national wildlife refuge setting is described this way: "The night before the opening day of duck season was a big affair. An opening night dinner was a tradition that took place every year, and developed into a real social event when guests were invited. Some guests did become a problem, wanting to drink and gamble until very late, making it difficult for the club members who were looking forward to an early morning shoot on the marsh.

"At the end of duck season the Sunday brunch was also a tradition. All members and their wives, as well as wives of deceased members, were invited, and the owners of the ranch were also in attendance. A sparkling menu befitting the end of a successful duck season usually included a hamburger quiche, sautéed mushrooms, fruit cup, sweet rolls, all topped off with vodka fizzes."

But that, according to an account in the *Humboldt Historian* journal, is what life was like during the early 1900s at Humboldt Fish and Game Club at what is now Humboldt Bay National Wildlife Refuge in northern California.

The refuge — with help from the Pacific-Southwest Region cultural resources branch, the Friends of Humboldt Bay National Wildlife Refuge and the Pierson Building Center — is restoring the club's cabin and hopes to open it to visitors as a historical interpretive site during National Wildlife Refuge Week in October.

The cabin was built around 1915 on what was then the McBride Ranch about 270 miles north of San Francisco. Members of the Humboldt Fish and Game Club used the cabin as sleeping quarters and a clubhouse through the early 1980s. The Service bought the McBride Ranch in 1988, and soon began using the clubhouse as a check station for hunters on the Salmon Creek Unit Controlled Hunting Area of the refuge. In 2005, a new check station was built and the clubhouse was moved to near the visitor center.



The early 20th-century Humboldt Fish and Game Club cabin at Humboldt Bay National Wildlife Refuge in California is being restored as a historical interpretive site. Behind the cabin is a barn from the property's days as a cattle ranch. (Andrea Harris/USFWS)

In 2009, the Friends of Humboldt Bay National Wildlife Refuge received a National Fish and Wildlife Foundation grant to restore the clubhouse and convert it into an interpretive cabin. Pierson Building Center, a local business, donated \$1,700 in supplies and more than 50 hours of the time and expertise of Keith Condit, a master carpenter and historical restoration expert. A Youth Conservation Corps crew also participated in the restoration.

Refuge's 40th Anniversary


The restoration included a new roof, bringing entrances to Americans with Disabilities Act standards, replacing damaged siding, replacing modern windows with historically accurate ones, restoring an old "cooler box" from the era before refrigeration, and building a boardwalk to provide access to the site. A grand opening of the interpretive cabin is planned for Refuge Week 2011 to coincide with the refuge's 40th anniversary.

Hunting artifacts, such as old decoys, scull boats, photos and taxidermy mounts of waterfowl contributed by former members, will be on display. The

guiding vision is to create an experience detailing the history of the club and ranch, waterfowl hunting in the area and hunters' role in the conservation of America's natural resources.

And, according to the *Humboldt Historian* account, hunting at the turn of the last century was bountiful:

"Duck shooting must have been very good in those days because [club by-laws state] that no member or guest shall be permitted to kill more than 25 ducks during a 24-hour period. Any member shooting over 25 ducks is subject to a fine of \$10 for the first offense and expulsion from the club for the second."

Today, the 24-hour limit is seven birds. The fine is \$250, plus \$150 per bird possessed over the limit. 

Sean Brophy is a park ranger at Humboldt Bay National Wildlife Refuge.

From China to Minnesota and Back, Conservation Matters

By Bill O'Brian

Last fall, when all eyes were on President Obama's multinational, multipurpose visit to Asia, diplomacy of a different sort between residents of the largest continent and Americans was taking place on a quieter level with a more targeted focus: wetlands conservation.

From Oct. 31 to Nov. 13, in the Upper Midwest of the United States, eight Chinese ecologists toured more than half a dozen national wildlife refuges. During that same two-week period, nine U.S. Fish and Wildlife Service employees toured some of southeastern China's national nature reserves.

The simultaneous wetlands restoration and management visits were part of the Service's Wildlife Without Borders China program, which since 1986 has been facilitating the exchange of conservation information between the world's first and third most-populous nations.

The Chinese delegation's visit to Minnesota and Wisconsin included a memorable moment at Sherburne National Wildlife Refuge, MN, where the visitors saw two bald eagles building a nest. "The eagles actually were breaking branches off trees and carrying them back to their new nest in the wild," says refuge manager Anne Sittauer, still amazed at the spectacle. "I had never really seen that behavior before, and here the Chinese were saying, 'That's your national symbol, and look at it.'"

Beyond that iconic sighting, says Sittauer, two things at Sherburne Refuge seemed to strike the Chinese. They were surprised that most of the refuge's 23 wetlands were created as impoundments, and they were fascinated by the concept. They also were amazed by the number of refuge Friends and volunteers. "They were impressed that citizens, even citizens who have full-time jobs, come and do work on the refuge for free," she says.

The Chinese also took note of refuges' environmental education programs,

says Peter Ward, a Service Division of International Conservation program officer who led part of the tour. He recalls one Chinese visitor saying: "You raise your children to have a respect for nature ... and that's more important than [conservation] laws."

Sittauer was struck by the Chinese officials' zeal for conservation. Half a world away, so was Refuge System wildlife resources branch chief Deborah Rocque, one of five System staffers to visit China: "We were all impressed by the Chinese passion and ability to incorporate the human dimension into their conservation delivery, from tea houses and lovely gardens to a massive and comprehensive museum devoted to wetlands. Their conservation is about people first — wildlife and wild places for the sake of the people."

Walking in Antiquity

The single most beautiful spot the U.S. delegation saw, according to Rocque and her colleagues, was Tianmushan National Nature Reserve, home to an ancient Buddhist temple, giant cedars and ginkgo trees. "It was both beautiful and perfectly captured the essential human element in the Chinese conservation model — we walked on a stone path more than 1,000 years old," she says. The most important spot the U.S. group saw was Poyang Lake National Nature Reserve, site of important wintering bird populations.

The simultaneous U.S.-China exchanges were only part of the Service's international conservation efforts last fall. In September, more than 150 ecologists from China, Russia



Two Chinese ecologists visiting the United States last fall enjoy a view of part of Upper Mississippi National Wildlife and Fish Refuge from a bluff in Wisconsin. (Peter Ward/USFWS)

and the United States held the third International Symposium on Ecology and Biodiversity in Large Rivers of Northeast Asia and North America in Memphis. The first two conferences were in Russia (2002) and China (2006). The gatherings have yielded Chinese-Russian cooperation on conserving species such as sturgeon in the Amur River, which forms a portion of the countries' border. "It's one of the great rivers of the world, and it's nice to see that China and Russia are working together to manage it," says Ward.

All three countries may have a way to go in striking an appropriate balance between economic growth and environmental conservation — and such exchanges can help.


"We're managing some of the same species here as they are in China, because many of the species are migrating," says Sittauer. "When you talk about climate change and global warming and all of that, you realize that you really should be talking to these people." Conferring with foreign conservationists, she says, "gives you a better platform to consider the bigger picture." 

Focus...Conserving the Future, Honoring the

Wildlife Refuges and the Next Generation

This year promises to be momentous for the National Wildlife Refuge System. Scores of U.S. Fish and Wildlife Service employees have been working for months with Refuge Friends and partners to develop a vision for the Refuge System for the next decade and beyond. Hundreds of Service employees will start the task of planning the vision's implementation in 2011. This new vision, titled *Conserving the Future: Wildlife Refuges and the Next Generation*, will be the successor to the *Fulfilling the Promise* vision crafted in the late 1990s.

