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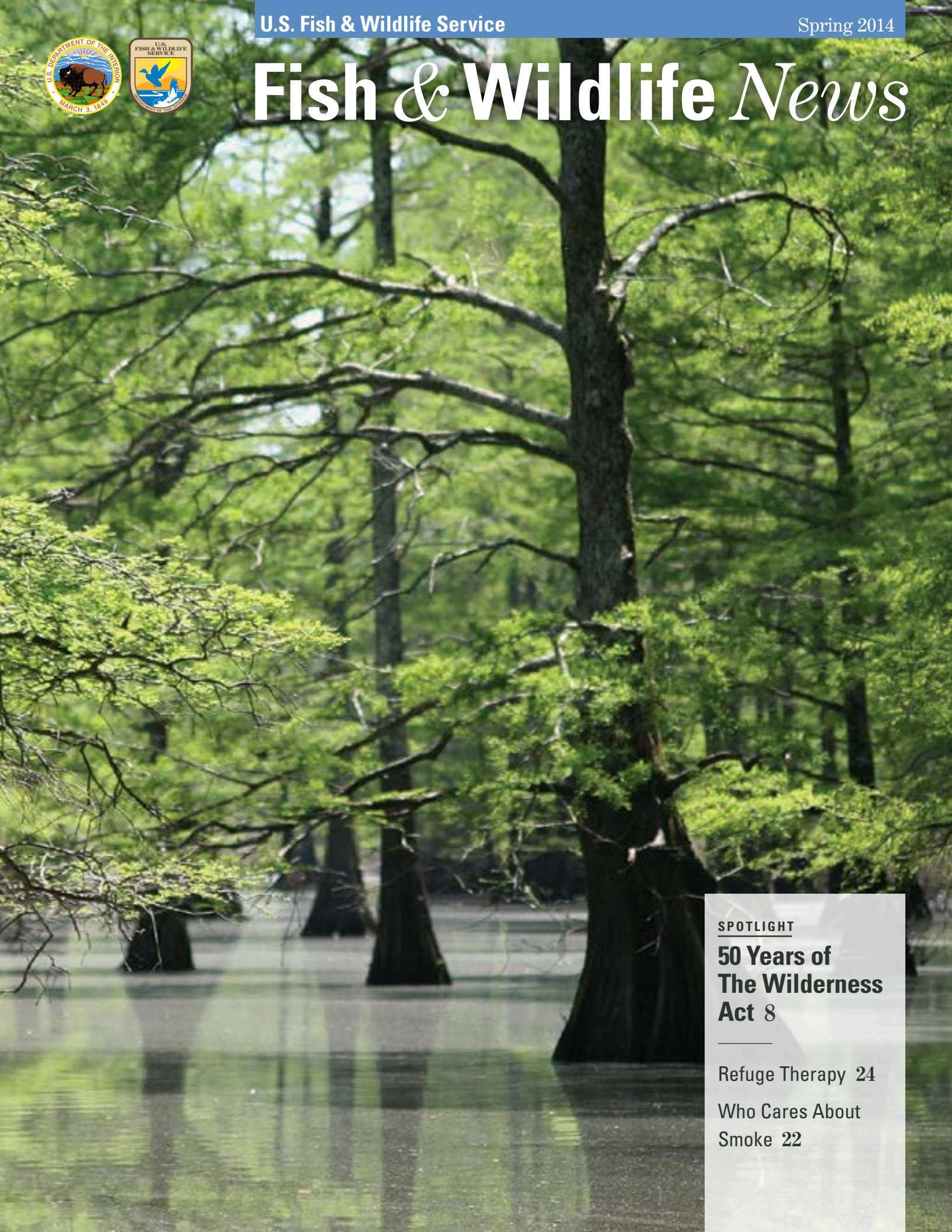

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Escaping the Confines of Civilization

We needed the Wilderness Act in 1964 and still need it today

by NANCY ROEPER

ON THE COVER: WILDERNESS AT BIG LAKE NATIONAL WILDLIFE REFUGE IN ARKANSAS. JEREMY BENNETT/USFWS

Jim Kurth

Read current Arctic Refuge Manager Brian Glaspell's take on the refuge p. 14.

Wilderness: Values Beyond Its Land Boundaries

It's hard for me to believe that it has been 20 years since I moved to Fairbanks, Alaska, to begin my assignment as manager of Arctic National Wildlife Refuge. The refuge is a world-class natural area and the preeminent remaining American wilderness. The experience changed my life; it deepened my understanding of the natural world and the human experience in it.

The place evokes a sense of timelessness. When you find fossilized coral on the refuge's coastal plan, you can imagine the ancient ocean that once covered it. Billion-year-old rocks are exposed in the upthrust of the Brooks Range. Muskoxen and caribou remind you that the Pleistocene Epoch—the Ice Age—was yesterday in Earth's history, and that people who once crossed the Bering land bridge encountered the mastodon and the scimitar cat. Those people's descendants—the Inupiat and Gwich 'in people—still live there; their cultures thrive.

> *"[Wilderness] encompasses values and benefits that extend beyond its boundaries, to the millions of Americans who will never visit, but find satisfaction in knowing these vestiges still exist.* —Roger Kaye

It is impossible not to feel small there. It is hard not to feel spiritual there. The place seems to compel an understanding that there are forces beyond our comprehension, perhaps a power of some kind that is bigger than our own species. I always prayed when I was there. The Earth is a very good place.

My experiences in the Arctic always made me think of our stewardship of both the refuge and the planet—of our progress and our failures. The Arctic Refuge remains protected and its wilderness character remains. I believe that it will always be so. But during my time there, an elder from Kaktovik told me he had water in his ice basement and that no one had ever seen that before. The numbers of polar bears around town were growing as bowhead whale carcasses from the fall hunt were becoming a more important food source and the sea ice receded farther and farther from shore.

As I was reflecting on my experiences in the Arctic and the upcoming 50th anniversary of the Wilderness Act, I remember some words my friend Roger Kaye wrote about wilderness in *Fulfilling the Promise*, the 1999 document that set the path for the Refuge System for the forthcoming decade: "Central to the experience and awareness of wilderness is humility, with its corollary, restraint; restraint in what is appropriate for visitors to do, as well as managers. Restraint is the reason for the 'minimum tool' rule, limiting use of our mechanisms to that which is necessary, and necessary not only to manage these areas, but to manage them as wilderness.

"Beyond its tangible resources and experiential opportunities, wilderness is a symbolic landscape. It encompasses values and benefits that extend beyond its boundaries, to the millions of Americans who will never visit, but find satisfaction in knowing these vestiges still exist. Wilderness areas are valued as remnants of our American cultural heritage as well as our universal evolutionary heritage, symbolically enshrining national as well as natural values. Wilderness protection serves as the most visible symbol of our generation's willingness to pass on some natural treasures as we found them. It is the finest example, perhaps, of our sense of stewardship of the system."

I wonder whether we have fulfilled the promise of that last sentence? Perhaps. I suspect we have more work to do. I wonder what a Chief of the National Wildlife Refuge System, reflecting on wilderness and our stewardship, might write 50 years from now. I hope we can be humble stewards who will provide inspiration in the future. □

JIM KURTH is Chief of the National Wildlife Refuge System

Partnerships Help a Small Lizard Stage a Big Comeback

U.S. NAVY

The status of the island night lizard, a small lizard known only to islands off the coast of southern California, has improved so much that the species no longer needs Endangered Species Act protection for survival.

After 36 years of protection under the Endangered Species Act (ESA), the island night lizard has successfully recovered and will be removed from federal protection.

Island night lizards, found only on the Channel Islands off the coast of California, average just two to four inches in length excluding the tails. Their coloration varies from pale ash gray and beige to shades of brown and black, with varying uniform, mottled and striped patterns. The lizard usually lives about 11 to 13 years.

Island night lizards are found only on three of the Channel Islands—San Clemente, San Nicolas and Santa Barbara. A very small number of lizards are also found on Sutil Island, several thousand yards from Santa Barbara Island.

The island night lizard was first listed under the ESA in 1977 as a result of severe habitat degradation on the Channel Islands. These islands were severely impacted by ranching and grazing, in particular, the introduction of non-native herbivores, including goats and pigs on San Clemente and San Nicolas islands, and rabbits on Santa Barbara Island. These animals stripped the land of vegetation and caused significant erosion. In addition, feral cats introduced to San Clemente and San Nicolas islands preyed on the lizard.

Two of the Channel Islands—San Clemente and San Nicolas—are administered by the U.S. Navy. Santa Barbara Island is managed by the National Park Service. By the mid-1990s these Service partners removed all goats, sheep and rabbits from the islands. Feral cats were successfully removed from San Nicolas Island in 2010, and while cats remain on San Clemente Island, they pose no significant risk to the survival of the island night lizard.

Today, there are estimated to be 21.3 million lizards on San Clemente Island, 15,300 lizards on San Nicolas Island, and 17,600 lizards on Santa Barbara Island (including Sutil Island). The National Park Service and the U.S. Navy have established native plant nurseries and are actively cultivating native plants to further restore the habitat on these islands.

Thanks primarily to the work of partners at the U.S. Navy and National Park Service to remove non-native species from the islands, protect habitat for the lizard and promote the restoration of native plants that provide habitat for the lizard, the island night lizard is flourishing. □

JANE HENDRON, Public Affairs, Pacific Southwest Region, and VALERIE FELLOWS, Endangered Species, Headquarters

Keeping America's Duck Factory Going

In the 1930s, the Dust Bowl brought widespread ruin, but in North Dakota, the ecological disaster had one good outcome: the establishment of a slew of national wildlife refuges. Without the construction of reservoirs and the restoration of habitat completed under the direction of the Service, many wildlife species might not have survived.

In May and June, 29 of these refuges marked their 75th anniversaries amid a new ecological crisis: the rapid conversion of surrounding prairie grasslands and wetlands to agriculture, energy development and other uses.

"These refuges were established in recognition of the importance of the landscape as a whole in sustaining waterfowl and other species," says Will Meeks, Assistant Regional Director for Refuges in the Service's Mountain-Prairie Region. "As our native prairie lands vanish, the refuges are becoming more vital than ever as natural oases."

In late March, the Service and several conservation partners launched the Prairies Conservation Campaign to call attention to the rapid loss of prairie habitat (See Conservation Organizations Join Forces to Support Conservation in the Prairies, p. 34).

LAURA HUBERS/USFWS

Snow geese and white-fronted geese fly out over a Dakota cornfield. Rapid conversion of land for farm and energy production is shrinking wildlife habitat in the Prairie Pothole Region.

North Dakota sits in the country's Prairie Pothole Region, a glaciated landscape of shallow basins covering 5.3 million acres in parts of Montana, the Dakotas, Minnesota and Iowa. Millions of migrating canvasbacks, mallards, pintails, gadwall, teal and other waterfowl flock to seasonal wetland ponds to breed, earning the area the nickname of America's duck factory.

Biologist J. Clark Salyer, hired in 1934 to manage the National Wildlife Refuge System, handpicked many of North Dakota's Dustbowl-era refuges. He crisscrossed the drought-parched state in his station wagon, sometimes driving 600 miles a day, to find distressed farmlands and buy those he could. In spring 1939, President Franklin Roosevelt signed executive orders establishing 29 new purchases as wildlife refuges.

Of these 29 North Dakota refuges, the Service owns 11. The remaining 18 are protected by conservation easements. That means the Service contracted with private landowners, paying them in return for their agreement to provide important migratory duck habitat.

Together, North Dakota's wildlife refuges account for only 1 percent of lands in the state. But by partnering with farmers, ranchers and other landowners, the Service has been able to revive damaged habitat on a much wider scale.

Refuges are "not just small isolated parcels," says Lloyd Jones, who retired in 2013 as refuge manager of Audubon National Wildlife Refuge in North Dakota. "They play a bigger role [by working] in association with the Small Wetlands Acquisition Program that acquires waterfowl production areas and wetland and grassland easements… so people have more opportunity to enjoy wild things and wild places." □

SUSAN MORSE, National Wildlife Refuge System, Headquarters

Beating Back Extinction One Plant at a Time

Peeking out from an unassuming hillside along a well-traveled road north of the San Francisco Bay is one of California's most endangered plants, Baker's larkspur. From theft to fire to flooding, the plant has been through the ringer.

Luckily for this lonely flower, botanists from the University of California Botanical Garden at Berkeley have been working closely with biologists from the Service's Sacramento Field Office to improve its chances of survival.

Where does one go to find the plant worthy of a Shakespearean tragedy? To protect the remaining plants, the Service doesn't give out specific locations, but the only remaining naturally occurring population of Baker's larkspur is on a steep embankment in West Marin County. Not long ago, this was the only place on the planet that this beautiful flowering plant, a perennial herb in the buttercup family, was found.

Here's a quick look at what led to the plant's life on the edge:

- Considered rare when it was formally described in the late 1930s, Baker's larkspur has only ever been found in three locations, one in Sonoma County and two in Marin County.
- In 1992, all the seed pods were collected by unknown individuals, which meant no reproduction that year.
- Originally proposed for listing in 1976, by the time the species was listed on January 26, 2000, two of those three locations had been lost to the plant, leaving the steep roadside embankment as the plant's only home.
- By 2001, the one remaining site had only 55 flowering plants.
- In 2002, local work crews gouged the slope, removing the largest plants before new seeds were fully developed.
- In September 2004, fire-fighting crews set backfires on the slope above the larkspur's location to control a wildfire. Few individuals survived.
- One month later, local road crews removed most of the remaining plants from the slope while clearing out a culvert below the population.
- By 2007, only seven plants appeared, and only two of those flowered. But both of those plants lost their flowers before seeds were fully developed.

Thankfully, the story of Baker's larkspur doesn't end there.

Because the plant is so rare, little is known about what specifically the plant needs to pull itself back from the brink. Garden staff and Service biologists put their heads together to carefully select new planting sites, based upon what is known of the species' habitat requirements, conditions required by similar species and the availability of willing and interested landowners.

VALARY BLOOM/USFWS

These plants have been raised at the nursery. Raising and collecting seed from plants in the nursery is not a good long-term strategy because plants that thrive in an artificial setting are different from those that do well in the wild. It also may over time compromise the gene pool.

In 2009, Garden staff, led by Holly Forbes and under contract with the Service, introduced plants propagated from wild seed to three sites within its historic range: two on private ranches and a third site on Marin Municipal Water District's land near Soulajoule Reservoir. All are within three miles of the last remaining wild occurrence in Marin County.

Between 2009 and 2011, more than 200 plants raised in the nursery by the Garden were planted in those experimental locations. Although the sites all had some success, the challenges facing the species weren't left by the side of the road. Many of the plants were eaten by banana slugs or other animals. Some reached maturity but didn't flower. Even those that did flower often lost their flowering stems before their seeds were viable. Adding insult to injury, trees fell at two of the three sites, changing the micro-climate of the locations.

Nature may be beautiful, but it is seldom kind.

But Garden and Service staff members have persevered.

Working without federal funding since 2013, Garden staff and volunteers continue to monitor the original and experimental sites. Counting starts in early spring just as the first leaves burst bright green from the soil. Periodically, new plants are propagated in the nursery and are replanted in the wild.

