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RefugeUpdate

National Wildlife Refuge System

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INSIDE: A roadrunner holding a lizard pauses in Congressionally designated wilderness at Bosque del Apache National Wildlife Refuge in New Mexico. There are 75 wilderness areas on 63 refuges in 25 states, and this year is the 50th anniversary of the Wilderness Act of 1964. See Focus section, beginning on Page 8. (Aaron Drew/USFWS)

Studying Water at Kanuti Refuge Is an Icy Proposition

By Maureen Clark

It's a blustery November morning. Jasper Hardison has been up for hours, checking weather, conferring with his pilot and loading the helicopter that will take him to stream-gauging stations on Kanuti National Wildlife Refuge.

Hardison and three other U.S. Fish and Wildlife Service Alaska Region hydrologists are wrapping up a six-year Kanuti Refuge water resources study.

In the Lower 48, Hardison says, such a study might be 90 percent project work and 10 percent logistics. At 1.6 million-acre Kanuti Refuge, which straddles the Arctic Circle, is roughly the size of Delaware, is roadless and is accessible only by air, "it's exactly the reverse"—90 percent logistics and 10 percent project.

Today in Bettles, AK, Hardison is awaiting sunrise. This time of year daylight is short—5½ hours. He already has lost a day this week to fog. Finally, just before 10 a.m., the sun edges above the southern horizon, the helicopter lifts off, and Hardison is on his way.

His work is fundamental to legally protecting refuge water. Under the 1980 Alaska National Interest Lands Conservation Act, one purpose of Kanuti Refuge is to

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Focus: Wilderness at 50, pages 8-15

Vision Quickly Becoming Practical Reality

By Bill O'Brian

Conserving the Future: Wildlife Refuges and the Next Generation is rapidly moving from the theoretical vision phase of the past few years into the practical implementation phase.

U.S. Fish and Wildlife Service employees across the National Wildlife Refuge System should "be on the lookout for the resources that are coming out of the implementation teams," says *Conserving the Future* coordinator Anna Harris. "These products were developed by our colleagues to provide details and direction to sustain healthy wildlife and habitats, and remain relevant in a changing world."

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From the Director

Bringing the Wilderness Magic to Everyone

Half a century ago, I was 8 years old, but fortunately, some smart and passionate folks were thinking about my future. And yours. They decided that "wild life" is more than individual plants and animals. Places should be set aside and allowed to stay wild and undisturbed by man.

Dan Ashe

Their work and passion culminated in the Wilderness Act of 1964. Signed by President Lyndon Johnson, the Wilderness Act created the National Wilderness Preservation System and established a formal mechanism for designating future wilderness. President Johnson stated, "If future generations are to remember us with gratitude rather than contempt, we must leave them a glimpse of the world as it was in the beginning, not just after we got through with it."

This year and in this issue of *Refuge Update,* we are celebrating the act's 50th anniversary, and with less than 3 percent of the contiguous United States still considered wild, we have a lot of work to do. As human population grows, and humanity consumes more and more to meet its growing needs, wild will become increasingly rare.

I've had the good fortune to visit many of our wildest places. One of them is not where you'd expect. Monomoy National Wildlife Refuge in Chatham, MA, is a wilderness that exists amid a crush of humanity. Have you ever tried to cross the Bourne Bridge onto Cape Cod on a summer weekend? The refuge includes the Monomoy Wilderness. When Congress created the Monomoy Wilderness in 1970, Monomoy was not the kind of pristine wilderness many imagine when they read the Wilderness Act—places where "the imprint of man's work [is] substantially unnoticeable."

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Chief's Corner

Urban Initiative Is Vital to Conservation

I enjoyed reading Director Dan Ashe's thoughts on wilderness as part of this *Refuge Update's* focus on the topic. While wilderness stewardship is a passion of mine, what I am very concerned about today is making sure our urban refuge initiatives are successful.

Jim Kurth

As we went through the deliberations leading up to the *Conserving the Future* conference in Madison, WI, in 2011, no topic sparked more interest than our conversations about relevancy in a changing America. We recognized that our nation is more urban today, with 80 percent of the population living in cities.

The nation is also becoming more ethnically diverse as the baby boom generation is aging. While our traditional hunting and angling partners remain crucial to conservation, their numbers reflect a smaller percentage of the overall population. If we want to grow support for wildlife conservation, then we have to go where the people are: We have to go to the cities.

The good news is the Refuge System is already present in many cities. There are more than 100 national wildlife refuges within 25 miles of cities with more than 250,000 people. The Refuge System's investments in these places haven't been much different than in more rural places.

As we implement *Conserving the Future,* the Urban Wildlife Refuge Initiative

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Refuge Update

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Inside

Hatching Fish in the Desert

By Bill O'Brian

Working in a harsh environment with one of the rarest fish on Earth, the U.S. Fish and Wildlife Service, National Park Service and others are doing unprecedented conservation research at a special facility within Ash Meadows National Wildlife Refuge in Nevada.

The Fish and Wildlife Service is collecting endangered Devils Hole pupfish eggs from a warm spring that is within the desert refuge but is jurisdictionally part of California's Death Valley National Park; transporting those eggs four miles to the Ash Meadows Fish Conservation Facility; and hatching and rearing larvae in captivity. The goal is to determine if it's feasible to establish a backup population using new methods developed by University of Arizona-Tucson researcher Olin Feuerbacher, now a Service biologist.

So far, 33 larvae have hatched from collected eggs and 29 fish (88 percent) are alive and healthy.

This is being done to bolster the species' odds of survival. Last fall, only 65 Devils Hole pupfish were observed in their only natural habitat, Devils Hole—an underwater cavern whose water is nearly always 92.3 degrees Fahrenheit and whose depth exceeds 432 feet.

"The Devils Hole pupfish is an icon of the conservation movement and was listed as endangered in 1967," says Service biologist Darrick Weissenfluh. "Devils Hole pupfish are important because they encourage us to think about our own future and the sustainability of our activities, especially groundwater use."

Weissenfluh manages the Service-owned Ash Meadows Fish Conservation Facility, which includes a 100,000-gallon state-of-the-art tank system that emulates Devils Hole. The facility's $4.5 million design and construction in 2012 was paid for with Southern Nevada Public Land Management Act funds. Various Service programs support its operation. It exists to save the Devils Hole pupfish and conduct research that benefits imperiled aquatic species.

The U.S. Fish and Wildlife Service is spearheading an effort to save the Devils Hole pupfish from extinction. The fish's only natural habitat is Devils Hole, an underwater cavern that is physically within Ash Meadows National Wildlife Refuge in Nevada but is jurisdictionally part of California's Death Valley National Park. (Olin Feuerbacher/USFWS)

Devils Hole pupfish have "much to teach scientists about adaptation to adverse conditions," the Service's Nevada Fish and Wildlife Office Web site says. "It has adapted to survive in very warm water with very low oxygen content."

The inch-long iridescent blue fish has been isolated in Devils Hole for 10,000 to 20,000 years. Individual pupfish live about one year and spend most of their time on a shallow rock shelf near the surface. From the late 1970s through 1996, the population seemed to be stable, with an average count of 324 individuals. In 1997, a steady decline to last fall's 65 began—for reasons mostly unknown, but that likely involve subtle habitat changes researchers are studying.

To reduce the likelihood of extinction, the Ash Meadows facility is attempting to establish a refuge population of Devils Hole pupfish that is genetically similar to the wild population—two refuge populations, actually, one in aquariums this year and another in the large tank system by the end of next year.

To do that, Weissenfluh says, facility staff members, in coordination with the Park Service and Nevada Department of Wildlife, are deploying and collecting egg recovery mats in Devils Hole to collect viable (fertilized) eggs from the wild population. The mats are deployed for up to a week and then carefully transported to the facility within 45 minutes of collection. At the facility, staff members place the eggs/mats in incubation aquariums for 10 days. Eggs typically hatch in a week.