The *Conserving the Future: Wildlife Refuges and the Next Generation* vision document will be presented for discussion and ratification at a conference in mid-July in Madison, WI.

Leading up to that conference, *Refuge Update* will present a series of Focus sections, starting with this issue's "Conserving the Future, Honoring the Past" rubric. It includes articles about how various functions on refuges have changed in recent decades and how past experience informs the way national wildlife refuges perform those functions today. 



Pelican Island National Wildlife Refuge, FL, above, is where the National Wildlife Refuge System got its start in 1903. Madison, WI, is where the U.S. Fish and Wildlife Service will contemplate the Refuge System's future this summer. (George Gentry)

Conserving the Future: Communicating on Many Levels — continued from page 1


In coming months, the National Wildlife Refuge Association and the Refuge System will be reaching out to critical publics. The five Core Teams, whose work formed the basis of the draft vision document, will host a series of Webinars starting in late January. A series of online forums will be held for Service employees, targeted communities of practice and partners throughout February, culminating in a national forum and broadcast to all Service employees on the Web.

In late April, the Core Teams and others will review all feedback for a final significant editorial examination. The Core Teams and the Steering Committee, which is led by Refuge System Chief Greg Siekaniec, will approve the draft vision document in mid- to late-May.

The vision document presented at the *Conserving the Future: Wildlife Refuges and the Next Generation* conference in mid-July will be largely complete when about 1,200 attendees arrive in Madison, WI, and hundreds more tune in via an array of technological avenues, including streaming video of plenary sessions that enables viewers to submit questions via e-mail or social media platforms such as Twitter.

Meanwhile, the program for the conference is being crafted. A work group for conference planning is outlining what will happen at the conference and beyond the confines of the Monona Terrace Community and Convention Center. Breakout sessions at the conference will provide another opportunity for people to discuss elements of the vision document.

Work group teams are concentrating on such areas as: greening the conference; making it memorable; bringing the arts into the program; virtualization; communications and engagement; youth engagement, including programming to introduce a new generation to careers in natural resources; and legacy and heritage.

"We will have a strong implementation plan as we move into the spring and summer," says Siekaniec. "More than 200 people were involved for a number of years in implementing the recommendations contained in *Fulfilling the Promise*, the guiding document adopted in 1998. We expect no less when we move to implement *Conserving the Future*. For now, we want the full range of people's opinions and ideas." 

The Fine Art of Flooding Bottomland Forests

By Larry Williams

Green tree reservoirs (GTRs) are common on national wildlife refuges, especially in the Southeast. Many were constructed in the 1900s to boost habitat for migrating ducks. Creating one usually involved building a levee to impound water on a bottomland hardwood forest and devising a way to deliver and remove water as needed. The result was expansive bottomland forest that could be deliberately flooded with shallow water to allow ducks to reach acorns and other foods produced by the trees.

GTRs were designed to mimic the natural floods that occurred in forests along river floodplains. In today's fragmented landscapes, it would be impossible for refuges to sustain waterfowl populations without GTRs.

Unfortunately, wildlife managers, like most people, can be guilty of too much enthusiasm.

Early in the evolution of GTRs, we in the National Wildlife Refuge System tried to keep them flooded as long as possible to maximize habitat for ducks. We typically flooded them in late fall, as ducks arrived, and didn't drain them until ducks left in spring. Our thinking was: If flooding the forest for a month is good, flooding it for four months must be great.

But, around 1980, watchful staff and long-term monitoring concluded that forests flooded too deep and too long begin to change in unhealthy ways. They stop regenerating because seeds can't germinate in flooded soil and young trees can't establish themselves. Existing trees show signs of stress: dead limbs, swollen trunks and small "epicormic" branches that develop on a tree's trunk when it is stressed and needs photosynthesis capacity. Over a span of years, the species composition changes; important red oak species, such as cherrybark oak and willow oak, are replaced by flood-tolerant species like

overcup oak and water hickory.

Felsenthal Pool

Felsenthal National Wildlife Refuge in southern Arkansas has one of the world's largest GTRs. Its 15,000-acre Felsenthal Pool is surrounded by hardwood forest. With flooding, the pool can expand to 36,000 acres, creating vast habitat for wintering mallards.

By 2000, most refuges, wary of too much flooding, were already managing GTRs with healthy varied flood regimes. But Felsenthal Pool was a special case. The pool's sheer size, the community's interest in it and shared jurisdiction with the U.S. Army Corps of Engineers made any change to the flooding regime a challenge.

"It Got Pretty Rough"

When refuge manager Bernie Petersen arrived in 2007, he knew of these conflicts. "It got pretty rough," he says. "I had several Congressional inquiries and lots of angry phone calls." The pool's trees were stressed, and the refuge forester saw a shift in forest composition, but citizens, especially waterfowl hunters, feared that not flooding the GTR, even for one year, would forever change waterfowl use.


The refuge and partners had to convince the public that less flooding was better. They brought in experts from the U.S. Forest Service, Arkansas Game and Fish Commission, U.S. Geological Survey (USGS) and the Fish and Wildlife Service's Migratory Birds program. All agreed that sustained flooding was



Wildlife managers have learned that flooding too deep and for too long begins to change bottomland hardwood forests in unhealthy ways. (USFWS)

hurting the pool's habitat value. They talked to hunters, citizens, county officials and Congressional staff, and they held tours to show stressed trees and lack of forest regeneration.

This education effort enabled the refuge, in cooperation with the Corps — which has jurisdiction for pool water levels — to experiment with less-frequent flooding. The experiments began in the winter of 2007-08. The results are looking good. Tree health is improving and waterfowl hunting has not suffered.

The refuge, the USGS and the Corps are working on a long-term plan to alternate flooding with periods of dryness in a way that mimics weather cycles. Once again, we find ourselves returning to where Mother Nature started. 

Larry Williams is chief of the Refuge System's Division of Budget, Performance and Workforce.

Focus...Conserving the Future, Honoring the

Law Enforcement Training: 31 Weeks

By Bill Kent

I remember the day distinctly. It was late in 1979. I was called into the refuge manager's office at Okefenokee National Wildlife Refuge in Georgia. I was handed a well-used .38-caliber revolver, a small gold badge and a handful of pink slips. Then, I recall the manager saying: "For God's sake, Bill, don't kill anybody."

It wasn't until a few months later that I attended four-week basic refuge law enforcement training at the Federal Law Enforcement Training Center (FLETC) in Glynco, GA. I went on to work at Parker River Refuge in Massachusetts, Klamath Basin Refuge Complex in Oregon and California, and Kenai Refuge in Alaska.

Today, new refuge officers complete 16 weeks of basic police training before they are issued firearms, and 31 weeks of training before they are given full enforcement authority.

The 16-week, land management-oriented training is conducted at FLETC. Its curriculum includes constitutional law, firearms training, officer response/defensive tactics, emergency vehicle operation, basic forensics, behavioral science and patrol skills. Then, after that four-month "holiday" in southeast Georgia, new officers attend Refuge Officer Basic School (ROBS). This three-week regimen at the National Conservation Training Center in Shepherdstown, WV, is devoted to U.S. Fish and Wildlife Service-specific policies, regulations and protocols. The final phase is 12 weeks under the mentoring eyes of three field training officers at three different national wildlife refuges. These field training officers specialize in evaluating the way new officers conduct enforcement activities and how well they understand the essential role an officer plays in refuge management.