In the meantime, a draft recovery plan for the species is in development. It describes what is known about the species' needs and lays out the recovery strategy, with detailed steps and estimated costs for immediate action. Release of this important document and invitation for public comment are expected by the end of this year.

Recovery is the ultimate goal of the Endangered Species Act. Sometimes success needs to be measured one plant at a time. □

SARAH SWENTY, External Affairs, Pacific Southwest Region

Damages Assessed, NRDAR Program, Partners Restore Colorado's Upper Arkansas River Basin—Part 1

For more than a century, waste from historic mines leached into adjacent lands and waters of the Arkansas River, contaminating more than 15 square miles of the upper Arkansas River basin in Lake County, Colorado, which includes the California Gulch Superfund site. The mining waste posed a serious threat to human health and safety because heavy metals, including lead, seeped into drinking water sources and soil. The heavy metals also injured such wildlife as the American dipper, tree swallow and brown trout, and their supporting habitats.

While the Environmental Protection Agency worked to clean the area up, a team of state and federal agencies and academics began to determine whether natural resources were injured and how badly. Starting in 1992, the team in the Arkansas River basin, led by the Service's Mountain-Prairie Region, began the Natural Resource Damage Assessment and Restoration (NRDAR) process

Laura Archuleta, a Service project manager and environmental contaminants specialist, has been working on the site for more than 17 years, and she said she's excited to see the team and its partners restoring the injured natural resources.

As far back as 1997, Archuleta and others began documenting injury to American dippers, tree swallows and supporting habitats in the basin. Tissue and blood samples from the birds showed high concentrations of cadmium, copper, lead and zinc. The concentrations tracked those measured in the bird's insect food source, indicating that such aquatic-dependent birds were exposed to the release of hazardous substances from the mining.

After determining the extent of the injuries and calculating damages (dollars), NRDAR teams negotiate legal settlements with the parties responsible for the hazardous releases. Funds received from the settlements are used to restore, replace or acquire the equivalent of the injured natural resources.

Once funding is available for restoration, the physical work begins, and the team works with interested conservation partners who undertake restoration projects based on a Restoration Plan/Environmental Assessment by the NRDAR team.

For this site, the 2008 NRDAR settlement was with ASARCO LLC and Resurrection Mining Company/Newmont USA Ltd. for $20.5 million.

In the upper Arkansas River, several restoration projects aim to improve aquatic habitat for wildlife and invertebrates, and increase brown trout populations by providing feeding areas, overhead cover, spawning areas and overwintering refuge habitat. Partners such as Colorado Parks and Wildlife, Lake County Conservation District and the Natural Resource Conservation

COLORADO PARKS AND WILDLIFE

A fisherman tries his luck amid the restoration equipment.

Service have been working on stream restoration by excavating pools, creating stream riffles, adding logs or root wads, installing boulders, planting and re-seeding riparian vegetation along banks, and installing livestock exclusion fencing.

The in-stream restoration, which began in 2011, is already showing improvement, and it benefits not only fish and birds but also the public, which now has a resource to enjoy—whether fishing, bird watching or simply enjoying the beauty of the basin.

Anglers have special reason to be happy with the restoration. In the early 1990s, fish couldn't live even three years. Today, trout are thriving and living up to 10 years. In fact, Colorado Parks and Wildlife named the upper Arkansas River as Gold Medal Trout Waters, indicating it offers the greatest potential for trophy trout fishing.

Other projects are also underway, including work to permanently protect important areas and projects to re-seed impacted areas with native vegetation.

The NRDAR team may have started the work, but the restoration could not take place without partners from all parts of the upper Arkansas River basin working together to restore fish and wildlife habitat, and public places for recreation and other uses.

Part 2 of this article, which focuses on those partnership efforts, will be in the next issue of *Fish & Wildlife News*. □

? MORE INFORMATION

To learn more about the NRDAR Program and the upper Arkansas River basin restoration projects, please visit the website at: <1.usa.gov/1nSvEex>.

Saving Coral Reefs: 1 Million Pounds of Shipwreck at a Time

The Service, partners and marine salvage experts—Curtin Maritime and Global Diving and Salvage—have removed nearly 1 million pounds of shipwrecks in the Pacific Ocean to protect some of the most pristine coral reefs in the world.

"Due to their isolation and protected status, the reefs of Palmyra Atoll and Kingman Reef Refuges are healthy and resilient, and experience few manmade stressors besides these wrecks," says Amanda Pollock, former refuge manager of Palmyra Atoll and Kingman Reef National Wildlife Refuges, and now deputy project leader for the managing refuge complex. The refuges are 1,000 miles south of Honolulu and part of the Pacific Remote Islands Marine National Monument.

The iron in the shipwrecks had fueled the growth of invasive organisms— anemone-like coral-limorph at Palmyra Refuge and filamentous algae, a long stringy hairlike marine plant, at Kingman Refuge—and the invaders smothered a large amount of once-healthy, diverse coral. This is known as "black reef"—when a reef with high coral diversity transforms into a brown or black reef dominated by a single, invasive species.

Now that the wrecks are gone, the otherwise healthy reefs will be better able to deal with the invasive species. But the Service

All debris from the three wrecks will be recycled or properly disposed of in California.

SUSAN WHITE/USFWS

AMANDA POLLOCK / USFWS

will work to remove the coralli-morph and algae, and restore the lively, colorful, diverse coral reefs.

"By removing the wrecks and invasive species, the Service is giving these reefs the best chance to adapt to global climate and oceanographic changes," Pollock says.

The salvagers may have started out as just contractors but quickly became key partners in a project that Susan White, monument superintendent and refuge project leader, calls "expertly planned and handled."

The 16-person shipwreck removal team used a full range of tools and techniques, from state-of-the-art equipment to sheer brawn and grit, all while ensuring protection of the fragile environment.

At Palmyra Refuge, a 40-by-20-foot floating barge served as the work platform for commercial divers removing a 618,350-pound Taiwanese fishing vessel. Five divers spent 880 hours cutting up the 121-foot ship with exothermic torches, burning rods, underwater chainsaws and jackhammers. They also safely removed 605 gallons of fuel products discovered in tanks onboard. The crew carefully rigged and loaded each piece—some weighing more than 30,000 pounds—onto specially constructed shallow water transport vessels. A 150-foot crane then loaded them onto a derrick barge for removal.

A second shipwreck, a pontoon barge grounded in three feet of water at Palmyra Refuge in the 1950s, had disintegrated over decades into small shale-like pieces of rust. Team members spent days dismantling and hand-shoveling 277,800 pounds of debris into buckets and lifting it onto the small vessels for transport back to the derrick barge.

The final and most dangerous phase was at Kingman Refuge, an extremely remote location with only a couple of unvegetated coral rubble islets, which offer little protection from volatile Pacific weather conditions. Despite a lack of accurately plotted navigational charts, pounding surf, driving rain and unreliable weather forecasts, team members manually retrieved 44,000 pounds of iron, teak and fiberglass from an unmarked vessel that grounded at Kingman Refuge in 2007 and had since broken apart and scattered on the reef.

Above: One of the project crew collects debris by hand at a shipwreck on Palmyra Atoll National Wildlife Refuge.

Left: Both Palmyra Atoll and Kingman Reef NWRs are home to rare giant clams.

"This team's unique attention to detail, professional integrity, skills and tenacious ability to work through the extreme challenges together were the defining factors for this project's success," White says.

Throughout the project, scientists and refuge managers monitored the status and health of the reef ecosystems, and the monitoring will continue as phase two, treatment of the invasive species, begins. □

Quick Action Stops Mouse Invasion of St. George Island, Alaska

House mice were never meant to be on the remote and windswept Bering Sea Island of St. George, Alaska. So it was quite a shock for Mark Merculief and his co-workers from the City of St. George when they opened a shipping container of grass seed and straw, and found house mice scurrying around inside.

St. George is one of the few populated islands in the world where house mice have not become established, and the residents of the island (both people and wild animals) want to keep it that way. No nuisance mice, gnawed food packages or threats to native wildlife for them!

"It was a surprise," says Merculief, "and not a nice one."

Recognizing the threat, the city workers immediately contacted Chris Merculief, president of the St. George Traditional Council, the organization charged with protecting the island from rodent introductions.

Chris Merculief and a crew from the Traditional Council set traps and spread the news to Alaska Maritime National Wildlife Refuge because part of the island is a national wildlife refuge and home to 2 million nesting seabirds. The refuge and the Traditional Council have long been partners working to keep St. George free of invasive rodents, so once the mice were discovered, the refuge worked with the city to come up with a plan to remove the mice.

Two experienced rodent trappers from the refuge, Steve Ebbert and Greg Thomson, flew to St. George as soon as possible, thanks to financial help provided by the National Fish and Wildlife Foundation. Once the biologists made it to the island they got to work eradicating the mice. When the dust cleared, more than 50 mice were trapped.

Fortunately, all the mice were inside the shipping container and had not yet spread to adjacent containers or the tundra.

"We got really lucky here" says Alaska Maritime Refuge biologist Marc Romano. "If mice had established themselves on St. George, they could have threatened the wildlife and gotten into the village." Mice can eat wild bird eggs, kill chicks, alter native vegetation, and could have threatened the native lemming species that's found only on St. George Island. In addition, eradicating mice once they've become established is expensive and in many circumstances nearly impossible.

But the strong partnership between the people of St. George Island and Alaska Maritime Refuge—with help from the National Fish and Wildlife Foundation—prevented that, and helped make this into a success story. □

USFWS

ALCOWLS / USFWS

Above: St. George is one of the few populated islands in the world where house mice have not become established. **Left**: St. George is home to 2 million nesting seabirds, including the crested auklet.

50 YEARS OF THE WILDERNESS ACT

INSIDE SPOTLIGHT

USFWS

Wilderness pioneer Mardy Murie in Alaska.

Escaping the Confines of Civilization

We needed the Wilderness Act in 1964 and still need it today

by NANCY ROEPER | The National Wilderness Preservation System turns 50 this year, significantly younger than three other federal systems of lands and waters that begin providing varying levels of protection before 1964. So why did the United States need to create a new national system, composed of elements from the U.S. Fish and Wildlife Service, the National Park Service and the U.S. Forest Service?

Proponents of wilderness in the early 1900s saw changes throughout the nation's wild lands that were altering the land's nature. National parks focused on building roads, hotels and visitor centers to encourage tourism via automobile. National forests were building roads to facilitate large-scale logging. Huge dams were going up on major Western rivers for energy production. The Service's National Wildlife Refuge System was focused on creating waterfowl and game habitat, often through major ecological intervention.

Key wilderness supporters such as Aldo Leopold, Arthur Carhart, Bob Marshall, Olaus and Mardy Murie, and Howard Zahniser recognized a need to preserve lands in their natural and wild form to balance this utilitarianism. They recognized the benefits of the undeveloped and wild nature of rapidly disappearing places such as the headwaters of the Gila River in New Mexico, Trappers Lake in Colorado and vast expanses of the Arctic in Alaska.

Advocates longed for permanent protection as they feared people might tire of the need to fight repeatedly to protect valuable places. As Zahniser said, "Let's try to be done with a wilderness preservation program made up of a sequence of overlapping emergencies, threats and defense campaigns! Let's make a concerted effort for a positive program that will establish an enduring system of areas where we can be at peace and not forever feel that the wilderness is a battleground."

Leopold felt much the same way: "Let no man think that because a few foresters have tentatively formulated a wilderness policy that the preservation of wilderness is assured."

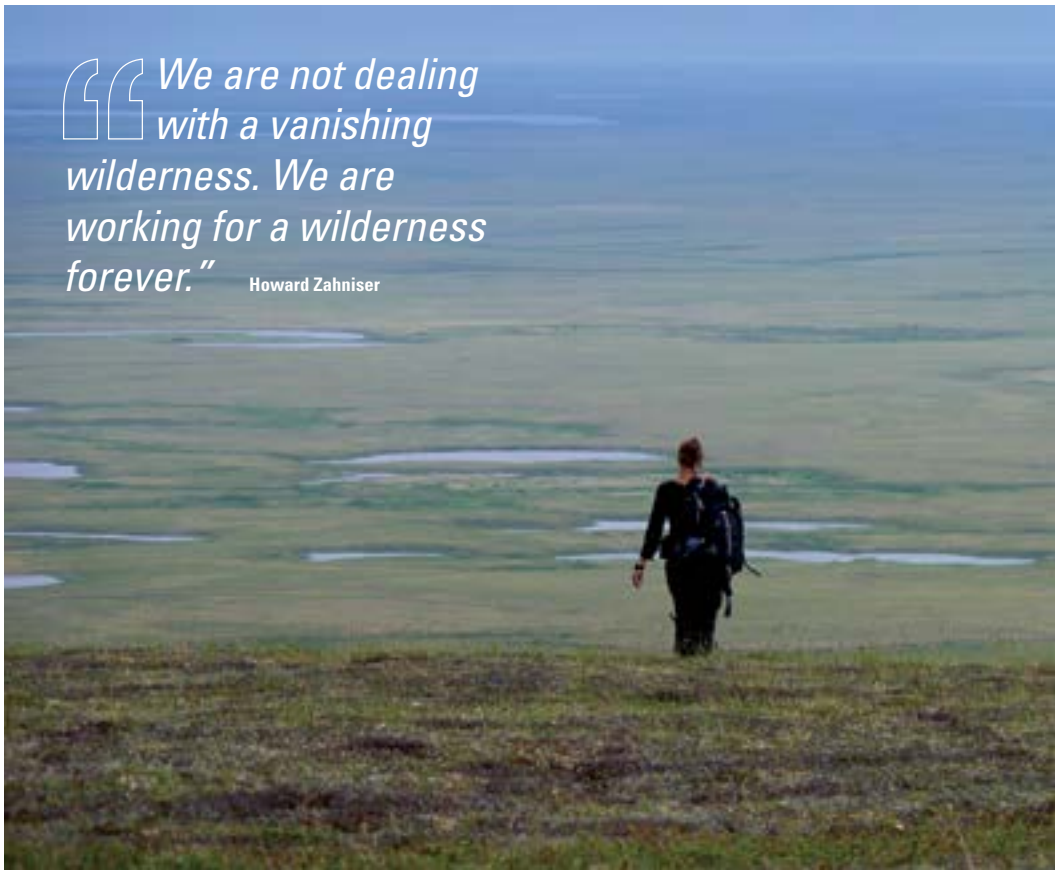
The U.S. Biological Survey, which became the Fish and Wildlife Service, bred some of the most passionate proponents of wilderness protection. Olaus Murie was a wildlife biologist for about 25 years. He and his wife, Mardy, worked tirelessly to protect Alaska's Brooks Range and the Sheenjek River. Zahniser was a writer and editor with the Service's forerunner for 10 years.

But it wasn't until he became executive director of The Wilderness Society that Zahniser began his tireless battle to pass legislation. He wrote the first draft of the Wilderness Act in 1956 and over nine years, shepherded it through 18 public hearings and 65 rewrites. Congress finally passed and President Johnson signed the Wilderness Act on September 3, 1964.