"When they hatch, intensive husbandry efforts begin, as the larval fish can be finicky and a challenge to rear," Weissenfluh says. "This project is just beginning, but our success to date is supporting the idea there are creative ways to conserve a species on the brink of extinction, such as collecting and propagating eggs as opposed to removing some or all of the adults from the wild."

Yuen Honored as Refuge Manager of the Year

The National Wildlife Refuge Association has honored two individuals, one couple and a Friends group with 2014 National Wildlife Refuge System awards.

Andy Yuen received the Paul Kroegel Refuge Manager of the Year Award.

Yuen, manager of the San Diego National Wildlife Refuge Complex, was cited for his conservation vision, his ability to give his staff space to do great work and being an outside-the-box thinker.

Yuen, who has worked with the U.S. Fish and Wildlife Service since 1984, was described as one the first Service managers to provide work experience opportunities for wounded military service members as they transitioned to the civilian workforce.

He was also praised for coordinating with the National Oceanic and Atmospheric Administration (NOAA), California Coastal Conservancy, Port of San Diego, U.S. Navy and the cities of Imperial Beach and Coronado to complete a 300-acre coastal wetland restoration project that restored 230 acres of tidal salt marsh on San Diego Bay Refuge and enhanced an additional 70 acres of coastal uplands and wetlands on port property along San Diego Bay. A similar partnership resulted in funding to implement trail and bikeway projects that improve access for observing wildlife along the bay.

Kenneth McCain received the Employee of the Year Award.

McCain, federal wildlife officer at Lower Suwannee and Cedar Keys National Wildlife Refuges in Florida, was honored for his hands-on style of law enforcement, his skill at identifying illegal activities and conducting interviews, and his ability to gain the public's respect.

"He genuinely cares about the refuges and their purpose, and he is passionate about communicating this purpose to the public," Refuge Association president David Houghton said of McCain, a 24-year Service employee. "Kenny doesn't just enforce the law; he educates people about why certain rules are in place."

Bob and Sharon Waldrop received the Volunteer of the Year Award.

The Waldrops were honored for more than a decade of service as volunteers at Crab Orchard National Wildlife Refuge in Illinois and the Southeast Louisiana Refuges Complex.

Together, the couple has contributed 32,693 volunteer hours so far to the Refuge System—almost 16 years of 40-hour workweeks. The Waldrops also were credited with training more than 160 interns and volunteers in various skills and crafts.

"Whether it was restoration after Hurricane Katrina or clean-up efforts in the wake of the BP oil spill, the Waldrops could be counted on to dive right in and help the refuge recover from unthinkable disaster," Houghton said of the Waldrops, who typically spend summers up north and winters down south.

Friends of Tualatin River Refuge received the Friends Group of the Year Award.

The Friends group that supports Tualatin River National Wildlife Refuge in suburban Portland, OR, was honored for outstanding efforts working in the refuge's wildlife center, providing environmental education programs, maintaining the refuge, monitoring birds, and planning and implementing the Tualatin River Bird Festival. Last year, the group contributed more than 17,000 hours of volunteer time to the refuge. Also last year, in recognition of the Friend group's 20th anniversary, the mayor of Sherwood, OR, proclaimed the city "Home of the Tualatin River National Wildlife Refuge."

JUDY GIBSON/USFWS

LARRY WOODWARD/USFWS

Andy Yuen, left, received the Refuge Manager of the Year Award for his work at San Diego Bay National Wildlife Refuge Complex in California. Kenneth McCain, federal wildlife officer at Lower Suwannee and Cedar Keys Refuges in Florida, was honored as Employee of the Year.

Left: The author helps a girl steady her camera on a summer photo safari at Kenai National Wildlife Refuge in Alaska. Right: The underside-of-a-mushroom photo that resulted. (USFWS)

Nature + Technology = Connection at Kenai Refuge

By Leah Eskelin

"Check it out!" An excited teenage voice echoes up the trail, amid the whisper of aspen leaves and the call of a distant raven. "You'll never believe the cool mushroom I just found." The thrill of discovering a mushroom encircling a stalk of club moss spreads to fellow hikers. Camera shutters snap. Grandparents check LCD screens with grandchildren. Middle-schoolers help toddlers.

We are on a fall digital photo safari at Kenai National Wildlife Refuge—one of a dozen seasonal safaris held on the refuge since 2010. The theme of this outing is: *Look closer, hunt for tiny worlds along the trail.* Participants' memory cards are filling fast with images of spiders on webs, mushroom gills and ripe rosehips.

Holly Conner, the mother of three children on the photo safari, says intermingling digital technology and a nature walk is "a great idea because technology is threatening to overwhelm us … Sitting on the couch playing a video game or watching TV sounds much more comfortable than walking down a forest path at 25 degrees. But when you throw technology into the mix, our young people get interested again."

Kenai Refuge in south-central Alaska has 16 digital cameras it uses for safaris and other interpretive and educational programs year-round. Seasonal photo safaris start with a brief lesson in camera operation, a conversation about the highlights of the particular season, and a discussion of the hike's theme. Participants are encouraged to build the theme into photos they take. They could be asked to find something special that others may overlook, take photos from an insect's perspective or capture different textures, colors or shapes through the lens.

Hikers Own the Hike

Like any guided nature walk, there are rules. Stay on the trail to protect the plants! Walk so that running feet don't scare away wildlife! Respect other hikers! But the rule that makes Kenai Refuge photo safaris special is: Don't ever let the group pass by something cool that you see!

This rule inspires safari participants to own the hike, to be present, to be aware. It shares the responsibility of keen eyes among everyone. The details that a preschooler picks up and the grand vista that an adult sees combine to reveal the richness of nature. Because every participant is armed with a camera, cool discoveries like a club moss-hugging mushroom get captured from every angle.

Today's technology can help us connect to our world in ways our grandparents never dreamed. Technology can also connect youth to the outdoors. The excitement of the too-cool-for-a-photo-safari teen when he found that mushroom was unlocked because we were using digital technology as a gateway to the forest. Before we started walking, his distant expression had clearly indicated that he was along only because his mother and sister insisted.

Awakening a connectedness to nature in youth who find technology intuitive may be done best by integrating technology and nature instead of ignoring the electronic devices that are ubiquitous today. Formal educators know technology can be an effective tool in the classroom. The same is true outdoors, where technology can encourage young people to look closer, delve into nature, feel its textures, listen to all its sounds and explore its beauty.

Ten-year-old Katherine Conner has a word of caution for environmental educators, though.

"A camera is fine, but not a Kindle or something like that," she says. "If you were playing on a Kindle or something like that, you wouldn't see anything new because you'd be focused on the Kindle instead of on nature."

Leah Eskelin is a visitor services park ranger at Kenai National Wildlife Refuge.

As Climate Changes, So Do Fire Strategies

By Karen Miranda Gleason

As warmer temperatures and drier conditions in much of the United States have led to earlier and longer-lasting fires, some wildland fire managers have modified firefighting tactics, taken steps to reduce public health hazards and adjusted the timing of seasonal hiring.

"In the words of hockey player Wayne Gretzky, we skate to where the puck is going to be, not to where it has been," said Refuge System fire ecologist Lou Ballard. "In addition to planning for climate change, even when managing an ongoing fire, we must anticipate what the weather and [vegetation] fuel loading will allow us to do and where those points of control or protection exist."

In the Southeast, firefighters on forested wetlands have faced several large wildfires in recent years—including two each at Virginia's Great Dismal Swamp National Wildlife Refuge and Georgia's Okefenokee Refuge, and one each at Pocosin Lakes Refuge and Alligator River Refuge in North Carolina. These fires produced sustained smoke and embers smoldering as deep as eight feet into organic peat soils.