Only after successful completion of all three training phases is a new officer

allowed to conduct law enforcement activities solo.

Was my introduction to, and the training for, law enforcement duties adequate? Of course not. Did I learn law enforcement techniques from more experienced officers as I progressed through my career? Yes; and those lessons ran the gamut from "how to" to "how *not* to" conduct appropriate and safe law enforcement activities.

Much Has Changed

In the early 1980s, about 800 refuge staff members had law enforcement authority. For most, law enforcement was a "collateral duty" usually conducted during hunting seasons. There were only a handful of full-time officers, primarily at high-visitor-use refuges. I believe that most of those collateral-duty officers would acknowledge that they were not highly motivated when it came to enforcement duties. Today the number of refuge personnel with law enforcement authority is down to about 400, but about two-thirds are full-time officers. The other one-third have dual functions at refuges with less visitor use or illegal activity. All of those officers complete the same 31 weeks of training and exercise the same enforcement authority.

Not only has training changed; so, too, has equipment. While at FLETC a new officer today is issued the basic personal equipment, including body armor and three types of firearms, needed daily when conducting enforcement activities. Once on duty at a refuge, an officer is provided a well-marked vehicle equipped with emergency lights and siren, a two-way radio and, ideally, an in-car video



Refuge zone officer Mary Blasing arrests a man at Crab Orchard National Wildlife Refuge in Illinois on a warrant for failure to appear for court date. (USFWS)

camera for recording contacts with refuge users. Additionally, since 2009, refuge officers are trained to use an "electronic control device," or Taser, to provide a non-lethal alternative to the use of deadly force in a critical situation.

Why is so much effort made and why are so many resources spent to train law enforcement officers today? Since the Refuge System was established in 1903, demands and concerns have changed dramatically. Illegal (and possibly commercial) hunting and fishing, timber theft, marijuana gardens, illegal aliens, vandalism and theft of government facilities, assault, murder, domestic violence, boundary encroachment, wetland easement violations and off-road vehicles are among the growing list of illegal activities occurring on refuges. Refuge officers must be able to face every one of those activities professionally and with confidence and competence. 🦋

Bill Kent recently retired as the Division of Refuge Law Enforcement's chief of training.

Better Bison Through Genetics

By Bill O'Brian

“Bison are nomadic,” says Dr. Tom Roffe. Left to roam, “they just munch and move, munch and move” across hundreds of thousands of acres.

So, giving them a vast contiguous home on the range is beyond the real estate capability of the National Wildlife Refuge System. But refuges can help conserve the iconic species’ genetic diversity. Since 2005, the System has done so in a fashion that would have been impossible decades ago.

“Our biggest role in refuges is to conserve the species’ foundation genetics for use in restoration efforts elsewhere” in the future, says Roffe, the U.S. Fish and Wildlife Service’s chief of wildlife health based in Bozeman, MT. “We hold in our basket a small number of diverse bison, and we want to make their genetic material available for wider species restoration.”

Roffe’s basket comprises six Refuge System units — the National Bison Range in Montana; Sully Hill National Game Preserve in North Dakota; Fort Niobrara National Wildlife Refuge in Nebraska; Rocky Mountain Arsenal National Wildlife Refuge in Colorado; Wichita Mountains Wildlife Refuge in Oklahoma; and Neal Smith National Wildlife Refuge in Iowa.

On those refuges, about 1,400 plains bison live in range-restricted, species-conservation herds. Because genetic models suggest 1,000 to 2,000 animals are needed to conserve genetic diversity over time, Roffe and colleagues manage the six refuge herds as one meta-population. It hasn’t always been thus.

Until the 1990s, “every refuge was kind of doing their own thing. There was no unified reason or goal,” says Roffe, who was not involved then. “They all did it individually and ad hoc” — occasional bison swaps notwithstanding.

In 2005, Roffe asked a question: “Why do we have bison on refuges?” He convened refuge managers to answer it. Managers articulated six reasons individual refuges have bison, but only one reason — species conservation and restoration — cut across all refuges. Since then, it has been the Refuge System’s primary *raison d’être* in the bison business.

Roffe and his refuge partners manage bison to minimize loss of genetic diversity within the Refuge System meta-population. Occasionally, they introduce new genes into that population. Usually, Roffe’s team goes to six autumnal roundups — one at each refuge. Each roundup’s purpose is to manage herd health and size to accommodate the refuge’s carrying capacity. Deciding which animals to cull is where science kicks in.

Selection Criteria

Radio-frequency identification (RFID) chips that link to a database of each bison’s health history and genetic information have been implanted in most of the bison. Roffe’s team makes sure the culling serves the larger genetic purpose of the meta-population, not just the individual refuge herds. The team has selection criteria designed to maintain genetic diversity: to ensure that uncommon genotypes are not removed; to maintain a wide age distribution; and to achieve a 50-50 gender ratio. Culled animals are sold or donated.

The refuge meta-population is a sliver of the plains bison demographic. There are roughly 420,000 bison in North America. Some 400,000 are in domestic herds



There are roughly 1,400 bison in species-conservation herds on national wildlife refuges, including these at Fort Niobrara National Wildlife Refuge in Nebraska. (Phyllis Cooper)

managed by private owners, mostly for commercial purposes. About 20,000 to 21,000 animals, including the 1,400 refuge bison, are in herds managed primarily for species conservation.

Roffe’s two primary goals are to increase the refuge meta-population to 2,000 and to ensure “that we are functioning in a smooth, efficient and consistent way across refuges to conserve bison genetic diversity and health. I think we’re pretty close to that.”

A secondary goal is to augment land base for landscape-wide species restoration.

But, because refuges are “postage-stamp-size parcels of land,” Roffe says, opportunities are limited and such restoration will require partnerships with public and private entities.

For now, he concentrates on positioning the species well to survive in the natural environment subject to natural selection. When the time comes for restoration, if the bison “don’t have genetic plasticity,” he says, “we stand to lose the species in the face of environmental change, such as that posed by global climate change. Our six refuges help conserve that diversity.”

Focus... Conserving the Future, Honoring the

Air Quality Branch Keeps an Eye on the Sky

By Kendall Slee

Canoes into the swamp at Okefenokee National Wildlife Refuge in southern Georgia and you are bound to feel you've escaped civilization. Almost.

"On a clear day, paddling through the Okefenokee, the sky is blue, distant cypress, loblolly bay and pine trees are clear on the horizon. The reflections in the blackwater along the Suwannee Canal are mirrorlike," says refuge biologist Sara Aicher. "On a hazy day, the sky is a grayish blue, and the distant views across an open marsh area do not grab the visitor's attention."

On such days, the haze consists mostly of sulfates from the region's coal-burning power plants, paper and pulp industry, cars, other fossil fuel combustion and organic particulates from fires. Aside from spoiling the view, pollutants can damage plants and aquatic habitat by altering the chemistry of rain, wetlands and lakes.