No Refuge System wilderness was designated by the Wilderness Act. Instead, the law gave the three agencies 10 years to review their lands and make wilderness recommendations. However, at public demand, Congress designated wilderness at Great Swamp National Wildlife Refuge in New Jersey only four years later in 1968—the first wilderness designated for the Refuge System and the Department of the Interior (See "Great Swamp: Interior's First Wilderness" p. 19).

Since then, Congress has designated wilderness on 62 additional refuges and one fish hatchery. There are also almost 2 million additional acres of Refuge System lands proposed as wilderness in the 1970s; Congress has neither designated the lands as wilderness nor released them from further wilderness consideration. As a result, the Service manages about 22 million acres of designated and proposed wilderness in accordance with the provisions of the Wilderness Act.

What are the consequences of wilderness designation in the Refuge System? In essence, wilderness areas have dual citizenship: They are members of the Refuge System and of the National Wilderness Preservation System. As the Refuge System manages



KRISTINE SOWL/ USFWS

these areas to achieve the wildlife conservation purposes for which they were established, the Service does it in ways that keep them primarily natural, undeveloped and wild, or as Howard Zahniser explained, "exhibiting the free play of natural forces."

Managers use temporary roads, motorized equipment and vehicles, mechanical transport, structures and the landing of aircraft sparingly, and only when their use has been carefully evaluated and determined to be the minimum requirement for managing the area to preserve its wilderness character.

Use and enjoyment of wilderness is another important principle of the Wilderness Act, which identifies outstanding opportunities for solitude or a primitive and unconfined type of recreation as a key descriptor of wilderness character. The Service encourages visitors to hunt, fish, observe and photograph wildlife, and engage in other activities as long as those activities are non-motorized, non-mechanized and compatible with wilderness preservation. Wilderness areas can also be great for snowshoeing, kayaking and camping.

The "dual citizenship" aspect of wilderness allows Refuge System staff to take advantage of the wilderness training, information and education offered by the interagency Arthur Carhart Wilderness Training Center and wilderness research, monitoring and scientific knowledge amassed by the interagency Aldo Leopold Wilderness Research Institute. Coordinated training, education and research means all four agencies that manage wilderness—now including the Bureau of Land Management—do so in a coordinated manner to protect a single Wilderness System.

As he so often did, Howard Zahniser summed up the strength of a single National Wilderness Preservation System: "Working to preserve in perpetuity is a great inspiration. We are not fighting a rear-guard action, we are facing a frontier. We are not slowing down a force that inevitably will destroy all the wilderness there is. We are generating another force, never to be wholly spent, that, renewed generation after generation, will be always effective in preserving wilderness. We are not fighting progress. We are making it. We are not dealing with a vanishing wilderness. We are working for a wilderness forever."

USFWS

Left: Andreafsky Wilderness, at Yukon Delta National Wildlife Refuge in Alaska. **Above**: President Johnson Signs the Wilderness Act.

My passion for wilderness began at an early age. I grew up exploring nearby fields, woods and swamps without my parents worrying about my safety. Growing up on Long Island, I found these relatively small areas constituted my own personal wilderness. I knew the best hiding places, trees to climb, blackberry patches and spots to catch pollywogs. From that beginning, I just scaled up to feel connected to truly undeveloped and wild areas as I camped and backpacked during graduate school. But it wasn't until I began my current position and my book learning about wilderness that I realized that some of my trips had been to areas that were Designated Wilderness. I now know that the exhilaration I felt in these places resulted not only from the incredible scenery, unexpected wildlife encounters and the exertion of transporting oneself with necessary food and shelter, but also from the feeling that I had escaped the confines of civilization; I could be wild! Even if only temporarily. I want future generations to experience that feeling.

During this 50th anniversary year, I look forward to the Service continuing and expanding upon its proud heritage of wilderness stewardship to preserve the special lands and waters that the American people have entrusted to it. □

NANCY ROEPER, National Wilderness Coordinator, National Wildlife Refuge System, Headquarters

ADVENTURE

Many heed call to enjoy areas 'untrammeled by man'

BY DEBORAH JEROME

Not long after we began our canoe trip in Okefenokee National Wildlife Refuge Wilderness in Georgia, I spotted my first alligator—its enormous head visible above the water's surface, its body hidden under the tea-colored bog. You usually gauge a gator's length by estimating in inches the distance between its eyes and snout and converting that to feet. In this case: a gator about 10 feet long.

My companions and I paddled (quickly) past the big gator and headed south into the Grand Prairie. Our canoe was suddenly bombarded with a brown geyser of water, peat and mud. Peat blowouts, caused by the release of methane gases from below, had blocked our route with an impassable island, filling in the once recognizable, open trail. We lost all sense of direction. Not knowing whether we were on solid footing or a floating island, we stayed in our boat and wedged our way free. Thankfully, we maneuvered our way back to the trail.

The Wilderness Act of 1964 made my experience possible. This definition in the act explains why: "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. 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…"

Wilderness areas are ideal for hiking, canoeing/kayaking, camping, photography, environmental education, interpretation, hunting, fishing and more—as long as those activities are compatible and appropriate with preserving wilderness character. But wilderness can be "loved to death" only too easily. As a result, wilderness administrators face many challenges.

The Wilderness Act specifies that as managers we maintain the natural setting and provide outstanding opportunities for solitude or primitive and unconfined recreation without diminishing the wilderness character. So, those who manage wilderness may adjust the number and distribution of visitors at any given time to maintain the experience and achieve wilderness objectives.

Wilderness administrators also manage each unit in the National Wilderness Preservation System as the most wild and undeveloped extreme within the spectrum of a wildlife refuge—applying the "minimum necessary" standard before taking administrative action in wilderness.

Commercial outfitting and guiding are two of the few commercial services permitted by the Wilderness Act to enhance the recreational experience in some areas "to the extent necessary," as the act says, and if found compatible under the National Wildlife Refuge System Improvement Act of 1997. Commercial guided boat tours led by experienced naturalists are offered at Okefenokee, as well as boat and camping equipment rentals, food and supplies.

The boat tours take advantage of the 120 miles of boat trails Congress requires be maintained. The boat trails are the only access into the wilderness and would quickly become overgrown and impassable unless maintained year-round by staff and volunteers. Depending on the location of a trail, water level and other factors, the "minimum necessary" requirement for clearing a trail may be hand tools and canoes or it may involve motorized boats and equipment.

Every dip of my paddle through the Okefenokee Wilderness brought a new experience that trumped the last: the sweet smell of flowering water plants, the amazing starlit night undiminished by city lights, the quiet swooshing sound of sandhill cranes overhead. Like most wilderness experiences, the trip was unforgettable. □

DEBORAH JEROME, Regional Wilderness Coordinator, National Wildlife Refuge System, Southeast Region

STACY SHELTON/USFWS STACY SHELTON/USFWS

AWAITS

VISIT It takes careful planning to visit wilderness. The Service has 75 wilderness areas on 63 refuges in 26 states. Find the perfect adventure by going online to find wilderness in the Service: <www.fws.gov/refuges/whm/wilderness.html>

Above: Boat trails are the only access into Okefenokee Wilderness. **Below**: Alligators are common in Okefenokee Wilderness in Georgia.

WILD LANDS IN T

The walls of the conference room at Arctic National Wildlife Refuge, headquartered in Fairbanks, Alaska, are hung with wood-framed photos of "the Founders," conservation giants whose vision and tireless struggle led to the refuge's establishment in 1960. More than an effort to protect a specific place, the Founders' campaign to establish Arctic Refuge was also about recognizing and preserving a set of values—unrestricted natural processes (wildness) and opportunities for exploration and discovery, solitude and challenge—that was later codified in the 1964 Wilderness Act.

Left to right: 1. A mom and three children fetch water at Arctic Refuge. The wilderness provides subsistence opportunities for some native Alaskans. 2. You'll find no roads or constructed trails within Arctic Refuge. 3. A visitor crosses a river in Arctic Refuge. 4. The Mollie Beattie Wilderness encompasses more than one-third of the total wilderness acreage in the National Wildlife Refuge System.

In the decades since Arctic Refuge was established, issues never imagined by the Founders have emerged. As a kid growing up near Anchorage, Alaska, Arctic Refuge featured prominently in my classroom lessons and family discussions around the dinner table. For me, like millions of others from Alaska to Florida, the persistent national debate about potential oil and gas resources in one small portion of the refuge provided an introduction to the vast world of wilderness, wildlife and cultural resources found in northeast Alaska.

Now, climate change and other large-scale human influences challenge the very notion of "natural," not only in the Arctic but across the world. And information technology allows for armchair exploration and virtual experiences that reveal the mountains' mysteries with a few quick keystrokes.

However, the role of the refuge as a symbol and exemplar of wilderness values has only grown.

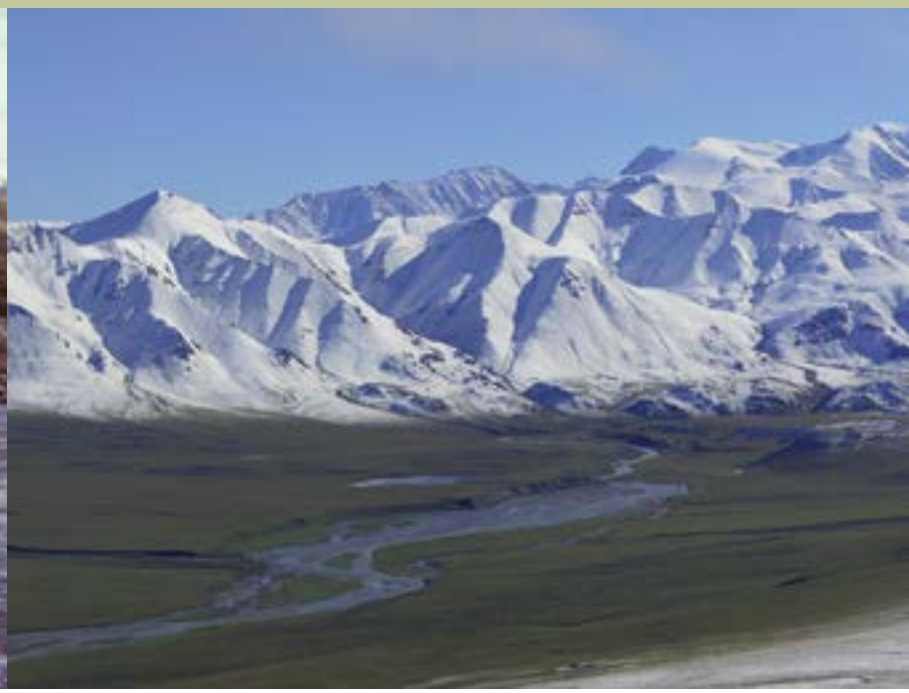
At nearly 8 million acres, Mollie Beattie Wilderness, as the Arctic Refuge wilderness is called, encompasses more than one-third of the total wilderness acreage in the National Wildlife Refuge System. It supports such animals as polar bear, wolf, wolverine, Dall sheep and caribou, as well as more than 200 other species of birds, mammals and fish. In addition, the wilderness provides subsistence opportunities for Inupiat and Gwich'in native peoples, who mix

LEFT TO RIGHT: USFWS, PAUL HAVERKAMP, USFWS, FRANKLIN DEKKER

HE ARCTIC

People are enriched by the knowledge that it exists

By BRIAN GLASPELL



traditional and modern lifestyles in villages on the periphery of the refuge.

There are no roads or constructed trails within the wilderness, or anywhere within the larger 19.6 million-acre refuge, an area about the size of South Carolina. Most visitors as well as refuge staff travel by bush airplanes equipped with oversized "tundra tires" for landing on unimproved airstrips. Just getting to the refuge is a multi-day affair, and a typical wilderness visit lasts for a week or more. This challenging travel and access situation limits both recreational visitors as well as scientists and wildlife managers. Despite its attractions as a unique natural laboratory and wilderness recreation paradise, Arctic Refuge receives fewer than 2,000 visitors a year.

The truth is, most Americans will never set foot in Mollie Beattie Wilderness, but many are enriched by the knowledge that it exists. The refuge is a real, tangible place that serves as both habitat and homeland. It is also an intangible and powerful symbol of wildness and wilderness values for people across the country.

The value of symbols lies in their ability to evoke meanings and emotions, and therein lies a principle wilderness stewardship challenge at Arctic Refuge.

As a refuge manager, most of my management tools are designed to evaluate and address the effects of people on wildlife and habitats—but what about the effects of wild places on people? How do we share the refuge with millions who will never visit but also preserve opportunities for personal discovery and exploration? How does one meet legal and policy mandates for managing resources while stewarding the *idea* of a place? These are messy questions that defy easy answers.

Perhaps the best we can do is to frame each question in the context of a larger purpose. Olaus Murie, one of the principal refuge Founders, wrote that preservation of what is now Mollie Beattie Wilderness is about "the real problem of what the human species is to do with this earth."

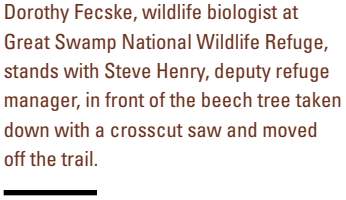
I'll be the first to agree that framing every wilderness choice in such grandiose terms may be a little over-the-top. However, I do believe that wilderness stewardship demands a thoughtful, humble approach, and our response to the "real problem" identified by Murie is ultimately demonstrated in the cumulative effect of myriad daily decisions.

Many of those decisions involve choices between "could" and "should." In the Arctic Refuge wilderness, unlike many other refuge settings, we have managed to preserve a functional, wild, natural setting. What we could do in that setting changes as fast as technology; what we should do is governed by a more stable set of rules. The Service's National Wilderness Stewardship Policy directs us to "set a high standard and provide an example for the public to follow." That sounds to me like good advice for stewarding a symbolic resource. As a symbol and example for the public to follow, Arctic Refuge, and its wilderness, may be more important to us than we are to it. □

BRIAN GLASPELL, Arctic National Wildlife Refuge, Alaska Region

THINK MINIMALLY

Traditional skills help preserve wilderness character



Dorothy Fecske, wildlife biologist at Great Swamp National Wildlife Refuge, stands with Steve Henry, deputy refuge manager, in front of the beech tree taken down with a crosscut saw and moved off the trail.

by STEVE HENRY

Steely gray skies and gusty moans like those of a great wounded beast brought on the ominous dark. Throughout the night of October 29, 2012, the forest exploded as trees were ripped from the ground and shattered against one another like giant jackstraws. When the sun finally rose the next morning, it was clear Hurricane Sandy deserved the title "superstorm."

Hurricane Sandy was the largest Atlantic storm ever recorded and the second most costly after Katrina. The mid-Atlantic Coast was particularly hard hit, with New Jersey suffering a heavy blow. Although coastal by nature, the size and strength of Sandy caused massive damage far inland, including at Great Swamp National Wildlife Refuge in New Jersey.

The days after the storm brought unprecedented challenges for refuge staff and volunteers. In the immediate aftermath, massive trees blown down by the wind blocked roads and brought down wires. The refuge was closed to the public for a week; power was not fully restored for nearly two. Emergency repairs were made to prevent further damage, but it would be weeks before service roads and boardwalks could be cleared to reopen.