To address the challenges, U.S. Fish and Wildlife Service fire specialists Sue Wilder and Kelley Van Druten gathered 50 experts for a 2½-day symposium at the Coastal North Carolina National Wildlife Refuges Gateway Visitor Center in Manteo late last year.

The symposium covered priority wildlife needs, hydrology and sea-level rise resiliency projects, fire danger rating for organic soils, mineral cycling/subsidence and accretion as well as management concerns, challenges and best management practices related to fire. Attendees came from the Refuge System, the Service ecological services program, universities, state land management agencies, The Nature Conservancy, nearby U.S. Air Force Dare Bombing Range and elsewhere. The symposium was funded by a grant from the Joint Fire Sciences Program of the U.S. Forest Service and Department of the Interior.

The 2011 Pains Bay fire at Alligator River National Wildlife Refuge in North Carolina is one of several fires in the Southeast in recent years that have produced sustained smoke and embers smoldering as deep as eight feet into organic peat soils. (USFWS)

A key symposium finding was the need to continue work with partners and neighbors to install more water control structures at refuges. Such devices allow refuges to reduce saltwater intrusion into wetlands, specifically at Alligator River Refuge, and move in fresh water during drought conditions. That keeps peat from drying out and becoming flammable at refuges like Pocosin Lakes and Great Dismal Swamp.

Additionally, as sea-level rise increases salinity in soil, forested wetlands are dying and being replaced by salt-tolerant shrubs and then marsh. During this transition, standing or fallen dead trees increase fuel for wildfires. Land managers are experimenting with ways to decrease saltwater intrusion and slow these changes, including planting salt-tolerant tree species and installing special water control structures.

Furthermore, managers are focused on soil subsidence and accretion studies to help identify the right frequency and extent to use prescribed fire to stimulate plant productivity and biomass accumulation in peat soils. The resultant soils may help combat rising sea level. However, if burns are conducted too frequently or burn too hot, then biomass will not accumulate. Because peat soils are major source of carbon sequestration, if prescribed burns go too deeply into the soils, carbon is released into the atmosphere, contributing to climate change.

"Alligator River was established to protect forested wetlands, so we want to hold onto them as long as we can," said Van Druten, a wildlife refuge specialist for North Carolina Coastal Plain Refuges Complex. "We are really struggling to find that balance between burning for either [reduced] fuels or habitat management, without adding that additional stressor that is going to tip the scales and push the habitat irreversibly towards shrub and then marsh."

Karen Miranda Gleason is a public affairs specialist in the Refuge System Branch of Fire Management in Boise, ID. Notes and findings from the fire symposium are at http://bit.ly/1fmKYZR.

Excessive dust can be hazardous to visitors and vegetation. Last summer, Hagerman National Wildlife Refuge in Texas was the site of the first of at least three new U.S. Geological Survey studies about dust suppression on refuge roads. Left: A passenger car is obscured by dust kicked up by an oil and gas-related truck. Right: Green oak leaves on the refuge are cloaked in white road dust. (Bethany Kunz/U.S. Geological Survey)

Hagerman Refuge, USGS Lead the Way on Dust Suppression

By Bill O'Brian

If you think dust is trivial, talk to Hagerman National Wildlife Refuge manager Kathy Whaley or U.S. Geological Survey biologist Bethany Kunz. Last summer, they oversaw the first of at least three new studies about dust suppression on refuge roads.

"As an ecologist, I have always been interested in conservation biology and questions of how wildlife populations persist in areas that are used by humans," says Kunz. In five years with the USGS in Missouri, Kunz has studied the effects of chemicals introduced into the environment for management purposes—herbicides, fire retardants and, now, dust suppressants.

"Dust seems inconsequential, but it's actually a safety concern and a money concern," she says.

Kunz will tell you that there are more than 150 road dust control products of various chemical compositions on the market—even Elmer's Glue-like products. "Millions of gallons are being applied," she says, "and we don't always have an idea of what they are doing to the environment."

Kunz will also tell you that "dust costs road managers money," and that proper dust control can reduce maintenance expenses by minimizing gravel loss, cutting new gravel cost and decreasing road-blading frequency.

Whaley, the manager at Hagerman Refuge in drought-prone north Texas, will tell you that dust control is important to improve visibility and, therefore, safety for visitors.

"To ensure a high-quality experience, it is imperative that visitors are able to drive and stop their vehicle on wildlife drives to observe birds and wildlife or take photographs without being subjected to severe dust from passing vehicles," she says.

> *"Dust seems inconsequential, but it's actually a safety concern and a money concern."*

Whaley will also tell you that dust can damage often-expensive binoculars and cameras, and that "bicycles and dusty roads do not go together well."

Both Whaley and Kunz will tell you that heavy dust can harm vegetation. It can inhibit photosynthesis. It can affect the health and appearance of trees, grasses, wetlands and wildflowers. Limestone dust can increase soil pH levels and, thus, foster invasive species.

So last summer, they conducted a study on two stretches of road at the 11,300-acre Hagerman Refuge—one an auto tour route and the other frequented by heavy equipment used in oil and gas extraction. Because environmental safety is of vital importance to National Wildlife Refuge System dust control programs, the study tested three non-toxic products: Dust Stop (a cellulose-based powder); Durablend (magnesium chloride with a bonding polymer added); and EnviroKleen (a biodegradable synthetic fluid with binder).

The goal was to learn which would be the most effective, environmentally safe product for refuge dust control. Other factors, Whaley says, were ease of application, sustainability of the road surface after application, length of time the product remains effective, impact of precipitation on effectiveness, and product cost related to longevity and overall success rate.

From Whaley's practical perspective, "the Durablend-treated sections of road consistently produced the least dust with passing traffic. From just a dust standpoint, there was a clear winner. However, the results become more complicated when you take into consideration surface condition after traffic use and cost."

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A Miami blue butterfly alights in the wilderness at Key West National Wildlife Refuge in Florida. There are 75 Congressionally designated wilderness areas on 63 national wildlife refuges in 25 states. (Molly McCarter/USFWS)

A common tern tends a chick in the wilderness at Monomoy National Wildlife Refuge on Cape Cod in Massachusetts. (USFWS)

Designated Wilderness Is "a Remarkable Concept"

By Bill O'Brian

Conservationists around the world and this issue of *Refuge Update* are celebrating the 50th anniversary of the Wilderness Act of 1964. But the idea of legally protecting wilderness in the United States did not magically arise that year. The law represents a half-century-long struggle that began with people like John Muir and culminated with people like Olaus Murie and Howard Zahniser.

"Passage of a bill preserving wilderness was not easy," according to *Wilderness.net,* a collaborative Web site of the Wilderness Institute at the University of Montana, the Arthur Carhart National Wilderness Training Center and the Aldo Leopold Wilderness Research Institute. "Zahniser wrote the first draft of the Wilderness Act in 1956. The journey of the Wilderness Act covers nine years, 65 rewrites and 18 public hearings" before being signed into law by President Lyndon B. Johnson on Sept. 3, 1964.

"That a society would decide to set aside lands and waters and not actively manage them was a remarkable concept for a country founded on western socioeconomic traditions," says National Wildlife Refuge System wilderness coordinator Nancy Roeper.

The Wilderness Act established the National Wilderness Preservation System, which today includes 757 Congressionally designated wilderness areas comprising about 109.5 million acres in 44 states and Puerto Rico.

The U.S. Fish and Wildlife Service manages more than 20 million acres of wilderness in the Refuge System—

Facts & Figures

- The U.S. Fish and Wildlife Service manages more than 20 million acres of wilderness in the National Refuge System. There are 75 wilderness areas on 63 refuges in 25 states.
- About 90 percent of Refuge System wilderness is in Alaska.
- The largest Refuge System wilderness area is the 8-million-acre Mollie Beattie Wilderness at Arctic National Wildlife Refuge in Alaska.
- The smallest Refuge System wilderness area is the six-acre wilderness at Pelican Island Refuge in Florida.
- The most recent additions to Refuge System wilderness areas came in 1994—3,195 acres at Havasu Refuge and 5,836 acres at Imperial Refuge. Both refuges straddle the Colorado River, which forms the California-Arizona border.
- There are 21 proposed wilderness areas (all managed as wilderness) and another dozen wilderness study areas under consideration in the Refuge System.
- Much of Leadville National Fish Hatchery lies within a 30,500-acre wilderness in Colorado. The Mount Massive Wilderness is co-managed by the U.S. Fish and Wildlife Service and the U.S. Forest Service.