Because Okefenokee Refuge contains almost 354,000 acres of Class I Wilderness Area, it is assigned the nation's highest degree of air quality protection. And since 1977 amendments to the Clean Air Act, the U.S. Fish and Wildlife Service's Branch of Air Quality has been responsible for safeguarding Okefenokee Refuge's air quality and that of Class I areas on 20 other national wildlife refuges.

In the 1980s and 1990s, the Branch of Air Quality focused on addressing single sources of pollution — often a nearby power plant or industry. Then, scientists collected pollution and visibility data and developed computer models to show — and predict — how pollution travels and affects visibility. This made it possible for the Environmental Protection Agency in 1999 to issue the Regional Haze Rule. The rule requires states and federal land managers to look more comprehensively at pollution sources to improve visible air



On a clear day over Chase Prairie at Okefenokee National Wildlife Refuge in Georgia, you can see forever. But on some days you can't. (USFWS)

quality at 156 national parks and Class I Wilderness Areas.

The branch acts on behalf of Okefenokee Refuge and other refuges to review air quality permits from industries seeking to modify or build facilities. The branch, in a consulting role, makes recommendations to state and local air permitting authorities about whether to allow such facilities or other pollution sources.


As part of this effort, the branch consults with Okefenokee Refuge on how to conduct prescribed burns. While fire is essential to maintaining native plants and natural cycles, a smoke management specialist helps implement smoke control techniques and monitor weather/pollution conditions to minimize smoke impact.

Because airborne pollution can travel hundreds, even thousands, of miles, the branch works with regional air planning organizations to help states collaborate to analyze haze and develop plans to improve visibility in Class I areas.

"For the first time in a long time, our Class I areas are the direct focus of air quality regulations that we find in the regional haze efforts," says branch chief

Sandra Silva. "All the regulations hinge on the national visibility goal: States are supposed to demonstrate that they're going to improve the 20 percent worst pollution days of the year and sustain the 20 percent cleanest days by *not* making them dirtier."

Data collected from monitoring equipment at refuges are crucial to judging state and regional progress on haze. Three times a week, Okefenokee Refuge collects samples from monitoring equipment that tracks trace elements in the air. Data gathered from 2000 to 2004 serve as a baseline. Every five years, data will be evaluated to judge whether the states are reaching their goals. At Okefenokee Refuge, this means there should be more days when a visitor can gaze at a crisp reflection or see an egret fly far into the blue sky.

As states and regions implement state-of-the-art pollution control devices for industry and address other pollution sources, the benefit will extend across the nation. "Improved visibility on Class I sites," says Silva, "means better air quality for everyone." 

Kendall Slee is a Colorado-based freelance writer.

Protecting Precious Prairie in Texas

By Mary Tillotson

More than a century ago, the high plains of the Texas panhandle were home to bison and rich shortgrass prairie on which they grazed. Tierra Blanca Creek and Buffalo Lake attracted migrating waterfowl. But settlers, hunters and cattlemen killed the bison, tapped the water and plowed under huge tracts of the prairie for agriculture.

Since its establishment in 1958, Buffalo Lake National Wildlife Refuge, 30 miles southwest of Amarillo, has been undoing the damage.

The refuge has been restoring the shortgrass prairie ecosystem and the native wildlife it sustains. It has been so successful that the 7,664-acre refuge now boasts 4,000 acres of the finest grassland in the high plains, 175 acres of which have been designated a National Natural Landmark.

The refuge has been trying to recreate the benefits of a bison (buffalo) presence. In the natural cycle, bison tidily cropped the knee-high grasses and their droppings fertilized the soil. Their hooves broke up the grass that otherwise would mat and thus prevent new seeds from germinating.

“We’re trying to imitate what the bison did by permitting cattle to be grazed,” says refuge manager Lynn Nymeyer, “and the grazing bids from ranchers have always been one of the highest on any refuge in the U.S. because the quality of the grazing is so fine.” Grazing is rotated: Each pasture area gets a year’s rest between grazing seasons. Grazing contract proceeds are plowed into the refuge’s general fund.

Buffalo Lake, created when Tierra Blanca Creek was dammed in the 1930s, had been fed for decades by natural springs and the creek. The lake was an oasis in an arid landscape for Central Flyway migrating waterfowl. But by the 1970s, so much of the water had

been diverted for agriculture and urban development that the creek and the lake dried up, perhaps never to return.

Today, about 600 acres of the dry lakebed are farmed for crops such as milo and winter wheat. Farming helps reduce the nitrates and phosphates that accumulated before the lake dried up, and it helps reduce woody encroachment into the lakebed. Local farmers with contracts to work the land keep two-thirds of the crop; the remainder stays on the refuge to feed wildlife. Alongside the dry lakebed, elm, cottonwood and grassland are home to prairie dogs, deer, coyotes and bobcats.

But migrating waterfowl haven’t been left out of the equation.

The Table’s Set

Each February, the refuge floods a 40-acre moist soil unit at Stewart Marsh; as the marsh dries in spring, aquatic plants that are delicacies to migrating waterbirds appear. “Neck deep to a duck is about how deeply we flood it,” says Nymeyer. “The table’s set for the ducks.” That spring feeding as the birds head north is especially important, he says, because it helps ensure a productive nesting season. The area is flooded again in the fall to provide a way station for the birds’ flight south for winter.

Refuge biologist Melanie Hartman says that in the mid-1960s about 800,000 ducks and 40,000 Canada geese wintered at Buffalo Lake. As the water dried up, so did the numbers of birds. Now pintail, mallards and teal are finding that they again have a pit stop in the panhandle. Hartman says that, in wet migration



Since 1958, Buffalo Lake National Wildlife Refuge staff members have been restoring the shortgrass prairie ecosystem and the native wildlife it sustains. (Kevin Barry)

seasons, the numbers of birds are similar to those that visited the refuge 50 years ago.

Recently, the refuge has permitted cattle grazing in colder months, too. Hartman says winter grazing helps reduce the thick-matted, cool-season grasses to promote warm-season grasses the following spring.

In addition to mimicking bison prairie maintenance by grazing cattle and replacing dead Buffalo Lake with man-made marsh, the refuge in recent years, with new personnel available, has replicated the cleansing effect of wildfires with controlled burns. The burns will be rotated every seven or eight years. Records are kept, Nymeyer says, to gauge how effective burns and grazing are in restoring the native ecosystem.

“If you lose the grasses,” says Nymeyer, “you lose the wildlife. If you mess up the prairie, you mess up *everything* that was once here.”

Mary Tillotson is a frequent contributor to Refuge Update.

Focus...Conserving the Future, Honoring the Studying Rachel Carson's Power of Persuasion

By Cynthia Britt

Much has been published about the research, writing and reception of Rachel Carson's landmark 1962 book, *Silent Spring*. Less has been said about Carson's groundbreaking public outreach writing during her 15 years as a U.S. Fish and Wildlife Service employee.

So, as a doctoral student in the University of Louisville's composition and rhetoric program, I made Carson's environmental writing the subject of my dissertation, which I completed in August 2010.

As a Service employee, Carson created the first of 12 *Conservation in Action* booklets more than 60 years ago, but the series is finding a new audience today in the field of environmental rhetoric. Four of the booklets published from 1947 to 1957 were written by Carson; the other eight were written by Service colleagues. The series highlighted nine national wildlife refuges, including Chincoteague Refuge in Virginia and Parker River Refuge in Massachusetts, and the Pribilof Islands, which became part of Alaska Maritime Refuge. One of the booklets explained the Federal Duck Stamp program. In the longest booklet, *Guarding Our Wildlife Resources*, Carson described global conservation efforts in fishery conservation, wildlife restoration, protection of endangered species and more.