The eastern half of Great Swamp Refuge has the distinction of being the first wilderness area designated within the Department of the Interior (DOI) (See "Great Swamp: Interior's First Wilderness" p. 19). In 1968, President Lyndon Johnson signed the act adding part of Great Swamp to the National Wilderness Preservation System, recognizing the "attractiveness of undisturbed solitude" that was "so sorely needed in the middle Atlantic

BOB BECKLEY / FOREST SERVICE

"Miniature wildernesses a stone's throw from megalopolis—a Fire Island seashore, a Great Swamp of New Jersey—may be as important to the future as the preservation of Yellowstone Park."

—Stewart L. Udall, Secretary of the Interior (1961–69)

region." Such solitude and its many related benefits would be "perpetually protected and enhanced" by Great Swamp National Wildlife Refuge Wilderness. This wilderness designation is astounding given how radically different Great Swamp was from previously designated areas. At less than the 5,000 acres generally required by the Wilderness Act and lying in the heart of the most heavily developed and densely populated area in the nation, the area's designation as wilderness speaks volumes about the commitment and vision of those who fought for its preservation.

Federal agencies that manage wilderness have a mandate to preserve "wilderness character." Such character emerges from the unique conditions and resources in each wilderness. To preserve character the Wilderness Act prohibits motorized equipment, motor vehicles, permanent roads and structures, among other things. Some discretion, however, is given to agencies to employ prohibited uses or activities in cases of emergency or "when necessary to meet the minimum requirements for the administration of the area" as wilderness. By policy, agencies are required to conduct a "minimum requirements analysis" to determine if a prohibited use may be allowed. The Wilderness Act's intent is clear: Such uses should be the rare exception, only when absolutely necessary and only when non-prohibited uses are unavailable or unworkable. Service policy goes further, eliminating cost or convenience as factors in determining the minimum requirement.

Great Swamp Refuge Wilderness contains more than eight miles of primitive hiking trails, and Hurricane Sandy affected them all. In several places, massive trees fell in huge tangles, completely blocking the trail. After the storm, the refuge staff focused on the emergency stabilization of structures and opening primary roads and visitor facilities. Attention then shifted to clearing wilderness trails.

In light of the extent of the damage, it was tempting to grant an exception to use chainsaws. Refuge staff and volunteers simply did not have the expertise or equipment to tackle the challenge any other way. After much thought and discussion, however, we decided that chainsaws weren't really the minimum requirement and that we needed a better option—an option that preserved wilderness character while also building in-house skills to deal with future storms.

Staff from the interagency Arthur Carhart National Wilderness Training Center put us in touch with Forest Service employees, who had years of experience using hand tools to maintain wilderness trails. Four months after Sandy, a team of three experts spent a week at Great Swamp Refuge, training staff and volunteers in the use of such "traditional tools" as axes and crosscut saws. It was both exciting and humbling to learn their woodsman's skills, skills that are unfortunately being lost in modern society. Beyond the use of tools, they taught us the importance of balance, leverage, angles and careful planning to work smarter with less effort. It was as much about physics as swinging an axe or pulling a saw. With their help, many blockages, including the worst, were cleared and the trails were safely reopened for the public.

Lynn Wolfe from Rachel Carson National Wildlife Refuge in Maine (left) and Dorothy Fecske of Great Swamp use a crosscut saw to cut up a large tree that came down across a wilderness trail during Hurricane Sandy.

BOB BECKLEY/FOREST SERVICE

Providing training in wilderness stewardship is really no different from other refuge disciplines that require training: Biologists spend years getting college degrees in wildlife conservation fields; maintenance personnel must be trained and licensed to operate heavy equipment; managers must learn supervisory and budgeting skills. It's no surprise that the ability to effectively preserve wilderness character will also necessitates training.

In the time since Hurricane Sandy, refuge staff and volunteers have continued to clear trails monthly. Our new skills and tools have given us the confidence to do the job safely and efficiently. In fact, good hand tools properly used have numerous advantages over motorized equipment. We take pride in using traditional methods in a way that preserves wilderness character. And the public is taking notice. A visitor to our wilderness area recently stopped by refuge headquarters to congratulate us after spotting several large trees that had been cleared using crosscut saws rather than chainsaws.

Great Swamp Refuge, like many refuges in the region, continues to recover from the devastating effects of Hurricane Sandy. If there is a silver lining, it is that our response has better prepared us to handle future events in a wilderness-appropriate way. As we celebrate the 50th anniversary of the Wilderness Act, DOI's first wilderness is better positioned than ever to handle whatever the future may bring. □

STEVE HENRY, Great Swamp National Wildlife Refuge, Northeast Region

In 1968, 3,660 acres of Great Swamp National Wildlife Refuge became a designated wilderness area.

USFWS

Great Swamp: Interior's First Wilderness

Who would have thought that just 26 miles west of New York's Times Square, you will find a federal wilderness area? Thanks to the hard work of a passionate community and support from Congress, 3,660 acres of Great Swamp National Wildlife Refuge became in 1968 the first wilderness area designated in the Department of the Interior.

In the late 1950s, the Port Authority of New York and New Jersey determined that the area was an ideal location for a major international airport. The proposed 10,000-acre airport was met with grassroots opposition. Helen Fenske, a local homemaker, was among the leaders who rallied the community in favor of conserving Great Swamp as a national wildlife refuge, and she played a key role in seeking out wilderness designation.

The New Jersey refuge has grown to more than 7,700 acres, and just under half of that is designated wilderness, with 8.5 miles of trails that offer visitors a primitive recreation experience.

The refuge wilderness area is also a hotspot for ecological integrity. Each spring biologists monitor vernal pools and wetlands to track breeding trends. The refuge has become an important resting and feeding area for more than 244 species of birds. Fox, deer, muskrat, turtles, fish, frogs and a wide variety of wildflowers and plants can also be found on the refuge. □

DAVE SAGAN, Great Swamp National Wildlife Refuge, Northeast Region

SPIRIT OF WILDERNESS ACT UNITES US

by JAMIE WILLIAMS

From snowy Alaska to the humid tip of Florida, every wild place in America that has been saved owes its enduring character to someone who loved it. Our world-renowned national parks, monuments, forests and refuges embody the heart and exceptionality of the people who strive to protect them. Since 1964, the Wilderness Act has enabled citizens to work locally and advocate in Congress to include treasured wild places in the National Wilderness Preservation System. Beyond the United States, the act's passage set a conservation gold standard for the rest of the industrial world.

The Wilderness Society was founded in 1935 to ensure that wild places had equal voice amidst the onslaught of development happening across America at that time. Visionaries such as Aldo Leopold, Bob Marshall and Benton Mackaye were intimately familiar with wild lands and pushed for a legislative measure that would help balance human needs with those of the natural world. We all benefit today from the more than 109 million acres of federal lands that have been protected by the Wilderness Act. In the National Wildlife Refuge System alone, 63 refuges in 26 states host 75 wilderness areas—about one-fifth of the designated wilderness acres in the United States.

Large protected areas such as designated wilderness are vital for safeguarding the natural systems that produce clean drinking water and protect wildlife. But today's development pressures coupled with a troubling trend in inadequate congressional funding for our public lands puts these wild places at risk. Budget shortages can cause significant delays in mandatory recreational and conservation planning, and hamper field monitoring on wildlife, fire conditions, archaeological sites and trail use.

USFWS

A visitor enjoys the view from atop Chupadera Peak in the Chupadera Wilderness at Bosque del Apache National Wildlife Refuge in New Mexico.

Last year's government shutdown showed us how much Americans value their public lands legacy. In wilderness, visitors can find solitude and peace and quiet, a chance to explore by foot or boat, traditional forms of recreation such as hunting or backpacking, or an opportunity to teach a child about different cultures that thrived off the land.

Some places, such as Arizona's Kofa National Wildlife Refuge, are predominantly designated wilderness, and astound us with their vast terrain; other refuges are intimate, offering quiet sanctuary for humans and wildlife near densely populated communities, such as the Parker River National Wildlife Refuge north of Boston, where wilderness designation is proposed. A personal favorite is the Sheldon-Hart Mountain National Wildlife Refuge Complex, which protects two critical habitat areas for migratory pronghorn antelope and other native species—such as bighorn sheep, mule deer, sage-grouse and redband trout—in southeastern Oregon and northern Nevada. There, wilderness designation is proposed for both Hart Mountain National Antelope Refuge and Sheldon National Wildlife Refuge in Oregon.

Wilderness lands remind us that human development doesn't belong everywhere. Late last year, Secretary of the Interior Sally Jewell reaffirmed a key Fish and Wildlife Service decision to forbid the construction of a road through Alaska's Izembek National Wildlife Refuge, protecting this sublime wilderness where sea otters and Steller's sea lions, wolves, caribou, brown bears, salmon and hundreds of thousands of shorebirds and seabirds thrive. A road would have permanently bisected the narrow strip of land that runs between two lagoons teeming with birds, fragmenting this irreplaceable wildlife area beyond repair.

The spirit of the Wilderness Act unites us around an inherently American idea: By securing "an enduring resource of wilderness," it reminds us of our nation's rich heritage, humanity's dependence on healthy natural systems and our ability to ensure a sustainable environment for future generations long after we are gone. □

JAMIE WILLIAMS is president of The Wilderness Society, the leading wild public lands conservation organization working to protect wilderness and inspire Americans to care for our wild places. <www.wilderness.org>

PRESERVING WILDERNESS CHARACTER FOR THE AGES

by NANCY ROEPER

BILL CROUCH/USFWS

Monica Patel, a 2011 Wilderness Fellow, does shoreline inventory and monitoring work at Edwin B. Forsythe Refuge in New Jersey.

To understand the Wilderness Character Monitoring Initiative, you first need some understanding of wilderness character itself. The term, "wilderness character" comes directly from the Wilderness Act.

In directing wilderness-managing agencies to preserve wilderness character, Congress defined it in somewhat poetic terms, but with key qualities mentioned. The act states that wilderness is:

- untrammeled—where the forces of nature are allowed free play;
- undeveloped—where the land retains its primeval character and permanent improvements are lacking; and
- natural—where the area is managed to preserve natural conditions.

It also must offer outstanding opportunities for solitude or a primitive and unconfined type of recreation.

A complete definition of wilderness character would incorporate many additional aspects such as the natural soundscape, dark skies, cultural values and the capacity to provide a temporary haven from the pressures of modern civilization.

With the encouraged public use and enjoyment of wilderness, as well as the stressors of pollution, nearby development, climate change and more, it has become clear that key qualities of wilderness must be monitored over time to determine whether wilderness character is degrading, remaining stable or improving.

With leadership from Dr. Peter Landres of the Aldo Leopold Wilderness Research Institute, the U.S. Forest Service developed protocols for wilderness character monitoring. Building on this effort, Landres and a team from the wilderness-managing agencies (Fish and Wildlife Service, National Park Service, Bureau of Land Management and Forest Service) and the U.S. Geological Survey developed an interagency monitoring strategy.

For its part, the Service began an effort to conduct wilderness character baseline assessments for all designated wilderness in the Service by the end of 2014, the 50th anniversary year of the Wilderness Act.

From 2011 to 2014, the Service hired groups of Wilderness Fellows to conduct assessments for the 63 refuges with wilderness areas, one fish hatchery and several proposed wilderness areas. The Service has also worked with the other three agencies to develop an interagency online wilderness character monitoring database.

Hiring Fellows made this initiative possible. The approach was affordable and has been an excellent way to familiarize recent college graduates with the Service and the National Wilderness Preservation System. The Fellows have been energetic and ready to help on non-wilderness projects such as banding birds, surveying amphibians, removing invasive plants, planting experimental plots of a host plant for a rare butterfly, and assisting in education programs for local schools.

Refuge staff learned a great deal about the status of wilderness by working with the Fellows to identify and prioritize the elements of wilderness character that were most important to measure. Although it is too early to draw conclusions about wilderness character, over the next several years, the Service will be better able to see how wilderness character is changing over time and understand how stewardship actions affect wilderness character.

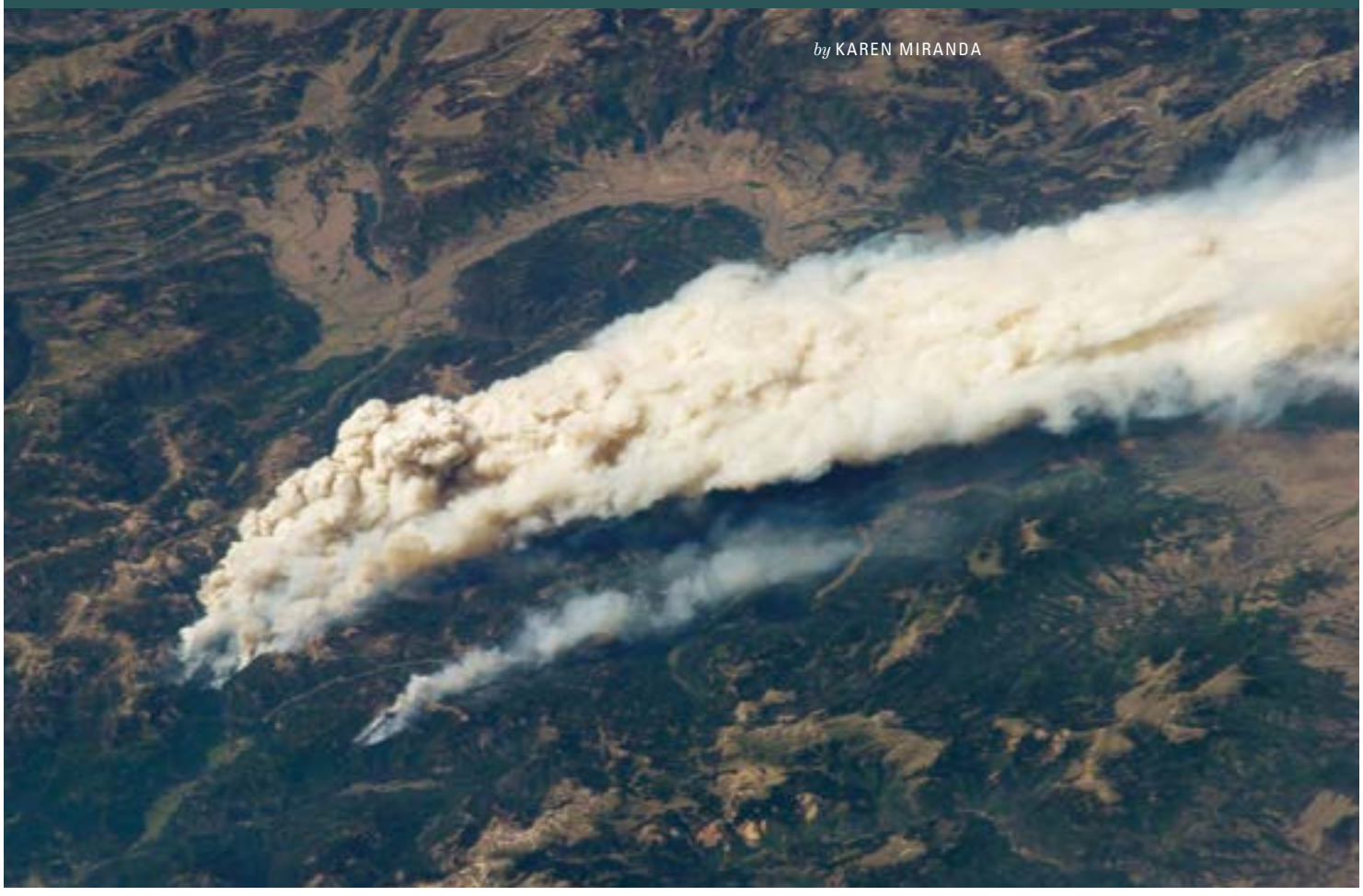
With hard data in hand, better stewardship decisions will help preserve wilderness character for the American people.