The 8-million-acre Mollie Beattie Wilderness at Arctic National Wildlife Refuge in Alaska is the largest designated wilderness area in the National Wildlife Refuge System. (Cathy Curby)

about one-fifth of all the designated wilderness areas in the nation. There are 75 wilderness areas on 63 refuges in 25 states. The Service is one of four federal agencies with stewardship responsibilities; the others are the Bureau of Land Management, the U.S. Forest Service and the National Park Service.

"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain," the Wilderness Act states. "An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions …"

Managing designated wilderness requires a light touch and special care—so much so that the Carhart training center has developed "four cornerstones of wilderness stewardship":

- Manage wilderness as a whole.
- Preserve wildness and natural conditions.
- Protect wilderness benefits.
- Provide and use the minimum necessary.

This issue of *Refuge Update* includes articles detailing how refuges monitor and manage wilderness. It's not necessarily easy. Molly McCarter, a 26-year-old 2011-13 Refuge System wilderness fellow, recognizes that—but she thinks it's worth it.

"One of the toughest balancing acts of wilderness management is figuring out how to balance wilderness preservation with other refuge management activities. What action (or non-action) is best for the wilderness resource? This is a question that I, and refuge managers, struggled with at every single wilderness that I visited," she says. "To me, wilderness preservation is tied to national pride—it's a part of our history. The idea of wilderness is an inherent part of American culture—wild spaces, existing in their own right, are what make the United States unique among countries. Wilderness preservation is cultural preservation."

For more about Refuge System wilderness, including a map, fact sheet, blog and short video essay, go to http://www.fws.gov/refuges/whm/

Characterizing Wilderness on Refuges

By Bill O'Brian

The Wilderness Act of 1964 mandates that Congressionally designated wilderness areas be managed to provide for "the preservation of their wilderness character." Before such character can be preserved, it must be defined and its current status must be gauged.

That is where the National Wildlife Refuge System's wilderness character monitoring program comes in.

Since 2011, wilderness character baseline assessments have been conducted on 50 of the 63 national wildlife refuges that have at least one wilderness area. The rest are to be done in 2014.

"If we don't know if, or how, wilderness character is changing, then we can't apply adaptive management techniques and strategic habitat conservation to ensure its preservation," says Refuge System wilderness coordinator Nancy Roeper. "With baseline assessments in hand, managers can now monitor wilderness character over time and make better decisions."

Refuge System wilderness fellows—recent college graduates or graduate students—have done the bulk of the wilderness character assessment work. In recent years, 20 wilderness fellows have been funded by the Refuge System Natural Resource Program Center in cooperation with the Aldo Leopold Wilderness Research Institute, the Student Conservation Association and American Conservation Experience.

One fellow, Molly McCarter, helped conduct assessments in wilderness areas at 11 refuges: Imperial and Cabeza Prieta in Arizona; Great White Heron, Key West, National Key Deer, St. Marks, Pelican Island, J.N. "Ding" Darling and Island Bay in Florida; Bosque del Apache in New Mexico; and Hawaiian Islands.

Refuge System wilderness fellow Molly McCarter helped conduct assessments in wilderness areas at 11 national wildlife refuges, including Bosque del Apache Refuge in New Mexico. (USFWS)

"Working in remote wilderness areas teaches you about yourself," McCarter says. "It inspires independence, creativity and reflection." It also provides the Refuge System with a benchmark.

Echoing Wilderness Act language, a baseline assessment evaluates five qualities of a given wilderness:

- **Natural.** Is it free from the *effects* of modern civilization?
- **Undeveloped.** Is it without permanent improvement or human habitation?
- **Untrammeled.** Is it free from the *actions* of modern human control or manipulation?
- **Solitude or primitive or unconfined recreation.** Does it have outstanding opportunities for same?
- **Other features.** Does it have other ecological, geological or other features of scientific, educational, scenic or historical value?

Then, using comparative data already collected by the refuge for other purposes or data that can be collected easily in the future, wilderness fellows and/or refuge staff identify prioritized measures that best represent the refuge's wilderness character. When the wilderness character is assessed again in a few years, managers can determine which way—better, worse or stable—those five qualities are trending.

The process is relatively simple, McCarter said, and it provides on-the ground information to assess trends and make defensible decisions; it provides regional and national information to evaluate policy effectiveness; it helps managers understand consequences of decisions and actions in wilderness; it provides solid information for planning; and it synthesizes data into a single, holistic assessment.

"If we want to ensure that there continue to be wild, untamed lands and waters that are not subject to the resource management priorities of the hour," says Roeper, "then we need the information that the baseline assessments provide to make decisions on a local and national scale that will prevent degradation of these special areas."

Wilderness fellow Nyssa Landres takes a more philosophical view. She recognizes that designated wilderness embodies both tangible and intangible aspects of land conservation. The tangible is the biological integrity of the habitat untrammeled by humans. The intangible is the "feeling of freedom, of self-reliance, of being one with nature away from civilization," she says. "The [baseline] assessment gets only at the tangible, but it creates the opportunity for the intangible to exist."

In the 4,600-acre designated wilderness area at Fort Niobrara National Wildlife Refuge in Nebraska, whenever conditions allow, bison are moved from pasture to pasture using herders on horseback, not motorized vehicles. (USFWS)

Managing Habitat—as Invisibly as Possible

By Susan Morse

When refuge manager Steve Hicks has to move 350 bison from winter to spring pastures at Fort Niobrara National Wildlife Refuge in Nebraska, he often uses herders on horseback, though ATVs are safer, easier and less labor-intensive.

When shrubs encroach on Okefenokee Refuge's popular canoe trails in Georgia, staff members often send in crews with hand clippers, though chainsaws chew up swamp growth faster.

When Gerry McChesney airs plans to rid California's Farallon Refuge of invasive house mice, the refuge manager cites several ways to protect gulls from rodenticide, though scaring the birds with sound and light has worked well in other island eradications.

In these cases and others, the easier, time-tested or more efficient actions are not off the table, but they're not Plan A. That's because the places in question are designated wilderness—areas where the Wilderness Act of 1964 intends man's hand to be invisible, or nearly so.

To preserve wilderness character, refuge managers must show their actions are "the minimum require[d] for administering the area as wilderness and necessary to accomplish the purposes of the refuge, including Wilderness Act purposes." What that generally means: no heavy machinery; no cars, trucks or aircraft; no easy-access roads or landing pads; no loud noises.

But rigid adherence isn't always possible, even the law concedes. The trick for wilderness managers is knowing when to bend—and when to stand firm, despite the inconvenience.

In Nebraska's 4,600-acre Fort Niobrara Wilderness, the choice of bison herding method may hinge on herd position. Horses are less intrusive. But four-wheelers can cover more ground and wield more clout. "Bison seem to respect a single vehicle pressuring them to move much more than several horses and riders," says Hicks.

Herding bison on horseback also takes longer. "In an ideal world, that would be a good thing," says Hicks, "because we could go slow and look at the habitats we are managing. Unfortunately, we live in a fast world where the duties are many, and time is short." Still, he says, "we try to respect wilderness standards."

In Georgia, managing the 350,000-acre Okefenokee Wilderness also involves tradeoffs. Hand tools suffice for some jobs—but not downed trees blocking trails or shelters needing quick repair.