I became interested in Carson in graduate school, when I found her sea trilogy at a library book sale. My favorite, *Under the Sea-Wind*, combines the literary prose of nature writing and the precision of scientific observation. The text is filled with wonder about the tides, the seasons and the life cycles of the animals whose experiences she narrates.

In 2007, when I first visited the National Conservation Training Center, Service historian Mark Madison opened the Carson archives to me. In the *Conservation in Action* booklets,

Carson wrote about wildlife preservation, particularly that of waterfowl, in a way that invited readers into a partnership with the Service. She described society's ethical commitment to create protected areas for non-human inhabitants, but she did so without using the term ethics. I wanted to learn how her writing worked to persuade so many people. I wanted to learn what created the power of her voice and how she was able to educate readers without seeming to teach.

Over the next three years, I visited other Carson archives and several national wildlife refuges. I focused on her persuasive strategies in the Chincoteague and Parker River booklets. Because Chincoteague Refuge was first in the series, it became a template for the rest. The Parker River Refuge booklet was distinctive in Carson's use of metaphors to explain the need for waterfowl refuges.

Carson approached wildlife preservation, specifically waterfowl protection, through a variety of ways of persuasion.

She appealed to readers' logic by including information about basic conservation concepts, such as flyways, bird banding, and the development of protective habitat and food sources.


In the Parker River booklet, Carson directly addressed waterfowl hunters by using a metaphor of commerce to argue how refuges would ensure their sport's future: "A wildlife refuge is an investment ... It is true that this area is



In the *Conservation in Action* booklet about Chincoteague National Wildlife Refuge, Rachel Carson wrote: We "must set apart for the birds refuges like Chincoteague, where they may find these simple and necessary creature requirements: food, rest, security." (USFWS)

withdrawn from hunting, just as money you invest in stocks is no longer in your pocket to spend. In a few years, however, the refuge investment begins to pay the sportsmen dividends."

Finally, and most important, Carson appealed to readers' emotions by arguing that waterfowl has the same right to safety, sustenance and shelter as do humans. In the Chincoteague booklet, she argued, we "must set apart for the birds refuges like Chincoteague, where they may find these simple and necessary creature requirements: food, rest, security."

In these ways, she convinced readers of the value of the National Wildlife Refuge System. I believe Carson's government writing and work is a rich site for environmental communication studies. Research in the history of the Refuge System and the work of its employees has much to teach us about the development and future of environmental advocacy and communication. 

Cynthia Britt is working on a chapter about Rachel Carson for a collection of essays to be published in 2012, the 50th anniversary of *Silent Spring*. She can be reached at cynthia.britt@louisville.edu.

“Best Display of Firefighting I’ve Seen in My 25 Years”

By Mike McMillan

Late last fall, Montana Gov. Brian Schweitzer sent a letter to the U.S. Fish and Wildlife Service. It read in part: “Your efforts, including a 20-mile burnout operation, successfully contained this fire and minimized damage to adjacent private lands, saving taxpayers untold dollars in fire suppression costs.”

The governor was praising the Service for its role in managing the 28,000-acre Raven Rat Patch Fire that burned on Charles M. Russell National Wildlife Refuge in August 2010. Actually, the blaze started as four fires on or near the refuge. Local, state, federal and tribal firefighters joined forces to bring it under control. Firefighters walked along roads and fuel breaks using drip torches and more portable fuses to send flames toward the main fire to neutralize its progress.

“It was the best display of firefighting I’ve seen in my 25 years,” says Mike Granger, the fire management officer at the 1.1 million-acre refuge.

The Service has come a long way in recent decades when it comes to fire management. It is recognized among federal agencies today for managing fire, but it wasn’t long ago when interagency respect was hard to come by, according to Granger.

“I’d show up on wildfires in the 1990s, and people thought I was there trying to give tickets for wildlife violations,” he says. “It’s still not all rosy, but now when we come together, we have plans in place — at least we’re not strangers.”

Established in 1978

The Service Fire Management Program was established in 1978 as part of the National Wildlife Refuge System. Today, it employs more than 500 full-time and 200 seasonal fire employees at refuges across the country.

Before that, refuge managers had no firefighter training, fire staffs,

resources or funds designated for fire management. Typically, when a wildfire got out of hand, the Bureau of Land Management, the U.S. Forest Service, the National Park Service and/or state divisions of forestry came to the rescue, bringing trained workforces and emergency funds. The lack of an organized fire program left the Refuge System vulnerable to the threat of even larger, unstoppable wildfires.

In 1976, public outrage flared when a fire started by lightning in August at Seney National Wildlife Refuge in Michigan torched more than 70,000 acres and burned into the next winter. A review of the incident resulted in hiring a Service national fire director. Three firefighter fatalities from 1979 to 1981 also brought Congressional attention and additional funding for firefighting personnel and training.

Soon, federal fire management programs expanded, improving training standardization and operating procedures. The adoption of the Incident Command System essentially enables professionals from various agencies to quickly organize into supervisory and support positions in response to any disaster — from fire to flood. Fire weather alerts, after-action reviews and leadership training help fire managers make sound decisions, track successes and address failures. SAFENET is an anonymous Web-based reporting system available to anyone to document unsafe firefighting practices and events.



A successful burnout operation helped contain the Raven Rat Patch Fire on and near Charles M. Russell National Wildlife Refuge in Montana last August. (Mike Granger/USFWS)

Perhaps the fire management realm in which refuges and the Service have come farthest in the past half-century is prescribed burning. Decades ago, refuge managers would quietly set prescribed fires to benefit wildlife habitat. Then, society largely viewed wildfire as an enemy to the environment, and prescribed fire was greatly misunderstood. As a result, years of aggressive fire suppression allowed hazardous overgrowth to foster devastating fires.

Since then, while other agencies have honed their suppression expertise, the Service has emerged as a role model for using prescribed fire to manage healthy ecosystems. Employing today’s best science, refuge fire managers routinely set small, low-intensity burns under ideal weather conditions. Conducting routine prescribed fires greatly reduces hazardous fuels and inhibits invasive plants from choking fire-adapted ecosystems on almost 400,000 acres of refuge land each year. 🦅

Mike McMillan is a member of the Alaska Smokejumpers, a branch of the Alaska Fire Service and the Bureau of Land Management.

Around the Refuge System

Kansas

Secretary of the Interior Ken Salazar in November 2010 announced the authorization of the Flint Hills Legacy Conservation Area, a new unit of the National Wildlife Refuge System. This conservation area in the Flint Hills tallgrass prairie region evolved from the U.S. Fish and Wildlife Service's ongoing work with the Kansas Department of Wildlife and Parks, private landowners, other agencies and partners. The conservation area "will serve as a living example of how wildlife conservation and ranching can successfully go hand in hand," Salazar said. The new refuge will help maintain the integrity of tallgrass prairie wildlife habitat, stream water quality and the agricultural heritage of the Flint Hills. More than 1 million acres are expected to be protected through voluntary, perpetual conservation easements, resulting in a "conservation footprint" of nearly 3 million acres. The easements will protect habitat for more than 100 species of grassland birds and 500 plant species, and ensure the region's sustainable ranching culture — which supports conservation of the tallgrass prairie — will continue. Today, less than four percent of the once-vast tallgrass prairie in the United States remains; nearly 80 percent of that lies in the Flint Hills of eastern Kansas and northeastern Oklahoma.