NANCY ROEPER, National Wilderness Coordinator, National Wildlife Refuge System, Headquarters

Who Cares About Smoke?

When fire threatens, air quality is an important but often overlooked detail

by KAREN MIRANDA



Lightning from a thunderstorm sparks a fire—winds quickly spread the fire through dry grasses, brush and timber. Fire crews are called in, and strategies are developed and implemented to protect homes, businesses and resources. When wildfire threatens, who really cares about smoke and air quality?

As it turns out, many folks do. Up until recently, smoke has simply been a little-addressed consequence of wildfires, the main focus being the threat to lives and property from the blaze itself. But for communities downwind, travelers on smoke-impacted highways and firefighters who sometimes must camp in smoke-choked valleys, air quality takes on great importance.

While smoke from wildfires cannot be controlled, planning for its impacts can certainly be considered. An interagency program of deploying Air Resource Advisors (ARAs) to large, long-duration wildfires has gained some traction in the last few years. Fewer than 20 ARAs are available in the country, although plans are in place to increase this number.

Mike Broughton, a smoke management specialist for the Service, is one of the ARAs to have been deployed. He worked on about 20 fires in 2012 and 2013 as an ARA, including the High Park fire (87,000+ acres) near Fort Collins, Colorado, the Halstead fire (181,000+ acres) near Stanley, Idaho, and the West Fork Complex fire (109,000+ acres) near Pagosa Springs, Colorado. Broughton's primary position is with the Branch of Air Quality in Lakewood, Colorado, and is funded by the Fire Management Branch out of Boise, Idaho. When the call comes in, Broughton gathers his gear and heads to where the action is.

While each incident is unique, an ARA typically gathers firsthand data on the fire's behavior, translates that to smoke and air quality impacts, then coordinates the distribution of the air quality message to local and state air quality and health officials, transportation departments and the fire's Incident Management Team.

Up-to-date information is key. Parents want to know whether they can send their kids outside to play. People with heart or respiratory conditions must minimize impacts to their health. Transportation officials need to know whether roads should be closed or monitored. Firefighters need periods of clean air to operate safely and efficiently.

Broughton and his fellow ARAs use many tools to forecast and communicate smoke impacts. A network of particulate monitoring stations gathers data and relays them through satellites to specialized websites. Monitors can be permanent—typically set up and maintained by each state's air quality agency—or portable—temporarily installed at desirable locations for the duration of the fire. Carbon monoxide monitors have been set up in some base camps. A computer program called the Blue Sky Smoke Modeling Framework, operated by the U.S. Forest Service AirFire Team in Seattle, can model ground-level fine particulate concentrations based on meteorology, fuel types and anticipated changes in fire behavior.

Broughton's experiences as an ARA have helped him in his regular duties as well, making certain that the Service can plan for and complete necessary prescribed burning without running afoul of local, state and federal air quality regulations.

"Many times our issues are not associated with actual exceedances of air quality standard, but simply getting prior approval from the agencies to conduct the burns, especially when we're near populated areas," he says. "But the ARA program has furthered the cooperation necessary to enable both the prescribed burners and the air quality regulators to achieve their goals." □

KAREN MIRANDA, Fire Management Branch, National Wildlife Refuge System, Headquarters

MIKE BROUGHTON/USFWS

A smoke monitor deployed in Del Norte, Colorado, to monitor emissions from the West Fork Complex fire in June 2013.

About 50 miles of smoke from the West Fork Complex near Pagosa Springs, Colorado, as seen from the International Space Station on June 20, 2013. This smoke—from fires burning more than 109,000 acres—reached almost 700 miles downwind on this day.

REFUGE THERAPY

Preschoolers with developmental delays learn to love what nature has to offer

by KATHERINE TAYLOR

Left: Students from the Carousel School get the feel of gumballs. **Right**: A paper tree, a nature banner and a drawer of natural objects grace the "outdoor corner" in the classroom.

When you hear the word "classroom," what image comes to mind? Is it a room lined with rows of desks, posters of famous authors on the walls and a chalkboard at the front of the room? What sounds would you expect to hear? Perhaps the shuffling of books and papers, the bell signaling it's time to change classes, or announcements blaring from the intercom?

Now what if this classroom was an open forest, and instead of rows of desks, trees and lush plant life surrounded you? There are no posters or chalkboards, and the only sounds you'll hear are a stream flowing, the shuffling of earth beneath your feet or birds singing a beautiful melody.

The lessons learned in this classroom date back to the dawn of humanity—the delicate balance of nature that connects us with every living thing. These are the lessons Amanda Wilkinson, public use specialist for the Service's South Arkansas Refuge Complex, is instilling in 13 preschoolers with developmental delays through a program she created known as "Refuge Therapy."

The goal of the program is to introduce children to nature while helping them to grow both mentally and socially in the process. All of the participants are students at the Carousel School, whose mission includes to "strive to effectively transition developmentally delayed children into a regular kindergarten classroom setting with positive expectations."

Refuge Therapy was first conceived when the school called the refuge to schedule a field trip last summer. Upon arrival, some of the children were apprehensive, highly anxious or very introverted. The trip began with a tour of the Visitor Center, allowing the children to explore and learn about the refuge.

"Because of the kids' anxiety, it was clear that every child could use a hand to hold for the remainder of the trip," says Wilkinson. Their tour of the refuge ended with a nature walk along a short trail behind the Visitor Center. Here, the children were encouraged to touch the bark of the trees, pick up leaves and other objects, look out over the pier at the pond, and smell the wildflowers growing in the butterfly garden. Some of the children did, but most did not.

"The hurdles for them were getting off the paved trail, touching the dirt-covered objects, walking out onto the pier, or trusting that the dragonflies that hovered over the garden were harmless," says Wilkinson.

"At that point, I realized that many of these kids never had an outdoor experience like this," she adds. "I felt compelled to offer more trips, to encourage the connection with nature and fill them with positive reinforcement when came to the natural world."

There were four additional refuge field trips that summer. Each time the children took nature walks along the same trail, and with Wilkinson's guidance, focused on different hurdles and elements to conquer.

"We fished in the pond from the very pier that only two months prior some of the kids would not go on. We fished with live crickets!" Wilkinson says.

Those initial field trips helped make Refuge Therapy a year-round program that couples improving early childhood fundamentals with the natural world. Monthly visits, bringing nature to the classroom and summer field trips are now the components of the program.

There is even an "outdoor corner" in the indoor classroom, which consists of a paper tree, a nature banner made during the first visit to the refuge and a collection of natural objects that allow the children to engage with nature while they're indoors.

> *"A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood."*
>
> —Rachel Carson, *The Sense of Wonder*

With each lesson Wilkinson adds pieces to the outdoor corner, changing the leaves on the tree depending on the season and laying out "nature spots."

"Nature spots are laminated pictures of the earth. Once they sit, I ask them to hand me their earth and tell me something they saw, heard, touched, smelled or tasted in nature that week. I then go into the lesson for the month," explains Wilkinson.

Thanks to the willingness of the Carousel School to pilot this experience, Refuge Therapy has given these children a new way to look at the world around them.

"From the very first time until now, I've noticed the increased awareness the kids have gained for the world around them," says Wilkinson. "They are stopping to hear the birds sing, asking about various plants and flowers they find, and are excited to talk about it all during my next visit. The word "nature" is now a part of their vocabulary, and they are constantly connecting it to all things."

The children's teacher, Shalanda Thompson, has also noticed positive changes since the beginning of the program.

"Wow! The changes are so dramatic. We collect leaves now, to place in our touch center," she says. "We are so amazed at the change in our students' ability to adapt to the feel of objects in nature and that they are open to experience the environment surrounding us each day."

Perhaps one of the most noticeable developments has been in a little girl named Caelynn, who at the start of Refuge Therapy was terrified to be outside and overwhelmed during her first visit. By the end of the summer she was holding a bucket full of live crickets, and she is excited to participate in regular nature walks with her class and discover new things.

It's not just the children who have been impacted by the program. "As a mother myself, to two small children, I find it fascinating that their minds are like little sponges, soaking in everything around them, just waiting for the opportunity to use their knowledge," says Wilkinson. "For me, it has been an awesome experience; to not only introduce nature to these children, but to be there during such an instrumental time in their lives." □

KATHERINE TAYLOR, External Affairs, Southeast Region

REACHING OUT TO

About 80 percent of Americans live in urban communities, and one of the challenges the Service faces is to make sure that they—and all Americans—have opportunities to connect with nature. A personal connection will help make clear the value of the world's natural resources to everyday life and the importance of conserving them.

To connect city dwellers to nature, the National Wildlife Refuge System has created an Urban Wildlife Refuge Program and established eight pilot Urban Wildlife Refuge Partnerships. With these partnerships, the Service is reaching out to people where they live, work and play, whether that's a schoolyard habitat or a community park. The Service relies on the partners in this program—community organizations that are already practicing conservation—to share their community expertise, their knowledge and their relationships.

In this way, the Service can not only encourage and nurture an appreciation of wildlife conservation in urban audiences but also learn and appreciate the diverse perspectives and values of urban communities.

L.A. River Rover Urban Wildlife Refuge Partnership

LOS ANGELES, CALIFORNIA

USFWS

The River Rover, a bus that houses interactive exhibits including a model of the Los Angeles River watershed, provides opportunities to educate families and children in one of the most diverse and densely populated regions of the country by "Bringing the River to the People." Through the Rover, partners can engage with an audience who may not be comfortable going to the river on their own or may even be unsure how to get there.

Masonville Cove Urban Wildlife Refuge Partnership

BALTIMORE, MARYLAND

USFWS

A cooperative venture between the Service's Chesapeake Bay Ecological Services Office and Patuxent Research Refuge and partners has restored an abandoned and contaminated area near Baltimore Harbor—the Masonville Cove Nature Area on the Patapsco River—in a lower-income, high-crime neighborhood, and is continuing its upkeep. Partners such as the National Aquarium have also reached out to students with environmental education, internships and volunteer programs.

THE CITIES

Providence Parks Urban Wildlife Refuge Partnership

PROVIDENCE, RHODE ISLAND

USFWS

Rhode Island National Wildlife Refuge Complex and the Service's Southern New England/New York Bight Coastal Program are working with partners to develop and implement an environmental awareness and education program by bringing messages to more than 100 parks, schools and a zoo.

Forest Preserves of Cook County Urban Wildlife Refuge Partnership

CHICAGO, ILLINOIS

USFWS

This project teaches people about nature and offers opportunities that start in urban neighborhoods and expand to the forest preserves and ultimately, refuges. Partners connect to target audiences in nature-based presentations (birds and habitat restoration), guided bird and nature walks, field trips, outdoor activities and restoration workdays.

Valle De Oro Urban Wildlife Refuge Partnership

ALBUQUERQUE, NEW MEXICO

USFWS

Valle de Oro National Wildlife Refuge and partners will establish an urban presence before the refuge officially opens in 3-5 years. It will include a community garden and conservation education.

Houston Urban Wildlife Refuge Partnership

HOUSTON, TEXAS

MARC REID/HOUSTON WILDERNESS

The Texas Mid-Coast National Wildlife Refuge Complex will work with Houston Wilderness, an alliance of business, environmental and government interests, to create a coordinated conservation presence in the metro area.

Lake Sammamish Urban Wildlife Refuge Partnership

SEATTLE, WASHINGTON

USFWS

This partnership works to increase awareness, understanding and support of the Service and the conservation of aquatic ecosystems and native species at Lake Sammamish State Park and the Issaquah State Hatchery, as well as city parks and trails.

MUSEUM OBJECTS COME TO LIFE

This is the fourth in a series of curiosities of the Service's history from the National Conservation Training Center Museum. As the first and only curator of the museum, Jeanne M. Harold says the history surrounding the objects in the museum give them life.

Ancient Plastic?

One often admired object in the collection is a sideboard or credenza made of elephant bone and ivory. It is beautifully carved with ornate, detailed figures on cartouches along the sides. A woman tried to bring it into the country under the description of "Ming Dynasty plastic." The wildlife inspector was quite sure that plastic did not exist during the Ming Dynasty (1368-1644)! It was confiscated and ended up here. By the way, the drawers are lined in plastic contact paper. I guess this was an attempt to fool us into believing that the Ming Dynasty folks really did have plastic!

No Funny Business

Tucked away in the corner is a suitcase made of ugly yellow metal. Upon opening it, one sees two rows of mallard ducks, each on either half of the case. They are real taxidermied mallards, with their little feet cut off and their bottoms tarred. Back in the day, some hunters used real ducks as decoys to bring in waterfowl. This was common enough that even Abercrombie and Fitch made such decoys, as the metal tag on the case proves. Seems the company made real sporting equipment, in the days before they specialized in teen clothes! My favorite thing about the case, though, is the fact that they separated the boys from the girls in the case. Guess they didn't want any mallard fraternization going on when the case was closed.

Art Meets the ESA – ESA Wins

Ah, art! It can be inspiring, breath-taking, quirky, provocative or just plain weird. We have a few examples of just plain weird. Last year we received two large cases holding a baby Grevy's Zebra and a baby Bactrian camel, both in strange poses. Wearing colorful bows, party hats, dressed-up with endangered birds and harnesses, these unfortunate little creatures were French "artworks" destined to adorn a boutique or gallery in Washington state. Ah, destiny! They were really destined to adorn our museum, because even artists cannot use and abuse species protected by the Endangered Species Act or CITES.

Story Behind the Badge?

A lovely woman named Judy Lawrence donated her father's badge collection to the NCTC Museum early last year. Her father, Charles "Chuck" Lawrence, was the Chief of Law Enforcement from the 1940s through the 1960s. The badges are absolutely splendid, and date from the first half of the Service's lifetime, when it was still part of the Department of Agriculture. One badge, in particular, may be very significant. It dates from 1919–1939, and is bent and riddled with #6 shotgun pellets, It may have been the badge carried by Edgar Lindgren, the first Service Law Enforcement officer to be killed in the line of duty. In 1922, Lindgren approached three men near Big Lake, Iowa, for shooting a bittern out of season. Asking to see their hunting licenses, Lindgren was hit by a shotgun blast. Two of the hunters then shot him at point blank range as he lay disarmed and bleeding on the ground. Lindgren died four days later. No records of his badge number can be found, but the badge has all the right hallmarks, and it would have been available to Charles Lawrence. Oh, what a tale that badge might tell. If you have any knowledge of Lindgren's badge or Charles' collection, please let me know.

pacific

Getting Goosebumps as Nēnē Return to Oahu

Endangered Hawaiian geese, or nēnē, have moved into James Campbell National Wildlife Refuge on Oahu in Hawaii—the first time nēnē have been spotted on the island since the 1700s.