Surveys of endangered red-cockaded woodpeckers that nest at Okefenokee also follow wilderness guidelines. Says biologist Sara Aicher, "With most of the islands accessible only by helicopter, we monitor every other year to reduce disturbance, and do not band the birds or install artificial cavity boxes," as is common elsewhere.

Sometimes, the choice in managing wilderness is not whether to permit an intrusion, but how to deal with it.

That's the case in the Farallons, where non-native mice have made the islands less hospitable to rare seabirds, including the ashy storm-petrel. The swarming of mice each fall coincides with burrowing owl migration. Instead of continuing their flight, the owls stay to feast—first, on the mice, and then, on the storm-petrels.

The proposed mouse eradication—which, if approved, could occur as early as fall 2015—involves potential wilderness intrusions, including mouse bait and the helicopters to drop it. Managers must also decide whether proposed gull-hazing techniques are the minimum necessary to protect the gulls.

McChesney concedes, "To eradicate the mice will involve some short-term impacts on wilderness character. But mice are having long-term impacts … because they're affecting native wildlife of the islands. Our decision must weigh the short-term impacts against the long-term benefits."

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

1st DOI Wilderness Could've Been an Airport

Had it not been for Marcellus Hartley Dodge, Helen Fenske and the activists they inspired, Great Swamp National Wildlife Refuge and its designated wilderness in New Jersey would have become the New York metro area's fourth (and largest) airport.

In the late 1950s, Dodge, a conservationist and Remington Arms Co. chairman, "injected momentum" into the effort to save the Great Swamp, according to current refuge manager Bill Koch. In the 1960s, Fenske, a housewife and mother of three, became a tireless promoter of the effort.

Even though the refuge had been established in 1960, transportation officials continued to propose the jetport on the land 25 air miles west of Times Square. But Dodge and Fenske, who lived nearby, did not give up. Dodge worked behind the scenes and brought in the North American Wildlife Foundation. Fenske was "one of many activists," says Koch. "She was the face of it."

Refuge System wilderness fellow Nyssa Landres prepares to use a zipline to go from non-wilderness Southeast Farallon Island to designated wilderness West End Island at Farallon National Wildlife Refuge off California. (Nora Livingston)

Two visitors enjoy the wilderness at Great Swamp National Wildlife Refuge in New Jersey. In the 1960s, the land 25 air miles west of Times Square was proposed as the site for New York City's fourth airport. (USFWS)

Dodge died in 1963, the Wilderness Act was enacted in 1964, and transportation officials still sought the airport. Fenske, Rep. Peter Frelinghuysen Jr. and others used the act to full advantage. In 1968, part of Great Swamp Refuge became the Department of the Interior's first designated wilderness—on the condition that a road and structures be removed and wetlands be restored.

"It's more wilderness today than it was in 1968," says Koch. "It's actually striking. Many visitors are really surprised. You don't know you're still in New Jersey when you come to the refuge."

The 1978 book "Saving the Great Swamp: The People, the Power Brokers and an Urban Wilderness" by Cam Cavanaugh recounts the saga. Fenske became a major environmental advocate in New Jersey and promoted the establishment of Wallkill River and Cape May Refuges before her death in 2007.

A Zipline to Wilderness

At Farallon National Wildlife Refuge off the coast of California, when conservationists need to go from Southeast Farallon Island to West End Island, they get there via a zipline.

They do so because rocky West End Island is designated wilderness and the zipline enables the refuge to comply with the Wilderness Act of 1964's prohibition of motorized transportation in wilderness areas. In accordance with the act, no boat is used, no helicopter, just a zipline.

"It makes a statement about wilderness," says Refuge System wilderness fellow Nyssa Landres. "A small anchor in the rock is as far as we're going to go."

The distance is just 50 or 60 feet, and "it's actually more of a haul line than a zipline," says Landres, who helped install a new line last summer. "It creates this mentality of separation" that didn't exist when a footbridge crossed the water decades ago.

Because it is wilderness, refuge staff members visit 70-acre West End Island infrequently and don't stay long—seven times a year and a total of 20 person hours annually, Landres estimates. When

they do go, though, the zipline is the mode of transport.

"It's not as glamorous as it sounds, but it's still pretty cool," Landres says. "There are waves crashing underneath you, and there are sea lions playing. It's not for everybody, but I love it."

A volunteer crew at Okefenokee National Wildlife Refuge in Georgia received an award for adhering as closely as possible to the principles and protocols of the Wilderness Act of 1964 while maintaining canoe trails. (USFWS)

Wilderness Review As Part of CCP

Maine Coastal Islands National Wildlife Refuge is the only refuge without designated wilderness to have completed a wilderness review of its habitat as part of its comprehensive conservation plan (CCP) and recommended designating wilderness as a result. The Director of the U.S. Fish and Wildlife Service, the Secretary of the Interior and members of Congress have followed suit in recommending that 13 of the refuge's islands be designated as wilderness.

"To qualify for wilderness designation, an area generally has to be at least 5,000 acres and roadless, or any sized roadless island," says Maine Coastal Islands Refuge manager Beth Goettel, who arrived after the 2005 CCP was completed. "Obviously, we had lots of islands to consider—42 at the time of the CCP. The first step was to inventory all the areas that might qualify, then evaluate them for naturalness and opportunities for solitude or primitive or unconfined recreation. We also considered whether the islands could be managed successfully to retain their wilderness values."

However, Goettel notes, wilderness areas may be established only by Congress. As recently as April 2013, Rep. Mike Michaud introduced legislation to designate the 13 islands—Outer Heron, Outer White, Little Marshall, John's, Bois Bubert, Inner Sand, Halifax, Cross, Inner Double Head Shot, Outer Double Head Shot, Mink, Scotch and Old Man—as cumulative 3,125 acres of wilderness.

The Wilderness Society and the Friends of Maine's Seabird Islands both support such a designation at Maine Coastal Island Refuge, but the legislation has not yet been passed.

Clearing Trail, Respecting Wilderness

A volunteer crew at Okefenokee National Wildlife Refuge received a U.S. Fish and Wildlife Service Southeast Regional Director Honor Award last year for adhering as closely as possible to the principles and protocols of the Wilderness Act of 1964 while maintaining canoe trails through the Georgia refuge's 350,000-acre designated wilderness area.

The crew, known as the Okefenokee Trail Team, was composed of six men and four women. They were overseen by then-refuge manager Curt McCasland, who has since become a supervisor in the Service's Pacific Southwest Region.

"Some donated three months of their time to cut out fallen trees and overgrown shrubs that blocked many of the refuge's 120 miles of paddling trails," the Southeast Region said in announcing the award. "They battled icy dawns and lingering drought conditions that exposed huge logs hidden beneath the tannic-acid water for more than a century. These logs had to be lifted out of the canoe trails with cables and hand-powered winches because the refuge is a Class 1 Wilderness area. One cypress log weighed between 15,000 to 18,000 pounds and took five people a half-day to remove it. The team observed all wilderness area protocols utilizing hand tools wherever possible and keeping trips to and from the worksite to an absolute minimum."

More than 40,000 visitors use the water trails annually at Okefenokee Refuge, where they might see alligators, turtles, snakes, wading birds, butterflies, dragonflies and other wildlife in a vast wilderness setting.

Distinctive Hunting, Lasting Memories

By Robin West

It was a warm August evening more than 25 years ago, but I remember it vividly.

I had finished a day of smoking and drying meat from a Dall sheep ram that I had harvested two days earlier and was hovering over a small camp stove waiting impatiently for water to boil for my freeze-dried dinner. I glanced across the Kongakut River and watched a special event of nature unfold in the heart of the Congressionally designated wilderness at Alaska's Arctic National Wildlife Refuge.

A male grizzly bear was lumbering downstream while a pack of wolf pups and one parent moved playfully upstream—the adults' view blocked from each other by low willows along the river's edge. I watched intently as they reached each other. There was immediate surprise, and then the adult wolf bit the bear in the butt and ushered the pups over the mountain at a rapid pace. The bear exited in the direction it had come with equal zeal.