Montana

Charles M. Russell National Wildlife Refuge is renowned as a dinosaur fossil site, but the discovery of a prehistoric sea creature called a plesiosaur has scientists particularly intrigued. "We kind of base our level of excitement on how excited the paleontologists get, and they're definitely excited about this one," says acting refuge manager Bill Berg. While bow hunting on the refuge last fall, Dave Bradt of Florence, MT, found the plesiosaur remains in approximately 75 million-year-old dirt/rock. Part of the neck, which Berg estimates weighs 800 to 900 pounds, had been exposed by erosion. Refuge staff "went back in there and covered it up with loose material to keep it from weathering more



Bow hunter Dave Bradt of Florence, MT, found this rare — and huge — fossil at Charles M. Russell National Wildlife Refuge. (Courtesy of Dave Bradt)

than it has," says Berg. Much of the rest of the plesiosaur's body is believed to be encased in rock formations. This spring, Berg says, refuge staff will take a Museum of the Rockies paleontologist to the site to make a scientific evaluation of the specimen. Numerous scattered triceratops and tyrannosaurus rex fossils have been found on the 1.1 million-acre refuge, which was once an inland sea, but a potentially intact plesiosaur is rare, Berg says. Like modern-day whales, plesiosaurs were air breathers. They propelled themselves in the sea using their four paddles, catching fish and other prey with well-toothed jaws on the end of long necks. The largest of them were 40 feet long and had nearly 70 neck vertebra. The discovery at the refuge is believed to have from 19 to 26 neck vertebra.

Massachusetts

For the second year in a row, Bristol County Agricultural High School students are helping Assabet River National Wildlife Refuge establish a population of Blanding's turtles, a species listed as threatened in the state. In September 2010, the students received from nearby Oxbow National Refuge 80 turtle hatchlings, which they will "head-start" — or raise in captivity — in a well-equipped lab at the school. The

hatchlings are scheduled to be released at Assabet River Refuge in May. The head-starting program, which was featured in the January/February 2010 issue of *Refuge Update*, protects the hatchlings from predation and increases their likelihood of survival in the wild. Since the fall of 2007, 108 Blanding's turtles head-started at various sites have been released at Assabet River Refuge.

Florida

Pelican Island National Wildlife Refuge is offering van tours every other Wednesday this winter to give older people a chance to get close to nature. The van tours are available free of charge on a reservations-only basis. The tours, being offered through March, are designed for people unable to walk the three-mile-long Joe Michael Memorial Trail. "By offering these tours, we are able to connect a population of citizens with nature who would be unable to experience nature and wildlife otherwise," says refuge ranger Joanna Webb. The tours are conducted in two 11-passenger vans.

Georgia

Viewers of Civil War buttons, coins and tourniquet buckles on display for the first time through May at Georgia Southern

University can thank the National Wildlife Refuge System, among others. The System is helping to interpret and protect Camp Lawton — the recently unearthed Confederate Army prison camp that is the source of the artifacts. The remarkably intact Civil War site is located on land now occupied by the Bo Ginn National Fish Hatchery and a Georgia state park. U.S. Fish and Wildlife Service regional archaeologist Rick Kanaski, who works primarily on refuges, is part of the multi-agency team planning the prison camp site's long-term management. Refuge System law enforcement officers are also helping to secure the historic site against looting and vandalism.

New Mexico

There is nothing high tech or fancy about it, but this spring Maxwell National Wildlife Refuge will be taking a step to greatly enhance its high-elevation shortgrass prairie habitat. It's removing two county roads that bisect that habitat. With the blessing of Colfax County, the 3,700-acre refuge along the Front Range of the Rocky Mountains in the northern part of the state will use its maintenance road-grader to knock the crown out of the cumulative four-mile length of the gravel roads. It will then fill in the ditches, employ temporary staff to remove the five-strand barbed wire fences that line the roads, re-seed the right-of-way with native grasses and let nature take its course. "Over time, evidence of the roads is going to disappear. Cost is going to be very low," says refuge manager Aaron Mize. "Within a decade, you're not going to see much of a remnant of road out there." The restoration will benefit pronghorn antelope, for which the barbed-wire fences are a major impediment, and other species that rely on shortgrass prairie, including grasshopper sparrows, meadowlarks and other grassland birds; prairie rattlesnakes; and tiger salamanders.


Wyoming

Staff at the National Elk Refuge arranged for a new traveling exhibit to stop at the Jackson Hole & Greater



Maxwell National Wildlife Refuge, NM, is taking the simple step of removing two roads to greatly enhance its high-elevation shortgrass prairie habitat. (Benny Tanner)

Yellowstone Visitor Center for a day last fall to give visitors a lesson in bear safety. The exhibit — funded by the Jackson Hole Wildlife Foundation and with state and federal money — includes full-body mounted grizzly and black bears. Displays on the exterior of the mobile unit describe how people can avoid conflicts with bears. Personnel from three participating organizations answered questions and demonstrated the proper use of bear spray as a defense

in an encounter. Spray is "a very effective tool, but no one should wait until an emergency to try it for the first time," says Lori Iverson, outdoor recreation planner at the refuge. The refuge hasn't had much documented bear activity, and it does not require hunters to carry bear spray, but grizzly bear range is expanding toward the refuge and spray is mandatory in a Grand Teton National Park hunt area that borders the refuge. 

Minnesota

David Ellis has been awarded the 2010 Sense of Wonder Recognition for his work at the Prairie Wetlands Learning Center at Fergus Falls Wetland Management District, where he is an instructional systems specialist.

In conjunction with the local public school system, where he was an elementary teacher for 30 years, he established the prairie science class, in which 220 students spend part of every school day exploring prairies and wetlands. In the process, they study science, math, language arts and health. The curriculum remains grounded in state and local standards but uses the natural environment as a teaching tool.

Recently, Ellis worked with the Friends of the Prairie Wetlands Learning Center to obtain a \$50,000 grant from the Otto Bremer Foundation to pay for three interns to take the learning center's model to new schools and refuges in the Midwest Region. "This model is free and available to anyone looking to connect people with nature," says Ellis.

The Sense of Wonder Recognition Program annually honors a U.S. Fish and Wildlife Service employee "who has designed, implemented, or shown visionary leadership in an interpretive or environmental education program that fosters a sense of wonder and enhances public stewardship of our wildlife heritage." Ellis received the award at the National Association of Interpretation annual meeting in November in Las Vegas.

Lawson, Pyle and Gibson Win National Realty Awards

The Upper Midwest carried the day when it came to the 2010 National Realty Awards.

The winners of the three awards presented annually by the Refuge System Division of Realty are Lois Lawson of U.S. Fish and Wildlife Service Great Lakes/Big Rivers Region; Chuck Pyle of the Huron Wetland Management District in South Dakota; and Jerry Gibson of the Iowa Department of Natural Resources.

Dieffenbach Award

Lois Lawson, a senior regional realty specialist, received the 2010 Rudolph Dieffenbach Award, presented annually to an employee for significant contributions to the Service's land acquisition systems, operation or mission. Since Lawson began working with Upper Mississippi River National Wildlife and Fish Refuge in 2002, she has acquired 13 tracts of land totaling almost 1,200 acres.