The pair of endangered Hawaiian geese have nested and successfully hatched three goslings on the refuge near Kahuku, Oahu. It is possible more birds will arrive in the future, particularly in places that provide safe and protected habitat such as national wildlife refuges. The nēnē were first observed on Oahu in early January.

The Hawaiian goose was driven to near extinction in the early 1950s. Approximately 30 birds were left in the world—all on Hawaii Island. However, Hawaii's state bird is on the comeback with statewide totals estimated between 2,450 and 2,550 birds on the islands of Hawaii, Maui, Molokai, Kauai and, now, Oahu. Nēnē population increases and recovery are due to cooperative management by federal and state agencies, including the Service, Hawaii Division of Forestry and Wildlife, National Park Service and San Diego Zoological Park. □

USFWS

Nēnē have reared three chicks at James Campbell National Wildlife Refuge on Oahu in Hawaii, the first time nēnē have been spotted on the island since the 1700s.

Reaching Students with Salmon in the Classroom

The Service is committed to working with partners and the public to promote stewardship of natural resources. With that goal in mind, biologists at Spring Creek National Fish Hatchery in the Columbia Gorge in Washington developed the Salmon in the Classroom program.

Twenty years and 29 fish tanks later, this innovative cross-curricular program is going strong, helping students raise salmon from egg to fry stage in their classroom. Service biologists work with teachers to provide guidance at each stage of growth, lead activities that build an understanding of salmon's importance, and foster greater environmental awareness.

For the first time, students in the Portland Public School system engaged with Salmon in the Classroom. Thanks to the support of partners in the Black Parent Initiative, Oregon Youth Development Council and Portland Public Schools, the Service brought this program to the students at Boise-Eliot-Humboldt Elementary School and Chief Joseph-Ockley Green Elementary.

Fourth-graders at Boise-Eliot-Humbolt Elementary visit Spring Creek National Fish Hatchery.

Using a curriculum developed and implemented by the Spring Creek Information and Education Office, Salmon in the Classroom is designed to meet the new standards of education and ties environmental education objectives to the grade level expectations in all subject areas.

Some students blogged about their experience. See Salmon in the Classroom through the eyes of these citizen scientists: <behsalmon.blogspot.com>. □

AMANDA SMITH, External Affairs, Pacific Region

U.S. FOREST SERVICE

Almost 3,000 acres of beetle habitat are being protected at the Muddy Boggy Conservation Bank.

southwest

Conservation Bank Will Help American Burying Beetle

The Muddy Boggy Conservation Bank (MBCB) has been approved as the first conservation bank in Oklahoma and the first bank in the nation to help the American burying beetle.

Conservation banks are permanently protected lands conserved for various at-risk species. Developers can buy credits in a conservation bank if their project will hurt at-risk species or other natural resources. The bank owner then uses the money to protect the resources in the conservation bank, which offsets the original impact. This is often more practical than trying to set aside an area inside the original project.

The MBCB is located where Hughes, Coal and Pontotoc counties meet in south-central Oklahoma. Almost 3,000 acres of beetle habitat are protected, and the bank will offset many of the threats to the beetle, such as habitat fragmentation, loss of native habitat, extirpation and depletion of carrion (needed for food and reproductive success), lack of fire/fire suppression, and closure of forest canopy and understory.

The beetle is a scavenger dependent upon carrion for its lifecycle and must compete with vertebrate and other invertebrate species for food. It lives for one year, is nocturnal, usually reproduces once and undergoes a complete metamorphosis. The beetle buries a small vertebrate carcass, and the female lays eggs beside it. Once, the eggs hatch, the mother moves the larvae to the carcass, which they feed on until mature. Both parents care for the larvae. □

Getting Arizona Wet — Ecological Services Is Creating Wetlands in an Arid Region

Wetlands provide important habitat for fish, wildlife and plants, as well as recreation and wildlife viewing opportunities for many people. In otherwise arid environments, riparian areas and wetlands provide unusually high biodiversity.

Throughout the western United States, approximately 95 percent of wetlands have been altered or destroyed during the last century. The number of wetlands in Arizona has been reduced more than 30 percent. Water diversions and extractions, and agricultural and human development have had the greatest negative impact.

Biologists in the Partners for Fish and Wildlife Program have been collaborating with various Arizona state agencies, communities, landowners, schools and conservation organizations to create or restore wetlands. Three examples of this important work are the Black Canyon City restoration project, the Town of Pinetop-Lakeside and the White Mountain Wildlife and Nature Center project, and the City of Sedona project.

The Black Canyon City restoration project, a cooperative effort involving the Black Canyon Community Association, Arizona Game and Fish Department, Friends of Agua Fria National Monument, National Park Service, Arizona Water Protection Fund, Fred Phillips Consulting, the Service and others, restored approximately 24 acres and more than half a stream mile of the Agua Fria River corridor. The restoration project included invasive species removal, native tree plantings, natural resource education, wetland restoration and the creation of a native fish refuge. The native fish refuge includes an artificial stream and small impoundment. The impoundment and specified reaches of the stream were stocked with desert pupfish, Gila chub, Gila topminnow, loach minnow and

The Pinetop-Lakeside and the White Mountain Wildlife and Nature Center project provides habitat for amphibians, waterfowl, marsh birds and other wildlife.

U.S. FOREST SERVICE

spikedace. Small waterfalls act as barriers between groups of native fishes introduced into the stream and impoundment. As populations of introduced native fish increase, surplus fish will be reintroduced into local streams and rivers or relocated to other refuge locations.

The Pinetop-Lakeside and the White Mountain Wildlife and Nature Center project created wetland habitat and promoted natural resource education. The project included creation of half an acre of wetland habitat, construction of a viewing platform and installation of educational signs. The wetlands currently provide habitat for amphibians, waterfowl, marsh birds and other wildlife. Because of the location, youth and others visiting the White Mountain Meadow Recreation Complex (next to the Nature Center) are exposed to wetland conservation and education.

The City of Sedona project created 27 acres of low elevation wetland habitat using treated effluent in the Verde River Focus Area. This project included conversion of an existing infiltration basin into a 27-acre multiple-celled wetland complex; creation of islands, an artificial stream and different water depths in the wetlands to promote habitat diversity; and addition of wetland plants and riparian vegetation in shoreline areas. Wetland cells will provide habitat for migrating and nesting waterfowl. Deeper water within some cells will provide opportunities for diving ducks and other pelagic species. Riparian vegetation will provide habitat for migratory birds. □

USFWS

A seized ivory collection from an Ohio antiques dealer is valued at up to $250,000.

midwest

The Battle Against Ivory Trafficking in the Midwest

An ivory trafficker and self-proclaimed 20-year antiques dealer from Ohio has been put out of business as federal wildlife inspectors and special agents connected the dots to stop a long-running operation that channeled illegal ivory sales through an online auction and shopping website.

Even though African elephants have been protected internationally for decades, as many as 35,000 elephants are poached annually for the illegal ivory trade. The case in Ohio stems from a two-year investigation that began when Chicago-based wildlife inspectors discovered a series of illegal shipments destined for China, all mislabeled and without the required permits.

The investigation ended with the antiques dealer, of Northwood, Ohio, paying an $8,000 fine, forfeiting an ivory collection valued at up to $250,000 and being ordered to complete two years of community service for violating the Lacey Act.

The investigation revealed that the dealer was a frequent international importer and exporter of elephant ivory and other animal products; however, there was no record of him acquiring the appropriate licenses or paying the appropriate fees for the lawful dealings of these items.

During the investigation, wildlife inspectors intercepted four illegal exports. In all instances, the dealer falsely listed both the value and the contents of the contraband in the packages. In addition, he failed to obtain related licenses and permits, and knowingly misrepresented what he was selling online.

For instance, on May 4, 2011, he claimed to be shipping a wooden handcrafted child's toy valued at $45. The shipment was intercepted by a Service wildlife inspector in Chicago who discovered that the shipment contained an elephant ivory carving. He had earlier sold this ivory carving online to a Chinese purchaser and described the carving as "EXC 19C Chinese Ox Bone Stick and Ball game bilboquette." Ox Bone is commonly used and understood to mean elephant ivory in such online auctions. The item sold for $635.

"Elephant ivory trafficking is devastating Africa's elephant populations. Illegal exports from the U.S. only fuel the demand and further imperil elephants," says Special Agent in Charge Gregory Jackson. □

Learn more about wildlife trafficking at <1.usa.gov/UVdiA0>.

TINA SHAW, External Affairs, Midwest Region

southeast

Keeping Lands Open for the Georgia Aster

As part of a large partnership effort across the Southeast to conserve at-risk plants and animals before federal protection is needed, the Service signed a Candidate Conservation Agreement with eight partners in May that may help keep the Georgia aster off the federal endangered species list.

Georgia aster is a widespread, but uncommon, plant found in the upper Piedmont and lower mountain regions of Alabama, Georgia, North Carolina and South Carolina. In 1999, the Service made the Georgia aster a candidate for inclusion on the federal endangered species list, meaning it warranted listing, but other species were a higher priority.

"We've brought together many of the key landowners who can collectively determine the future of this plant," says Dr. Mara Alexander, a Service botanist coordinating this effort to conserve the rare aster. "We've outlined a land management approach that meets their needs as landowners and supports Georgia aster."

Candidate Conservation Agreements are designed to conserve plants and animals, which are candidates for the endangered species list. Signatories to the Georgia aster agreement are the Service, Clemson University, Georgia Department of Natural Resources, Georgia Department of Transportation, Georgia Power, Mecklenburg County Park and Recreation in North Carolina, the National Park Service, North Carolina Department of Agriculture & Consumer Services, and the U.S. Forest Service. Each signatory agrees to undertake conservation actions that collectively remove the need to place the plant on the endangered species list. Commitments include:

- Searching for new populations,
- Monitoring known occurrences to estimate range-wide population trends,
- Keeping forests with Georgia aster thinned to a level that provides ample sunlight,
- Avoiding mowing rights-of-way from late spring to mid-fall, when Georgia aster is at its tallest and reproducing,
- Cutting to no less than four inches when rights-of-way are mowed, and avoiding operating machinery on wet soils to reduce soil compaction,
- Avoiding spraying herbicides in or near Georgia aster populations, and
- Marking populations to avoid inadvertent damage during right-of-way maintenance.

Cooperators to the agreement who are assisting in the conservation of the Georgia aster are the Heritage Programs of Alabama, Georgia, North Carolina and South Carolina, the Atlanta Botanical Garden, North Carolina Botanical Garden, State Botanical Garden of Georgia, The Citadel, The Nature Conservancy and the U.S. Army Corps of Engineers.

The Georgia aster was once more common across the Southeast, living in open savanna and prairie communities. Extensive wildfire control and the disappearance of large, native grazing animals left nothing to keep these areas open and grassy. As a result, forests have largely taken their place on the landscape. This decline in savanna and prairie habitat led to a decline in the plants and animals that depended on these areas. Conserving this species today involves working to keep parts of the land open through the use of prescribed fire.

For more information about the Southeast's At-Risk Species Conservation Strategy, go to <1.usa.gov/1nSZ9Nh>.

The Georgia aster needs open land to grow.

GARY PEEPLES, Asheville Ecological Services Field Office, Southeast Region

JEREMY MARKUSON/USFWS

A bog asphodel in bloom in New Jersey.

northeast

Search Reveals Lilies Among the Pines

The bog asphodel is a perennial flowering herb that grows along streams and in mucky soils in Pinelands National Reserve in New Jersey. A member of the lily family, it produces bright yellow flowers in the summer and reddish-brown seed capsules in the fall. Its scientific name, from the Greek *narthecion*, means a chest or box to store ointments.

In 1990, the Service determined this plant was a candidate for protection under the Endangered Species Act, meaning that adding the species to the federal list of endangered and threatened plants was warranted, but the Service needed to first protect species at greater risk of extinction.

Scientists actively searched the pinelands for bog asphodel populations and, to their surprise, they found this lily growing in many more places than was previously known!

From 2004 to 2012, the New Jersey Department of Environmental Protection and Raritan Valley Community College searched 112 miles of potential habitat in New Jersey and found 33 new populations of bog asphodel. Based on these surveys, the total number of populations increased 57 percent, and the area of known populations of bog asophodel increased 86 percent.

Better yet, these analyses found populations to be relatively secure from direct threats of habitat destruction, with 94 percent of populations occurring on public lands, and more than 96 percent occurring within the boundaries of the state and federal Pinelands Reserve.

Over the last 20 years, frequent monitoring activities, research studies and increases in regulatory protections have improved the understanding and outlook for the bog asphodel. After collecting all this information, the Service concluded that the species is secure in its current range and is no longer a candidate for Endangered Species Act protection.

JEREMY MARKUSON, New Jersey Ecological Services Field Office, Northeast Region, and KAREN MIRANDA, Fire Management Branch, National Wildlife Refuge System, Headquarters

Missisquoi National Wildlife Refuge Designated as Ramsar Wetland of International Importance

The Service's Lake Champlain Fish and Wildlife Resources Office and Missisquoi National Wildlife Refuge worked with the Vermont Fish and Wildlife Department to designate the refuge and three State Wildlife Management Areas as a Wetland of International Importance under the Ramsar Convention on Wetlands.

The Ramsar Convention is an international treaty signed in Ramsar, Iran, in 1971 that guides voluntary international protection of wetlands. Wetlands provide many benefits to their communities, including clean water, flood abatement, wildlife habitat, recreation, tourism, fishing and more. A designation can mean more economic benefits through fishing, tourism and other recreation.

The Missisquoi Delta and Bay Wetlands site is the first Ramsar wetland in Vermont. It encompasses 7,665 acres, and includes the Missisquoi Refuge and the Maquam, Carmens Marsh and Rock River Wildlife Management Areas.

To qualify as a Wetland of International Importance, the Missisquoi staff pointed out that their wetlands:

- Provide habitat for up to 20,000 waterfowl during migration, the largest concentration of waterfowl in Vermont, and for such at-risk species as the eastern spiny softshell turtle, seven species of mussel and the lake sturgeon;

KEN STURM/USFWS

The Missisquoi Delta and Bay Wetlands provide habitat for the largest great blue heron rookery in Vermont.

- Are home to the largest great blue heron rookery in Vermont;
- Are the only known breeding site for black terns in Vermont;
- Include the largest and perhaps highest quality silver maple floodplain forest in Vermont as well as natural and managed marshes of wild rice, buttonbush and tussock sedge; and
- Protect the Maquam Bog, the largest bog in Vermont and one of the largest ombotrophic, or rain-fed, bogs in New England, which harbors a rare pitch pine plant community, the only example of this natural community type in Vermont.

There are 35 other designated sites in the United States and more than 2,000 around the world. Missisquoi is the 20th national wildlife refuge to be designated under the Ramsar Convention.

mountain-prairie

Organizations Join Forces to Support Conservation in the Prairies

A coalition of conservation organizations has launched a coordinated, partner-driven "Prairies Conservation Campaign" to bring public attention to the dramatic conversion of grasslands and wetlands to cropland in one of America's last intact grassland ecosystems—the Prairie Pothole Region.