Nearly an hour passed when I heard a wolf howl. The mate of the other wolf had returned from hunting and was calling for its family. I voiced a howl in return and was surprised to see the wolf run to the river's edge and swim to my camp, only to discover its mistake mere feet from my tent and return across the river to follow the scent of its family.

That is one of countless memories I hold from wilderness hunting trips. Wilderness areas on national wildlife refuges provide such memories for many hunters every year and, with proper protection, will do so for generations to come.

Hunting is a traditional use of wild lands throughout the United States and is supported by the Wilderness Act of 1964 and the National Wildlife Refuge System Administration Act.

The author with his hunting bow at Georgia's Blackbeard Island National Wildlife Refuge, one of 63 refuges that include Congressionally designated wilderness. (USFWS)

Wilderness hunting is not for everyone. The restrictions on access and use of wilderness areas—no permanent roads, no mechanized transportation, etc.—make the experience more difficult than some hunters will undertake. I once walked 59 miles on a successful eight-day sheep hunt in Alaska's Kenai National Wildlife Refuge, most of it with a heavy pack. Yet I and many other hunters would have it no other way.

A Cherished Experience

The restrictions required by law to protect wilderness values also protect the quality of the game and the experience cherished by many hunters. I witnessed this most recently on a hunt at Georgia's Blackbeard Island National Wildlife Refuge, which just marked 67 years of providing for a bow hunt for deer, and more recently to help manage a growing population of feral hogs. Approximately one-third of the hunters chose to hunt the island's designated wilderness area, even though they would have to pack out any harvested game rather than hauling it out on a motorized ATV. This choice is important.

I believe that, over time, the added level of legal protection afforded designated wilderness will benefit hunting opportunities by providing large areas of natural habitat that can support healthy populations of all wildlife—hunted and non-hunted species alike. That is not to say I believe that all lands suitable for wilderness should be so designated. Many social and economic factors must come into play as society decides how to manage the larger landscape into the future.

From a hunter's viewpoint, though, having a variety of remote designated wilderness areas serves our interests well. What is good for wildlife will always be good for hunters.

Robin West recently retired after 35 years with U.S. Fish and Wildlife Service. During that time, he managed Refuge System designated wilderness in Alaska, Oregon and Washington.

The wilderness at Togiak National Wildlife Refuge encompasses almost 2.3 million acres in Alaska. Ninety percent of Refuge System wilderness is located in that state. (Steve Hillebrand)

From the Director — *from page 2*

People had left their mark (structures, foundations, roads and more) on the Monomoy Wilderness; some are still evident today.

But it is worth the effort to reach the pristine, which is what refuge manager Dave Brownlie and the National Wildlife Refuge System are doing. Essentially, they are re-wilding this dynamic coastal barrier system and its biodiversity of birds, marine wildlife and coastal habitats.

As important as wilderness areas are to wildlife, they are also essential to us—to clear our heads, to experience what it means to be really outdoors, and to connect with the earth and our natural heritage.

They preserve what Brownlie calls the "Monomoy magic," the feeling he gets when he visits Monomoy's southernmost tip. There, amid the wildlife, he says: "Yeah, I'm really in a wilderness now." You can almost hear the tension fade from his voice as he says it, too.

As important as wilderness areas are to wildlife, they are also essential to us.

To ensure that wilderness is not lost to short-term gain or for the latest tourist trap, it's up to us to convey the value of wilderness—not to the nation in the abstract, but concretely to each and every one of us.

Only then, when everyone can, and does, fully appreciate wilderness, will we be confident that the wild lands and "wild life" we love will be there for our children and grandchildren. So, like those pioneers of wilderness protection, who acted for you and me 50 years ago, you and I now have our date with destiny. We are leading today's U.S. Fish and Wildlife Service and today's conservation community. So let's get out there and make our own version of the Monomoy magic.

Around the Refuge System

Midway Atoll

Wisdom, a 63-year-old Laysan albatross, and her mate hatched another chick at Midway Atoll National Wildlife Refuge on February 4. Wisdom is the oldest wild banded bird and has been nesting consecutively at the refuge since 2008. She probably has hatched at least 30 chicks over her lifetime. The refuge provides habitat for the world's largest population of Laysan albatross. The birds typically pair for life. They lay one egg, which is incubated by both male and female for about 65 days. To see a video of Wisdom in November 2013 laying the egg that hatched, go to *http://bit.ly/1jfnPQv*.

On Jan. 9, a short-tailed albatross chick hatched at Midway Atoll Refuge. It was only the third hatching in recorded history of a short-tailed albatross anyplace other than three small islands off Japan. The short-tailed albatross is one of the world's most endangered seabird species. It has a stunning golden head and is much larger than its cousin, the Laysan albatross, which nests on the refuge by the hundreds of thousands.

Wisdom, a 63-year-old Laysan albatross, tends to her chick less than a week after it hatched in February at Midway Atoll National Wildlife Refuge. (USFWS)

Florida

Toni Westland, the supervisory refuge ranger at J.N. "Ding" Darling National Wildlife Refuge, knows there's nothing like a little scat to capture the attention of third-graders and adults alike. The refuge's "Scats and Tracks" environmental education program has been a hit for years. Now, the refuge has taken it a step further. It has installed 10 interpretive scat panels along its new Wildlife Education Boardwalk, which links the Sanibel School (elementary/middle school) to the refuge's Indigo Trail. The individual flip panels are topped with replicas of raccoon, bobcat, yellow-crowned night heron, coyote, gopher tortoise, otter, marsh rabbit, alligator and black racer snake scat, and a white ibis pellet. The scat replicas were sculpted by North Carolina artist David Williams (*www.winginitworks.com*). "We needed a way to engage more families and visitors since we cannot do the Scats and Track program for everyone," says Westland. "This self-guided discovery trail allows them to learn at their own pace." The flip panels, which open to show information about the diet and other characteristics of the animals, were funded by the refuge's Friends organization, the Ding Darling Society.

California

All of Skaggs Island is now part of San Pablo Bay National Wildlife Refuge, thanks to the acquisition of the 1,092-acre Haire Ranch. The nonprofit Sonoma Land Trust coordinated the $8.3 million purchase, which was funded primarily by the Natural Resources Conservation Service. Sonoma Land Trust raised the remaining funding needed from the State Coastal Conservancy and the Gordon and Betty Moore Foundation. The land was transferred to the U.S. Fish and Wildlife Service in December 2013. Historically, Skaggs Island was part of a vast tidal marsh fringing San Pablo and San Francisco bays before the marshes were diked and drained in the 1800s. In 1941, most of the island was condemned by the Navy for a communications and intelligence-gathering base. In 2011, the Navy transferred its land to the Service to become part of the refuge. The Service has planned to restore Skaggs Island to tidal marsh for many years, but a 1941 civil action required the Service to maintain the network of flood protection levees, ditches and stormwater pumps that kept Haire Ranch dry enough for farming. Because of that agreement and the owners' earlier reluctance to sell, the Service has been unable to flood the island and return it to wetlands. The plan now is to restore the 4,400-acre island to marsh within a decade.

Coastal Wetlands Grants

Interior Secretary Sally Jewell and U.S. Fish and Wildlife Service Director Dan Ashe in January announced $16.5 million in grants to support 21 critical coastal wetland projects in 12 states and Puerto Rico under the National Coastal Grants Wetlands Conservation Grants Program. State and local governments, private landowners, conservation groups and other partners will contribute an additional $18.2 million to the projects, which include acquiring, restoring or enhancing coastal wetlands and adjacent uplands to provide long-term conservation benefits.