"Lois always seems to find a way to make the system work for both sellers and the Service," said Jim Nissen, La Crosse District manager at Upper Mississippi River Refuge, in nominating Lawson. "She has a knack for taking the complicated and making it simple for both landowners and field managers to understand. This interpretive work has the effect of both streamlining and improving procedures and getting the job done as quickly as possible."

The award honors Rudolph Dieffenbach, who was responsible for organizing and directing the appraisal and acquisition of lands for 272 national

wildlife refuges during his federal career from 1908 to 1952.

Land Legacy Award

Chuck Pyle, a private lands biologist at Huron WMD for 12 years, is the winner of the 2010 Land Legacy Award. Pyle was praised by the Huron Wetland Acquisition Office as a vocal advocate of the Small Wetlands Acquisition Program (SWAP), which uses funds from the sale of federal Duck Stamps to permanently protect migratory bird habitat, often in the Prairie Pothole Region of the United States.

"Historically in the Dakotas, government programs, including SWAP, are met with some level of unease and skepticism," the acquisition office said in nominating Pyle. "Chuck has been able to ease this concern by showing landowners how their goals and ours are not that far apart."

National Land Protection Award

Jerry Gibson, a senior acquisition-donation agent with the Iowa Department of Natural Resources, is the winner of the 2010 National Land Protection Award, which recognizes



Since 2002, Rudolph Dieffenbach Award winner Lois Lawson has acquired 13 tracts of land totaling almost 1,200 acres for Upper Mississippi River National Wildlife and Fish Refuge.

individuals, groups, organizations, corporations or public agencies for significant contributions to land protection for fish and wildlife resources.

"Jerry has been the principal negotiator, case closer, relocation specialist and problem solver for the U.S. Fish and Wildlife Service acquisitions in Iowa for the past 22 years," said Midwest Region supervisory realty specialist Ross Grimwood.

Gibson's work has resulted in the protection of more than 31,000 acres for the National Wildlife Refuge System in Iowa, about one-third of that at Port Louisa National Wildlife Refuge, according to Grimwood. 🦋

Chief's Corner — continued from page 2

Madison, WI, when we expect the vision document to be largely complete. You still have time to comment.

Here are a couple of ways to join the dialogue:

- Go online at <http://americaswildlife.org/>, click "join a group" and let us know what you think.
- Write directly to me at Chief, National Wildlife Refuge System/ NWRs/R9/FWS/DOI@FWS

At this moment, in this decade, we have a singular opportunity to build a stronger Refuge System that honors our conservation legacy and looks to our future. I'm looking forward to hearing from you. 🦋

A Curious Mix: Elk, Waterfowl and Corn

By Shawn Gillette

When you think of central New Mexico, the first species that comes to mind probably is not elk. And when you think of elk, you probably don't imagine them competing for food with long-necked migratory birds.

So the fact that elk are present in increasing numbers at Bosque del Apache National Wildlife Refuge and might be filching corn primarily intended for sandhill cranes and geese might surprise you.

For the refuge, it is a research opportunity. Last fall, Bosque del Apache Refuge and the New Mexico Department of Game and Fish began an ambitious operation to capture and collar up to 30 adult elk.

Elk, a species reintroduced into the state in the first half of the last century, began migrating into the fertile Rio Grande floodplain from the San Mateo and Magdalena mountain ranges in the early 1990s. At first, their presence on the refuge was limited. But, as drought, hunting and other pressures affected the herd, elk meandered onto refuge lands and remained.

By 2000, elk had become a resident species. Current population estimates range from 80 to 100 animals on Bosque del Apache Refuge, and management has begun to work with the state on a three-year study to learn if the resident population is growing and what impact the elk have on migratory birds.

Bosque del Apache Refuge was established in 1939 to provide wintering habitat for sandhill cranes and other migratory waterfowl. The 57,331-acre refuge — which straddles the Rio Grande Valley about 90 miles south of Albuquerque — uses a cooperative farming program to produce 1.5 million pounds of corn annually for the birds. This year's production is estimated at 1.2 million pounds. That is not ideal, but it is enough to feed upwards of 12,000 sandhill cranes and 45,000 light geese that are expected to winter on the refuge.



Last fall, Bosque del Apache National Refuge and the New Mexico Department of Game and Fish began collaring elk as part of a three-year study of the species on the refuge. (Erv Nichols/USFWS)


Competition Grows

Competition between the elk and the waterfowl for the limited corn is a growing concern. While the sight of elk in refuge farm fields may delight the public, it is viewed carefully by refuge management. Because elk hunting is not permitted on the refuge, the elk population faces few outside pressures and has increased as a result. At present, there is no management plan for the species, so the refuge is working with the state to gain data on its elk.

As part of the study, the New Mexico Department of Game and Fish coordinates elk captures. A contracted helicopter locates and tranquilizes elk. On the ground, a veterinarian monitors vital signs while a state disease biologist collects a tissue sample to test for chronic wasting disease, takes a blood sample for genetics work and fits the animal with a VHF radio collar. Refuge staff and volunteers will track the collared elk for the next three years.

Additionally, Bosque del Apache Refuge staff and U.S. Fish and Wildlife Service Southwest Region research biologists

are working with the University of New Mexico's Nepal Study Center to test six population-monitoring techniques, including radio telemetry and camera trapping, for usefulness to the refuge and applicability in remote settings such as the Himalayan nation of Nepal, where monitoring of many species is limited or nonexistent.

The main goal of the operation, though, is to learn more about the elk and how they share wintering habitat with Bosque del Apache Refuge's more famous residents — cranes and other migratory waterfowl. 

Shawn Gillette is visitor services chief at Bosque del Apache National Wildlife Refuge.

Short-Tailed Albatross Show Signs of Nesting at Midway Atoll Refuge — continued from page 1

at sea and plastic ingestion; reducing bycatch of these seabirds from commercial fisheries; and addressing invasive species and other competitive species at nesting colonies.

The pair first “met” at Midway Atoll Refuge during the breeding season four years ago (2007-08). That season, they were observed spending only a little time together. During the second season (2008-09), their time together increased. By the third season (2009-10), they arrived at the Eastern Island breeding colony together in October and built a nest. Now, in their fourth breeding season (2010-2011), they appear to have copulated and laid an egg. The incubation period is roughly 65 days.

The short-tailed albatross, listed as endangered since 1970, is the largest seabird in the North Pacific, with a wing span of seven to 7.5 feet. It is known for the golden yellow cast on its head and nape; for its large, pink bill with blue tip and black border around the base; and for its pale bluish feet and legs. Its life span is 12 to 45 years. Pairs begin breeding at about seven or eight years of age, and mate for life.

Once thought to be the most abundant albatross species in the North Pacific with a population of more than 5 million adults, short-tailed albatross were hunted for feathers, and harmed in other ways, to near extinction.

By the 20th century, only two colonies remained on remote Japanese islands — Torishima Island in the Philippine Sea and Minami-kojima Island near Taiwan in the East China Sea. In 1939, the short-tailed albatross’ main breeding grounds on Torishima were buried under 30 to 90 feet of lava after a volcanic eruption. Population numbers plummeted to 10 nesting pairs. Since then, conservation efforts have helped increase the population to approximately 2,400 birds, which forage widely across the temperate/subarctic North Pacific and can be seen in the Gulf of Alaska, along the Aleutian Islands and in the Bering Sea.