The Prairie Pothole Region runs from central Iowa, northwest through Minnesota, North Dakota, South Dakota and Montana into Canada.

"More than 50 percent of North American migratory waterfowl depend upon the mix of wetlands and grasslands found in the Prairie Pothole Region," says Noreen Walsh, Regional Director for the Service's Mountain-Prairie Region, a partner in the campaign. "This area is called America's duck factory because it is the most productive area for nesting waterfowl on the continent, perhaps the world. These prairies and all the wildlife that they support are currently stressed by many factors acting together to threaten our natural heritage. By joining together as stewards, we can shed light on this problem and find solutions."

Beyond conversion to cropland, stressors include a changing climate.

In addition to being necessary to wildlife, prairie grasslands interspersed with wetlands provide numerous societal benefits, including filtering water, reducing erosion and sedimentation, and absorbing flood waters.

Among other goals, the campaign seeks to create grassroots awareness in the region about landowner conservation programs and tools available to help prevent the loss of grassland. While this strategy primarily focuses on stakeholder cooperation in local communities, partner organizations invite the public to follow and participate in the conversation online using the **#ConserveThePrairies** hashtag.

One of the campaign's primary goals is to increase opportunities for voluntary incentive-based

The Prairie Pothole Region, with its mix of wetlands and grasslands, is a magnet for breeding ducks.

USFWS

tools to keep livestock producers profitable and therefore prevent conversion to cropland. This will ensure that the region has healthy fish and wildlife populations and healthy soil and water resources, as well as ensuring that ranch families will always be an integral and profitable component of the region's economy.

Partner organizations include the Service, Ducks Unlimited, World Wildlife Fund, Delta Waterfowl, North Dakota Game and Fish Department, South Dakota Game, Fish and Parks, Pheasants Forever, and North Dakota Natural Resources Trust.

More information is available at <1.usa.gov/1j5vvTc>. □

USFWS

The Service determined that the polar bear is a threatened species because of the ongoing loss of sea ice habitat from global climate change.

alaska

Getting at the 'How' of Polar Bear Conservation

The Service is working with a diverse group of stakeholders to draft a plan to conserve the polar bear in the United States over the next century. The plan, when finalized, will guide Service activities for polar bear conservation in response to the Service's 2008 determination that the polar bear is a threatened species because of the ongoing loss of sea ice habitat from global climate change.

"We are working with our partners here in Alaska, throughout the U.S., and internationally to address all threats to polar bears," says the Service's Alaska Region Regional Director Geoffrey Haskett. "The team we have convened to develop the United States' conservation management plan includes a diverse array of perspectives about polar bears, but the one thing everyone can agree on is that polar bears should be conserved, the question is 'how?'"

The plan will meet legal obligations under the Endangered Species and Marine Mammal Protection acts, and will contribute to a global plan being drafted by the parties to the 1973 Agreement on the Conservation of Polar Bear—United States, Canada, Russia, Norway and Greenland/Denmark—the five polar bear range states.

The Polar Bear Recovery Team —as the group is known— consists of 35 representatives from federal agencies, the State of Alaska, the North Slope Borough, Alaska Native organizations, industry, nonprofit organizations and the Canadian Wildlife Service. Team members have expertise in polar bear biology, climate science, policy, communications, and traditional and contemporary indigenous ecological knowledge. The team's goal is to have the draft available for public comment period in late fall and a final plan to present to international partners at their 2015 meeting.

"The Service received over 700,000 public comments during the listing process, so we know the public has a great interest in the fate of polar bears," Haskett says. "The public will have a similar opportunity to weigh in on how we continue to conserve and manage polar bears into the future as outlined in the plan."

Sharing a Bird's Eye View of the Arctic Coast

An eye-popping project called Alaska ShoreZone makes it possible to "fly" along Alaska's northern coasts without ever leaving your house, and staff from Selawik National Wildlife Refuge are getting the news out, attending tribal council meetings in the Iñupiaq villages of Noorvik and Buckland to familiarize council and community members with ShoreZone.

In the summer of 2012, the ShoreZone team flew along Alaska's entire coastline from a helicopter at low tide, taking aerial photographs every second along with continuous video.

Because online viewing of these images is difficult with the slow Internet speed in rural Alaska, Selawik Refuge worked with the ShoreZone team to produce CDs with photos of nearby coastal areas for communities on or adjacent to the refuge. Refuge staff then combed through hundreds of these photos to select the best ones for sharing with the tribal councils as examples of what ShoreZone offers.

With beautiful spring weather, staff traveled by snowmobile to the village meetings, getting a chance to explore the refuge on the ground while delivering an important message to a local audience.

Alaska ShoreZone is funded by more than 20 partners, including the Service and Alaska's Landscape Conservation Cooperatives.

These images are available to all for free online viewing at <goo.gl/aQfvY8>.

ALASKA SHOREZONE

This sandy point near the mouth of Selawik River is called Singiagruk. It's an important humpback whitefish spawning area and traditional subsistence site.

CINDY SANDOVAL/USFWS

The sun sets on the Collins Ranch area of Ash Meadows NWR.

pacific southwest

Ash Meadows National Wildlife Refuge Once Home to Whiskey Bootleggers

As their cars crisscross the refuge roads along desert springs and seeps at Ash Meadows National Wildlife Refuge in the Mojave Desert in Nevada, many travelers may not realize they are driving past a former bootlegger's paradise.

In January 1920 the 18th Amendment made the manufacture, sale and transportation of "intoxicating liquors" illegal within the United States. As the government tried to eradicate alcohol consumption, portions of the public started to sidestep federal Bureau of Prohibition agents and build stills to brew alcohol. For a successful business bootleggers needed two things, privacy and water. Ash Meadows had both.

Fresh water springs dot the harsh, dry Ash Meadows lands. The area is still fairly desolate, but was especially empty in the 1930s. The landmarks that surround the area and present day refuge include Death Valley to the west and the Funeral Mountain Range. These ominous formations and a reputation for outlaw hideouts kept unwanted visitors away. According to local lore, even the sheriff of nearby Tonopah was too scared to venture into Ash Meadows after bootleggers.

Steve Collins was a typical farmer in the area, and a northern portion of Ash Meadows NWR still bears the name Collins Ranch. He sold chickens, eggs and produce to workers in nearby mining camps, but he also had a side business. In 1932 Collins applied to the Nevada State Engineers for more water to irrigate his fields, and the state approved the request. But Collins had other plans for this water, making whiskey. Along with providing the vapor used to make and vent alcohol, the spring water that seeped out of Collins Ranch had slowly formed a small canyon over many years, and this canyon would provide cover for Collins' still.

"The area became known as Whiskey Wash as Collins used the canyon to hide the still used for bootlegging," says Refuge Manager Sharon McKelvey. *The Nevada West & Pahrump Valley Times* reported that Collins' still was so well made that after prohibition ended, it was sold to a legitimate brewing company.

Today, little remains of the area's bootlegging past but legends and rusting whiskey barrel rings. Other Ash Meadows legends tell the story of bootleggers hiding their product in sand dunes to avoid detection, but when they returned, the ever-shifting dunes had swallowed the alcohol forever. Still others say that Collins was actually Jesse James hiding out in Nevada looking for a fresh start.

These stories cannot be verified, and as time passes the stories, much like the rings, are buried and forgotten. But they provide a colorful past for the desert oasis known today as Ash Meadows NWR. □

Cindy Sandoval, External Affairs, Pacific Southwest Region

transitions

Headquarters

Donna Brewer, who worked at the National Conservation Training Center since 2001, retired in April. Donna was also a member of the Service's National Climate Team, and worked closely with the Office of the Science Advisor and the Landscape Conservation Cooperatives to develop science-based capacities within the agency and with partner organizations. Donna was essential to the development and expansion of NCTC's climate change program. She helped create a widely recognized, state-of-the-art curriculum addressing conservation issues posed by climate change and launched an ongoing effort to incorporate climate change broadly into Service training courses.

Before the Service, Donna held conservation positions with the University of Southern California, Bureau of Land Management, California Department of Fish and Game, Minerals Management Service, National Marine Fisheries Service and the U.S. Geological Survey.

In 1997, Donna and her husband completed a six-year circumnavigation of the world in their 44-foot sailboat—46,000 sea miles, 38 countries, 743 anchorages and 232 islands.

She has bachelor's degree in Biological Sciences from University of California, Irvine, and a master's from California State University at Long Beach. □

4 Retirements Cost HQ External Affairs Nearly 150 Years

As winter turned to spring, External Affairs in Headquarters lost nearly 150 years of federal service with the retirements of four longtime employees.

Craig Rieben, a public affairs specialist, retired after a 40-year Service career. He started on March 31,1974, in Anchorage, Alaska. Before that, he worked as a news reporter for a Salt Lake City, Utah, television station, covering environmental and science-related issues.

Craig's first Service job was working on informational materials about potential refuge units and expansion of existing ones to be made under the Alaska Native Claims Settlement Act. When Craig started some of the issues the Service was wrestling with included wolves, grizzly bears and trade in wildlife products (sound familiar?).

He came to HQ in 1983 after time as a public affairs officer in the Alaska and Southeast regional offices. He served as Chief of Public Affairs and most recently Chief of Internal Communications. Like many longtime Service employees, Craig played the important role of mentor to many junior staff in Public Affairs, and the staff speaks warmly of Craig's calmness and patience in the fast-paced world of communications.

That quality was put to the test in 1989 when he returned to Alaska on a detail to handle communications related to the Exxon Valdez oil spill, something he calls his favorite moment with the Service.

Now that he is retired Craig says he "needs to check on a dozen grandkids scattered across the country and take them fishing." He'll also be moving to Lynchburg, Virginia, and revisiting long-neglected hobbies such as sailing, flying airplanes, fishing and amateur radio.

He calls the Service an "outstanding agency," and says "it has been a privilege to work with people dedicated to wildlife and natural resource conservation for so many years."

Craig served as editor in chief and editorial adviser to the *Fish & Wildlife News* over the years.

Also retiring from EA:

Pete Maccini, a printing services specialist, with 38 years at various Department of the Interior agencies, nearly 17 at the Service, enjoyed "helping folks accomplish their end goal, by producing a quality printed product—be it a full color vibrant poster or a dull black and white technical report."

In retirement, he plans to unwind and play catch-up on some projects around the house. He also wants to spend time with his son before he heads off to college.

He will miss the talented and dedicated folks at the Service, "who always pulled together to get the job done no matter how un-realistic the deadline."

Jan Miller, an information specialist, served 30 years, most with the Service. Her favorite part of the job was writing, researching and editing.

Jan will also miss her colleagues and bringing the people who answer the toll-free Service phone number up to speed on Service issues.

She has plans to stay busy. Other than various projects in her house and yard, Jan has two trips planned already: one to El Salvador in July and another to Girl Scout National Convention in Salt Lake City in October. She also hopes to become more involved in church, community and Girl Scout activities, increase her involvement in Leave No Trace and Project WILD, and take on volunteer opportunities as they come up.

Lavonda Walton, a photographer, enhanced releases, stories and other materials with pictures for 33 years, the last 27 with the Service.

Lavonda says editing photos was her favorite part of the job, although getting the perfect shot was good, too.

She'll miss looking at the beautiful wildlife photos she worked on.

In retirement, she plans to practice the three Rs: Rest, Relaxation and Reflexology (she is a provider).

Thank you, Craig, Pete, Jan and Lavonda, for your service. Your skill and advice are missed. □

Senior Biologist **Michael Carpenter** retired in February after 20 years with the Service's International Affairs Program in the Division of Management Authority (DMA), Branch of Permits. With a B.S. (Biology) and M.S. (Ecology) from Bowling Green State University in Ohio and Ph.D. work in terrestrial vertebrate ecology at Arizona State University, Mike has enjoyed an adventurous career as a field biologist and zoologist.

He served as a roving ranger for the National Park Service in Arizona and conducted terrestrial vertebrate surveys for the Atomic Energy Commission on irradiated Central Pacific atolls. He had more than a decade of hands-on experience as a zoo biologist at the Phoenix Zoo and Brookfield Zoo, and he taught the Biology of Zoological Gardens for five years at Scottsdale Community College in Arizona.

He represented the Service abroad on missions to China, Russia and Canada, providing leadership and scientific expertise in the development and implementation of permitting programs for endangered and threatened species, in particular giant pandas and argali. He managed the Captive-Bred Wildlife Registration program and promoted robust relationships with the zoological community, representing the Service on key Species Survival Plan groups and offering regular presentations and expert guidance at annual meetings of the Association of Zoos and Aquariums and Zoological Registrars Association.

Beneficial Burn

Firefighter Connor Bowden uses a driptorch to ignite a portion of a 704-acre prescribed fire at Florida Panther National Wildlife Refuge. In South Florida, lightning fires have always been a regular occurrence. But when lightning fires happen now, they can threaten human life, property and critical infrastructure such as interstates and highways. The prescribed fire reduces the likelihood of a catastrophic wildfire impacting I-75 and State Road 29. Also, the burn maintains critical habitat for threatened and endangered species such as the Florida panther.

Mike mentored and supported DMA biologists learning ESA permitting processes and advised graduate students working on international conservation policy projects. He has traveled the world and is an accomplished photographer and birder, and looks forward to adding to his life lists of bird species and countries visited. □

Southeast

Lorna Patrick, with the Panama City Ecological Services Field Office in Florida, retired March 3 after working for the Service for 36 years. She started out as a co-op student in Vero Beach, Florida, worked brief stints in the fisheries program and at St. Marks National Wildlife Refuge, and then spent the majority of her career at the Panama City Ecological Services Field Office. While in Panama City she became a champion for coastal conservation. She led recovery efforts for many coastal species and became a recognized expert in sea turtles and artificial lighting. She played major roles in the Deepwater Horizon oil spill response and in various cold-stunning events affecting sea turtles. For the last three and a half years, she served as a regional listing biologist, and was the office's "go-to" person for numerous challenging actions, including the loggerhead sea turtle critical habitat revision and the listing and critical habitat designations for the Neosho mucket and rabbitsfoot mussels. She plans to spend her retirement on the couch…" for a while anyway," Lorna adds. □

Pacific Southwest

Polly Wheeler has taken over as Assistant Regional Director for the National Wildlife Refuge System in the Service's Pacific Southwest Region. The position was formerly held by Marge Kolar, who retired last year.

Polly comes to the office in Sacramento, California, after nearly three years as Deputy Chief of Refuges for the Alaska Region. In her new role, she oversees 50 wildlife refuges in California, Nevada and the Klamath Basin of Oregon, totaling more than 2 million acres of habitats.

She started her career as a researcher with private organizations in Fairbanks, Alaska, including one that was her own business. She went on to join the Alaska Department of Fish and Game, where she worked on Alaskan subsistence issues. That work led her to the Service's Alaska Region, where she continued subsistence work and eventually moved over to the Refuge Program.

In addition to her full-time professional employment, Polly has extensive experience teaching at the college level. Her teaching skills helped the Service, as she's served as an instructor at the National Conservation Training Center in West Virginia on numerous occasions since joining the agency.

She received a master's degree in Anthropology from the University of Alaska in Fairbanks and a doctoral degree in Anthropology from the University of Alberta.