The projects stand to benefit habitat and wildlife directly at at least seven national wildlife refuges: Willapa, WA; Savannah, GA/SC; Cedar Island, NC; Rappahannock River Valley, VA; Kodiak, AK; Don Edwards San Francisco Bay, CA; and Humboldt Bay, CA. A complete list of 2014 grant program projects is at *http://go.usa.gov/Bq4Y*

Mississippi

Staff at Mississippi Sandhill Crane National Wildlife Refuge released 22 juvenile cranes into the wild on December 10, 2013. The young birds, which were hatched at the Audubon Nature Institute in New Orleans, are the largest group of the endangered cranes released at the refuge in about a decade. "It's the first time we've had four different cohorts in a year, let alone all at the same time," said refuge supervisory biologist Scott Hereford. There are only about 110 Mississippi sandhill cranes in existence. An article about the refuge's efforts for the endangered birds' benefit appeared in the January/February 2013 issue of *Refuge Update* (*http://go.usa.gov/ZgzV*).

2 Refuges Win DOI Environmental Awards

Two national wildlife refuges were among the four team recipients of 2013 Department of the Interior Environmental Achievement Awards. San Luis National Wildlife Refuge Complex, CA, was recognized for its new, net-zero energy, 16,500 square-foot headquarters and visitor center. It is the first U.S. Fish and Wildlife Service building to earn a LEED platinum certification from the U.S. Green Building Council. Parker River National Wildlife Refuge, MA, was honored for improving water quality in the surrounding watershed through a "Slow the Flow" campaign, which involves the local community in workshops on sustainable landscaping techniques; a Rain Barrel Making Workshop; and a grant program. The awards recognize departmental employees and partners who have attained exceptional achievements under Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," and for cleaning up contaminated land.

New Mexico

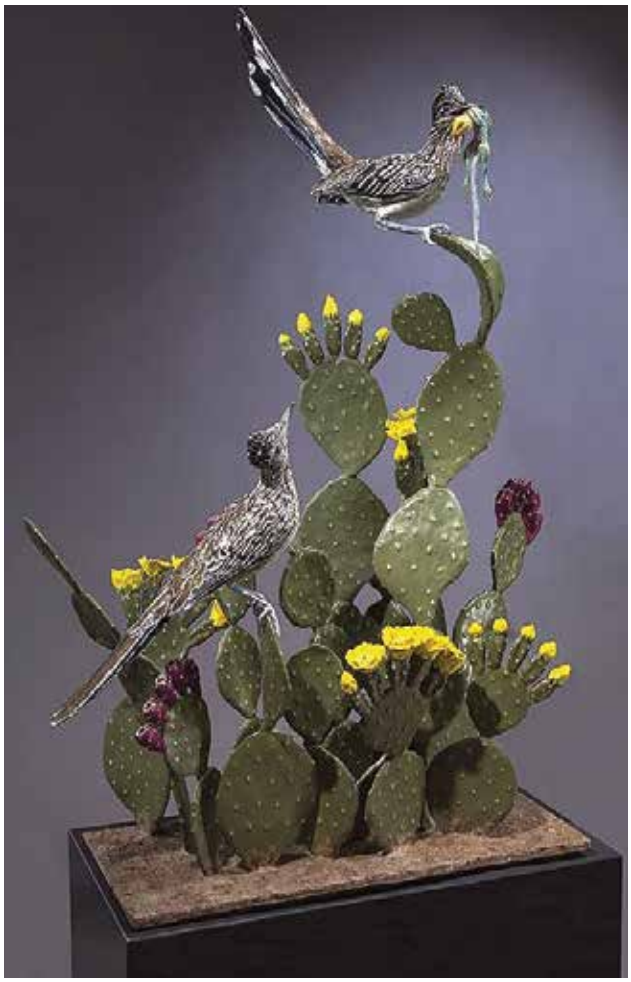
Bosque del Apache National Wildlife Refuge has inspired a sculpture that is scheduled to be displayed at three museum exhibits this year. The bronze sculpture by Colorado wildlife artist Eva Stanley titled "Eyes on the Prize" depicts two life-size roadrunners with a collared lizard on prickly pear cactus. "The Bosque has always been one of my favorite haunts, and I am almost always guaranteed to be able to spend some quality time observing and photographing roadrunners in your locale," Stanley told refuge staff in an e-mail. "Therefore, I chose to acknowledge Bosque Del Apache for this bronze piece." The sculpture will be part of an exhibit called America's Parks II, which premieres in mid-March in Bolivar, MO, moves on to Denver in late May and goes to Tucson, AZ, in mid-September. More information: *http://bit.ly/1hClmOk.*

Wyoming

A record number of visitors participated in National Elk Refuge's sleigh ride program this past holiday season. In the week between Christmas Day and New Year's Day, 4,728 people rode on a sleigh to view wintering elk. On Dec. 28 alone, a record 862 people shuttled onto the refuge via 55 sleighs. Sleigh rides are the refuge's most popular educational program. In addition to elk, passengers routinely see coyotes, bald eagles, trumpeter swans and ravens on the rides, which are conducted in a way that minimizes stress to the wintering animals.

Service-Nature Conservancy Fire Agreement

The U.S. Fish and Wildlife Service and The Nature Conservancy in December 2013 announced a new partnership to increase and better coordinate controlled burn activities on their respective lands to enhance wildlife values. The agreement will encourage more efficient use of personnel and equipment while treating lands that might otherwise not get the benefit of prescribed fires. Collectively, the Service and TNC manage more than 78 million fire-adapted acres across the United States.



The bronze sculpture titled "Eyes on the Prize" was inspired by wildlife artist Eva Stanley's visits to Bosque del Apache National Wildlife Refuge in New Mexico. (www.EvasWildlifeArt.WordPress.com)

Vision Quickly Becoming Practical Reality — *continued from page 1*

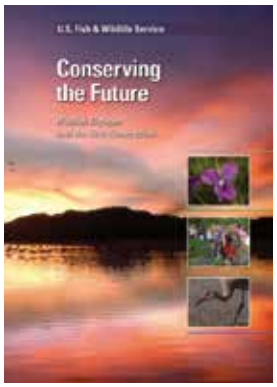
In the months immediately after the July 2011 ratification of the *Conserving the Future* vision for the Refuge System, nine implementation teams were chartered to put the vision into practice.

Today three of those teams have "formally graduated," says Harris, meaning they have fulfilled everything in the blueprint laid out in their work plan, had their products approved by Refuge System leadership, and disbanded. Six of the original teams are operating, and, in response to internal and external suggestions, a new team is being formed.

In a recent interview, Harris outlined the accomplishments of the three graduated teams.

One result from the Strategic Growth implementation team's work is that "for the first time we have a strategic growth policy for the Refuge System," says Harris. "That's huge." The Service has been moving toward such a policy for decades, and in late January a draft was published in the *Federal Register.*

The principles set forth in the Planning implementation team's report, *A Landscape Scale Approach to Refuge System Planning,* "basically revolutionized the planning paradigm we're moving forward with," says Harris. "We're not going to do CCPs [comprehensive conservation plans] the way we've done them in the past."



The Community Partnerships implementation team produced strategic plans for Friends, volunteers and community partnerships; revamped the Friends mentor program; added relevant elements to 14 existing staff training courses offered at the National Conservation Training Center (NCTC); and identified a web tool to help track volunteers and their hours.

The new team—being assembled this spring and expected to complete its work this year—will address *Conserving the Future* Recommendation 18, which reads: "Support and enhance appropriate recreation opportunities on national wildlife refuges by partnering with state fish and wildlife agencies, other governmental bodies, conservation organizations and businesses; and by updating relevant policies and infrastructure." This team, which was split from the Hunting, Fishing and Outdoor Recreation implementation team, will examine the big six priority public uses of refuges and beyond. It also will consider refuge accessibility and community engagement, including reaching urban audiences.