Midway Atoll National Wildlife Refuge has planned to host a nesting colony for more than a decade, and the effort seems to be paying off. Short-tailed albatross were rarely seen on Midway Atoll before it began. This season marks the pair’s first known mating and nesting attempt.



A male short-tailed albatross incubates a freshly laid egg in November on Eastern Island at Midway Atoll National Wildlife Refuge. More photos are available at <http://www.flickr.com/photos/usfwspacific>. (John Klavitter/USFWS)

Refuge staff and volunteers will continue to monitor the nest daily with the use of a remote video camera. 🦋

David Patte is the Fish and Wildlife Service Pacific Region assistant regional director for external affairs.

At Waccamaw Refuge, “Estuary Creep” Is a Rising Concern — continued from page 5

SLAMM. “We know the sea is rising and saltwater is going to kill the trees,” says Sasser. “We need to know the elevation where this is going to take place — and when” — to make science-based land acquisition decisions.

The other two studies involve the U.S. Geological Survey. A four-year study of bald cypress tree mortality has shown that those trees are capable of budgeting freshwater during droughts but after five years of continuous salt stress, they begin to die. A one-

year study comparing historical carbon sequestration rates in tidal marshes is underway. Marshes are exceptional sequesterers, says Sasser, and “we need to understand how well the freshwater systems sequester carbon — before they are converted to brackish marshes and these historical functions are altered or lost.”

“What I’m hoping for,” he says, “is a melting pot of NOAA’s expertise and USGS’s expertise,” with land acquisition assistance from The Nature Conservancy.

In the meantime, Sasser does the best he can to manage habitat for black bears and swallow-tailed kites: “They need a lot of land. If we can take care of these umbrella species during these uncertain times of rapid habitat change, we will be in better shape to take care of the numerous other species that coexist and thrive alongside them.” 🦋

RAPP Counts

By Noah Kahn

Collecting performance-related information uses up valuable time. It takes money. It often requires educated guesswork. So, why does the National Wildlife Refuge System devote so much energy to doing it?

Performance data are both needed and valuable: to assess program effectiveness; to explain budgets; to answer questions from Congress; and to share with interested partners. But perhaps above all else, the Refuge System has a duty to tell American taxpayers how their money is being spent. In practice, the Refuge System fulfills this high-level responsibility by setting measurable goals and determining whether those goals have been met.

This is the crux of performance management — collecting and evaluating information in order to spend money wisely and to improve programs. But it's that second verb — *evaluating* — that is the key to making it work, and the Refuge System is working hard to strengthen that evaluation component.

The Refuge Annual Performance Plan (RAPP) is a database for documenting the accomplishments of individual wildlife refuges and wetland management districts in a way that says something about how the Refuge System as a whole is performing. While some of the information collected in RAPP has been useful, there is widespread agreement on the need to improve the process and make the collected information more usable. Based on suggestions from people in the field and regional offices, RAPP is being improved so it: 1) continues satisfying legislated requirements; 2) reduces undue administrative burden on field staff; and 3) collects only information that is useful and subsequently used.

Last year, after putting RAPP under careful scrutiny, the Refuge System made some transformational improvements. We eliminated 15 percent of RAPP's measures, ridding the




Volunteer Melissa Martin plants a spruce tree at West Virginia's Canaan Valley National Wildlife Refuge, which — as RAPP documents — did substantial habitat restoration in 2010. (Ken Strum/USFWS)

database of many metrics that were not particularly useful or often used. This “cleaning house” job is not complete, but 2010 was a strong start. In addition, RAPP was streamlined by integrating the “workbook” into a new, easy-to-use Web application, <https://rmis.fws.gov/rapp/StartPage.aspx>.

Staff members at field stations can now enter projects directly into the application and create reports showing performance data, notes and projects. In this way, refuges can use the RAPP application to help keep a historical record, not unlike parts of an annual narrative. The RAPP application also contains clarified guidance on interpreting measures and a clear explanation of which measures are required by the Department of the Interior, and how data are used by regional or headquarters staff.

The central idea is to count or otherwise track the things necessary for informed decision-making. And, while RAPP has improved, work remains if the Refuge System is to realize its long-term goal of fulfilling reporting requirements while simultaneously collecting information that's useful to all levels — the field, regions and headquarters.

In the long term, we'll keep in mind the words of Albert Einstein: “Not everything that can be counted counts, and not everything that counts can be counted.” 

Noah Kahn is national performance manager for the National Wildlife Refuge System.

A 2010 National Snapshot

Here is a snippet of what last year's Refuge Annual Performance Planning (RAPP) data tell about the National Wildlife Refuge System:

- Visitors: approximately 44.4 million
- Volunteers: 42,000
- Acres infested with non-native plants: 2.5 million
- Acres treated for non-native plants: 315,000
- Acres receiving needed management attention: 3.5 million
- Acres needing attention but management is deferred: 5.8 million



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A Look Back ... Mollie Beattie

The first woman to head the U.S. Fish and Wildlife Service, Mollie Beattie, was appointed in 1993 by President Bill Clinton. Then-Secretary of the Interior Bruce Babbitt wrote that Beattie was determined to make the Service “the strongest protector of America’s wild creatures and the finest steward over America’s National Wildlife Refuges.”

Three years later, Babbitt mourned Beattie’s death of brain cancer when she was only 49 years old. He wrote that Beattie “fought fiercely against the forces that sought to weaken the mission of our wildlife refuges, to gut the Endangered Species Act, or to turn the lights off on good science through funding cuts.” Commentator Ted Gup wrote in *The Washington Post* that Beattie’s “brief and quiet sojourn in Washington left a lasting mark on both the physical landscape of the nation and the political terrain of conservation ethics.” To recognize her extraordinary work in the field of conservation, Congress named a wilderness area in Alaska’s Arctic National Wildlife Refuge in her honor.



Mollie Beattie (1947-1996): “What a country chooses to save is what a country chooses to say about itself.” (USFWS)

A forester by training, Beattie worked for state agencies and conservation organizations in Vermont before coming to Washington. She sought to conserve endangered species by managing landscapes and ecosystems. During her brief tenure with the Service, 15

national wildlife refuges were added, more than 100 habitat conservation plans were signed with private landowners, and the gray wolf was reintroduced into the northern Rocky Mountains. One acquaintance recalled seeing her “rub cold water on the belly of a wild wolf to cool it, so the animal could be moved to another site for release.”

Beattie’s concerns went beyond individual species. In 1995, her prescient comments to a group of environmental journalists foretold the problems the National Wildlife Refuge System wrestles with today as it crafts a vision for the future: “When Americans are asked what the most pressing environmental issues are, they cite pollution issues such as toxic wastes and clean water. Problems like loss of biodiversity, rapid depletion of natural resources and the international problems of population explosion are way down the list. And yet these are the issues that are of greatest importance to the long-term health of our world.”

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Send Us Your Comments

Letters to the Editor or suggestions about *Refuge Update* can be e-mailed to RefugeUpdate@fws.gov or mailed to *Refuge Update*, USFWS-NWRS, 4401 North Fairfax Dr., Room 634C, Arlington, VA 22203-1610.