The six other original teams—Communications; Interpretation and Environmental Education; Hunting, Fishing and Outdoor Recreation; Leadership Development Council; Science; and Urban Wildlife Refuge Initiative—are proceeding apace. Over the next six months Harris expects final or close-to-final strategies on interpretation, environmental education, quality hunting and fishing, urban refuge standards and climate change.

She also expects practical applications from the Leadership Development Council that will enhance "information sharing between employees about opportunities in the Service," including online forums regarding available job swaps and details.

Overall, Harris says, "the teams have put together the policies, the strategies, the web resources and the best management practices to streamline efficiencies and lay out a path forward." Now, she says, the key is communication—from refuge leadership, regional chiefs and project leaders—about why the products "were developed, and where they came from, and how they provide a clear vision for the next decade."

To see the Conserving the Future *implementation teams' work progress and products, go to* http://www.fws.gov/refuges/vision/index.html.

Chief's Corner — *continued from page 2*

implementation team has described new standards of excellence that more fully illustrate the potential for urban refuges. The team is working on performance metrics that will allow us to track the effectiveness of new investments in urban refuges. The U.S. Fish and Wildlife Service has piloted innovative new partnerships where we can have an urban presence even when we don't own the land.

The Urban Wildlife Refuge Initiative isn't something fun to do when we get done with our important conservation work. It is as important as anything we are doing as a Service. If the Service doesn't work with others to develop a connected conservation community in urban centers to complement the efforts of our long-standing partners, then we will fail in our mission. No matter how important our work, if people don't know or simply don't care about it, we cannot be successful.

Twenty-some years ago, I managed the refuges in Rhode Island and Connecticut. They were small, surrounded by lots of cities and lots of people. It was easy to see how much of the natural world had been lost. People there cared about their refuges, and they knew how special they are. They let their elected officials know, and those folks cared, too. I remember Sen. John Chafee of Rhode Island as a great champion for the Refuge System. I remember him working in a bipartisan way with Sen. Joe Lieberman of Connecticut to protect Arctic National Wildlife Refuge—and wilderness.

To further forge that kind of spirit, we have lots of work to do.

Studying Water at Kanuti Refuge Is an Icy Proposition — *continued from page 1*

"maintain the water quality and quantity to conserve fish and wildlife and their habitats in their natural diversity." The National Wildlife Refuge System Improvement Act of 1997 directs the Service to obtain, under state law, water rights needed to meet refuge purposes.

Flying over Kanuti Refuge, it's clear that water is a main ecological driver. The refuge encompasses more than 70,000 acres of wetlands and waters, including thousands of miles of meandering rivers and streams.

The study's baseline data will be coupled with biological data to quantify the water needed to protect fish and wildlife. That information is needed to file for in-stream water rights to protect refuge waters from potential upstream threats, including oil, gas and mineral exploration and development.

Gathering the data is labor-intensive. During the six-year study, the hydrology staff has made up to seven multi-day trips to Kanuti Refuge annually. Hardison has made about 30 such trips. And the work of a hydrologist doesn't end when the water turns to ice. Winter lasts eight months. Because water flow is critical for overwintering fish, it's important to get an estimate of the flow—or lack of it. For Hardison, this means making the most of limited daylight hours and unpredictable ice conditions.

The first refuge stop today is Holonada Creek. After the helicopter settles onto the tundra, Hardison hauls gear through knee-deep snow down to the creek. He'll spend the next 2½ hours in below-freezing temperatures. He'll drill 15 eight-inch holes through nine inches of ice with a gas-powered auger. This will enable him to measure the water's depth and velocity beneath the ice as well as pH, specific conductivity, temperature, salinity and dissolved oxygen. He'll also download information from a data logger that records water flow. He'll analyze that data back at the regional office in Anchorage.

Alaska Region hydrologist Jasper Hardison measures water flow in a creek at Kanuti National Wildlife Refuge. Hardison and three other regional hydrologists are finishing up a six-year study of water resources on the Interior Alaska refuge. (Maureen Clark/USFWS)

His work done at Holonada Creek, Hardison packs up and flies to another of Kanuti Refuge's eight gauging stations. His work continues over two days, despite temperatures that dip to 20-below zero. Soft ice limits work at some sites today, but when Hardison returns in March the ice will be up to six feet thick. When he finds open water on Henshaw Creek, he pulls waders over his insulated flight suit and wades in to measure stream flow.

The work requires persistence. Engines and instruments can become balky. Calibration fluids can freeze up. LCD screens can fog up or blink out. Augers can die; batteries regularly do. Keeping fingers warm requires vigilance.

But the work is rewarding. "You're out there. It's wild. It's untouched," says Hardison. "Doing something to keep it that way is very satisfying."

By the time he wraps up the trip, all data-logger information has been collected and all gauging stations have been shut down for winter. Hardison and fellow regional hydrologists will be back in spring to begin a final season of data collection.

"The water resources folks are the unsung heroes of the Refuge System," says Kanuti Refuge manager Mike Spindler. "Gathering hydrology data is difficult and time consuming, but by securing water rights their work provides lasting value for the refuge."

Maureen Clark is an Alaska Region public affairs specialist.

Hagerman Refuge, USGS Lead the Way on Dust Suppression — *continued from page 7*

From Kunz's research perspective, all three were successful, but she stresses that "we're not trying to identify one magic-bullet *product*—because it doesn't exist."

Instead, Kunz says, the USGS studies—which are scheduled to continue at Squaw Creek and Swan Lake Refuges in Missouri this year and perhaps at Hart Mountain Refuge in Oregon after that—are trying to identify an *approach* to environmentally friendly dust control on refuges nationwide.

For more information about dust suppression, contact BKunz@usgs.gov *or* Kathy_Whaley@fws.gov *or go to* http://go.usa.gov/W7fP.

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A Look Back . . . George Mushbach

George Mushbach knew all too well that refuge managers don't always win popularity contests when they try to conserve habitat or wildlife. He managed Wichita Mountains Wildlife Refuge in Oklahoma in the late 1930s.

For years, local ranchers had been allowed to graze their cattle on refuge land, possibly as a way to control wildfires by reducing vegetation. When overgrazing became a problem, especially for the bison and longhorn cattle the refuge was intended to protect, Mushbach ended grazing. "Elimination of cattle from the refuge in 1938 precipitated a campaign on the part of disgruntled graziers to discredit the administration; petitions were in circulation; the Lawton Chamber of Commerce investigated; and many public officials were importuned to act on behalf of the cattle interests," Mushbach wrote in an annual report. He stood his ground. The ranchers and cattle left. And, he wrote, "After a hectic two months, the recriminations ceased."

Known best for his work to benefit bison, George Mushbach is shown here with an orphaned fawn in 1940. (USFWS)

The following year, Mushbach went on the offensive: "In carrying out a desire to keep the local public informed of refuge activities and to keep the name of the refuge and the Biological Survey to the forefront, more than 100 news items were furnished to the local press during three months. When one Lawton newspaper showed relish for wildlife stories, another Lawton daily also demanded similar 'wildlife yarns.' They were supplied regularly to both."

Some of those wildlife yarns may have involved Texas longhorn. Once the primary beef cattle in the United States, longhorns were forced into virtual extinction by improved breeds. A nucleus herd of 20 was brought to the refuge in 1927 and is still maintained as the Wichita Refuge bloodline.

In 1939, Mushbach left Wichita Mountains Refuge for the National Bison Range, MT, where he tackled other problems, such as trying to control goatweed (now popularly known as St. John's wort). It took 133 man days of hand hoeing, horse-drawn and power mowing, and Chrysolina beetles to stay on top of the weed.

In 1947, Mushbach filmed "Buffalo Lore," a 10-minute documentary about the importance of bison to Native Americans. He remained at the National Bison Range until retiring in 1950 after 35 years with the U.S. Fish and Wildlife Service. The years at Wichita Mountains earned him the Refuge System's designation as a conservation hero for his "steadfast dedication to a mission in the face of adversity."

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