Polly is married and has two dogs. When she isn't in the office, she can often be found pursuing her passion for running. □

honors

Headquarters

The Service's **Aquatic Animal Drug Approval Partnership Program** (AADAPP) Research Program was honored with the Service's Rachel Carson Award for Scientific Excellence (Group). The program generates high-quality data to support fish drug approval, making safe and effective fish drugs available to fisheries professionals. AADAPP staff—James Bowker, Molly Bowman, Dan Carty and Niccole Wandelear—are fish biologists with specialized skills and are leading experts in the country on conducting research and generating fish drug approvals in the United States. AADAPP is part of Headquarters but is physically located in Montana. □

In March, **Karen Miranda Gleason**, communication coordinator for the Branch of Fire Management under the National Wildlife Refuge System, completed the oral Readiness Review and passed the written Examination for Accreditation in Public Relations (APR), reflecting 16 competency areas in the field. APR is a voluntary certification program for public relations professionals, administered by the Universal Accreditation Board, a consortium of nine leading industry organizations, including the Public Relations Society of America (PRSA). □

Dr. Rosemarie Gnam, chief of the Division of Scientific Authority in the International Affairs Program, received Honorable Mention for Service's Science Leadership Award. Dr. Gnam provides scientific support for the implementation of the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES). Her work and leadership have been demonstrated both domestically and internationally in the protection of many species including sharks, red and pink corals, Bluefin tuna, paddlefish, tortoises and freshwater turtles, polar bears, and American ginseng. □

Jo Ann Mills of the Service's National Wetlands Inventory was honored by the Association of State Wetland Managers with the Dan Willard Ruby Slippers award. Jo Ann is only the third recipient of this award, given to individuals who have demonstrated outstanding dedication to protecting the nation's wetlands. She was recognized:

- For being our friend and helping us over the years,
- For being an outstanding wetland professional,
- For bringing practicality and good sense to wetland mapping,
- For helping us realize we have everything we need right here, and
- For reminding us there is nothing like friendship and no place like home.

The Association of State Wetland Managers is a nonprofit membership organization established in 1983 to promote and enhance protection and management of wetland resources, to promote application of sound science to wetland management efforts, and to provide training and education for members and the public. Members and partners include states and tribes, federal agencies, nonprofit partners, wetland professionals, educators and wetland enthusiasts. The main goal is to gain a better understanding of wetlands and how to protect, conserve and restore these resources throughout the nation.

During her 30-year Service career, Jo Ann Mills worked in headquarters in Endangered Species, International Affairs, Law Enforcement and Program Development Staff for Wildlife. She retired this spring after 20 years of service to the National Wetlands Inventory. She performed all the Headquarters work associated with budget and performance, and provided support and guidance to the regional and the Coastal Barrier Resources Act staff. Beyond her budget analyst duties she took on the additional role as National Wetlands Inventory's national coordinator. In this role she coordinated and disseminated information and data to and from the NWI regional staff, wetland stakeholder groups and the Federal Interagency Floodplain Management Task Force. She has been an outspoken and tireless advocate for wetlands and the species dependent on them, and will be missed. □

Pacific Southwest

Andy Yuen, project leader for San Diego National Wildlife Refuge Complex in California, was named the 2014 Paul Kroegel Refuge Manager of the Year by the National Wildlife Refuge Association for his conservation vision and ability to give his staff the space to learn, grow and do great work. The award recognizes Yuen for his accomplishments in protecting and managing the Seal Beach, Tijuana Slough, San Diego Bay and San Diego National Wildlife Refuges in southern California. Yuen has been the San Diego NWRC project leader since 2005. A key to Yuen's success is partnerships.

Throughout his tenure, he has worked closely with other agencies, organizations and stakeholders to build trust and combine resources to accomplish goals. For example, in 2012, Yuen's leadership contributed to the addition of Hidden Valley, a 1,905-acre conservation area, to the San Diego NWR. The addition of the Hidden Valley tract was accomplished through close partnering with diverse stakeholders, including the San Diego Association of Governments, Department of Homeland Security, California departments of Transportation and Fish and Wildlife, and The Nature Conservancy among others.

Yuen began his career with the Service in his native Hawaii in 1984 in the Student Career Experience Program. In 1992, Yuen helped to establish Kealia Pond National Wildlife Refuge and Guam National Wildlife Refuge. Even after leaving Hawaii, his work there set the stage for the establishment of Oahu Forest and Palmyra Atoll National Wildlife Refuges. He also was one of the first Service managers to provide work experience opportunities for wounded military service members as they re-entered the civilian workforce. □

Northeast

Dr. Jess W. Jones, a national leader in freshwater mussel conservation and restoration based in Virginia, has received the Service's 2013 Rachel Carson Award for Scientific Excellence (Individual) for his "exemplary scientific contributions to achieving extraordinary results in fish and wildlife conservation." Dr. Jones works with the latest technology to breed and raise juvenile mussels at Virginia Tech's Freshwater Mollusk Conservation Center for release in the Clinch and Powell rivers. Dr. Jones and his partners have released hundreds of thousands of hatchery-reared mussels to restore one of the nation's most biologically diverse ecosystems. In 2010, his team released 2,500 endangered oyster mussels. □

Dr. Mike Millard, director of the Service's Northeast Fishery Center in Lamar, Pennsylvania, is one of six scientists selected by the International Union for Conservation of Nature to assess and make recommendations on the status listing for horseshoe crabs. Millard has led the Service efforts on horseshoe crab conservation for more than a decade, and along with other Service biologists has made great strides in formulating sustainable management practices for the species. He traveled to Hong Kong and Taiwan where he contributed to a symposium for transferring ideas learned with local species to help conserve imperiled Asian horseshoe crab species. With the help of Millard and his U.S. colleagues, that international effort led to strategies to raise awareness for the imperiled Asian species.

The IUCN is a global authority on imperiled species and has a unique classification system for evaluating the conservation status of animal populations. The team of scientists on which Millard serves will make a recommendation on the species' status to the IUCN to ensure horseshoe crab populations are not overexploited.

Horseshoe crabs are harvested for use as bait, as well as for globally important purposes in the biomedical industry. At the same time, horseshoe crab eggs are a major dietary component of migrating shorebirds. The team's recommendations to the IUCN for a final decision will reflect the status of the North American population as a whole, and could affect both the commercial harvest industry and shorebird conservation efforts. A team of Asian scientists is working on recommendations for the three Asian species of horseshoe crabs. □

John Organ, division chief of the Wildlife and Sport Fish Restoration Program for the Service's Northeast Region, has received the Wildlife Management Institute's 2014 George Bird Grinnell Memorial Award for Distinguished Service to Natural Resource Conservation.

"Over the course of his 35-year career, John has relentlessly driven to make worthwhile contributions to the natural resource profession, and he has done so with great energy and little focus on recognition," said Wildlife Management Institute President Steve Williams, a former Service Director, in presenting the award. Williams further applauded Organ for his dedication to promoting "the role of hunting in wildlife conservation, science-based resource management, wildlife diversity, international conservation and irreproachable professionalism."

The Service's Northeast Region Regional Director Wendi Weber calls Organ "a consummate professional and valued colleague who exemplifies the meaning of public service." Weber adds, "He is an expert on a range of species and subjects—ranging from Canada lynx, river otters,

The Morning Commute

March did not head out like a lamb for these Service biologists with the Montana Fish and Wildlife Conservation Office and staff from Red Rock Lakes National Wildlife Refuge. They were braving the elements to find a suitable location for installing a fish trap to monitor Arctic Grayling on Red Rock Lakes Refuge in Montana.

spotted-necked otters, beaver, adaptive management, human dimensions, wildlife education, wildlife policy, leadership and wilderness. Conservation is not his vocation; it is his life's passion."

To many in the profession, Organ's seminal contribution to North American conservation has been his work to describe, advance and promote the North American Model of Wildlife Conservation. He is considered by his peers to be perhaps the single most knowledgeable living professional who understands the history and heritage of wildlife conservation in North America.

Organ received his Ph.D. in wildlife biology from the University of Massachusetts, Amherst, where he serves as adjunct associate professor of Wildlife Ecology and Conservation. □

Midwest

Dr. Lisa Williams, the branch chief of Environmental Contaminants at the East Lansing Ecological Services Field Office in Michigan, is the 2013 recipient of the Service's Science Leadership Award, which recognizes a Service employee's outstanding practice and support of scientific activities that improve the agency's knowledge and management of fish and wildlife resources. Dr. Williams served as the Assistant Deputy Branch Director for Wildlife Response-Houma Sector of the Deepwater Horizon Spill and as Branch Director and Deputy Branch Director for Wildlife and Environmental Assessment for the Michigan Enbridge Line 6B Pipeline Spill, the nation's largest inland oil spill. During those crises, Dr. Williams used ecologically, scientifically sound and acceptable practices and principles leading to effective and efficient response measures for both spills. The award also recognizes that Dr. Williams regularly mentors, guides and advises staff, helps develop future biologists and ensures that Service biologists are analyzing and presenting scientific results relevant to important issues. □

Servicewide Awards

The Service honored four 2013 Champions of Diversity for valuable strides toward inclusiveness at all levels.

Ron Wong of the Pacific Region won the Champion of Diversity Leadership Award for his work with veterans and students as manager of Quilcene National Fish Hatchery in Washington.

The 2013 Champion of Diversity Individual Award went to **Angela Okolie** (seen accepting her award from Deputy Director Rowan Gould), the chief technology officer of Ecological Services at HQ, who developed and implemented Temporary Assignment Programs with the Virginia Department of Rehabilitative Services and with Operation Warfighter.

Aaron Martin and **Neesha Stellrecht** of the Fairbanks Fish and Wildlife Office in Alaska received the 2013 Champion of Diversity Group Award. Martin, a supervisory fish and wildlife biologist in the Subsistence Fisheries Branch, and Stellrecht, a fish and wildlife biologist in the Endangered Species Branch, have reached out to Alaska native youth through career fairs to interest diverse candidates in Service careers.

Nominees for the awards should also be congratulated. They are:

Nate Hawley, career awareness branch chief at the National Conservation Training Center.

Cynthia Williams, Southeast Region Fisheries Program supervisor of the Fish and Wildlife Conservation Offices and the Warm Springs Fish Technology and Fish Health Centers.

Margaret Byrne of the Northeast Region, manager for the Hudson River Natural Resource Damage Assessment and Restoration.

Robyn Bortner of the Mountain-Prairie Region, fish and wildlife biologist, National Black-footed Ferret Conservation Center.

Steve Miller of the Alaska Region, fisheries biologist for the Kenai Fish and Wildlife Field Office.

Akimi King of the Pacific-Southwest Region, fish and wildlife biologist, at the Klamath Falls Fish and Wildlife Office.

Noemi Perez, Nontraditional stakeholders and media director in the Office of Partnership Liaison in HQ External Affairs.

Career Discovery Internship Program Mentors: In the Midwest Region, Ann Marie Chapman, Vicki Sherry and Mary Stefanski; in the Southeast Region, Stephen Gard, Gisella Burgos, Kary Allen, Greg McGinty and Rolf Olson; in the Northeast Region, Mao Lin, Monica Williams, Juancarlos Giese, Mariana Bergerson, Daffny Pitchford, Kofi Fynn-Aikins and Karrie Schwaab; and in the Alaska Region, Reneiase Bagsby, Lisa Hupp and Michelle Ostrowsk.

Recovery Implementation Program honorees with Secretary of the Interior Sally Jewell (center) and Service Deputy Director Steve Guertin (far right).

Pauline Borquez, David Laveau and Pam Busch in Division of Financial Operations in Denver, Colorado.

Janine Van Norman, Amy Brisendine, Ellen VanGelder, Emily Weller and Jessi Evans in the Branch of Foreign Species, HQ Ecological Services.

Four Service-nominated partnership projects were among those honored with the Department of the Interior's **2013 Partners in Conservation** awards for exemplary natural resource conservation efforts through public-private cooperation. The projects involve nearly 60 individuals and organizations; they are:

- The **Great Plains Nature Center** in Wichita, Kansas, which provides outdoor recreation and educational opportunities to hundreds of thousands of visitors. It serves as an outdoor education center for the City of Wichita, a regional office for the Kansas Department of Wildlife, Parks and Tourism, and an administrative site for the Service.

- The **Edwards Aquifer Recovery Implementation Program** (pictured above) in south Texas brings together a diverse group to balance water demands for species found nowhere else in the world and for more than 2 million area residents.

- The **Klamath Tribal Leadership Development for Integrative Science and Traditional Ecological Knowledge Program** in northern California and southern Oregon lets tribal youth combine their tribal ancestral cultural knowledge about the local ecology and resources with the high-tech capabilities of NASA and federal natural resource agencies.

- The **Center for Land-Based Learning Partnership** in Sacramento, California, gives high school students the opportunity to take part in a yearlong habitat restoration experience combining hands-on conservation with classroom learning. Students participate in restoration projects such as planting native trees, shrubs and grasses, installing irrigation and wildlife habitat structures, and monitoring plant and wildlife populations.

The Service was also named as a partner in these other winning projects:

- The **Cienega Watershed Partnership**, which promotes understanding and stewardship of the natural and cultural resources of the more than 45,000-acre Las Cienegas National Conservation Area southeast of Tucson, Arizona.

- The Service's **Arizona Ecological Services** was recognized for contribution to a historic, binational treaty agreement for the operation of the Colorado River. "Minute 319" has been touted as one of the most innovative negotiated agreements between nations to include environmental river flows.

- The **Desert National Wildlife Refuge Complex** was honored for work in the Cultural Resources Team of the Southern Nevada Agency Partnership to raise awareness of, and respect for, the historical significance of local history and tribal culture.

- The Service was named as a key partner in the **Huron-Erie Corridor Initiative Partnership**, which built three fish spawning reefs in the Detroit and St. Clair rivers.

- Finally, the Service was also commended for its role in the **Truckee River Watershed Partnership** in California, which is working to restore the threatened Lahontan cutthroat trout and the endangered and tribally sacred Cui-ui sucker fish.

Alaska

Poppy Benson (pictured above with junior birder Rachel Bolin), refuge ranger and interpretive and education specialist for Alaska Maritime National Wildlife Refuge in Homer, received the Alaska SeaLife Center Marine Science Outreach award, recognizing her achievements in ocean science, education and resource management. "Lots of people have good ideas, but not everyone has the energy to see them to fruition," Steve Delahanty, refuge manager at Alaska Maritime NWR, told the *Homer Tribune* in January. "Poppy is the Energizer Bunny of the maritime refuge." Benson is credited with creating the visitor services program at the refuge, and she developed many programs to connect people and nature, including camps for children of remote Alaskan villages. She also is one of the founders of the Kachemak Bay Shorebird Festival. In addition to the Service, during her 38-year career, Benson has worked with the U.S. Forest Service, the Bureau of Land Management. □

Bill Rice of the Alaska Region reeled in national recognition for improving fish passage and increasing community resilience to flood events when he received the 2013 National Fish Passage Program Field Biologist of the Year award. This award is given each year to one Service employee in recognition of their exceptional contributions to the mission of the Service's National Fish Passage Program. "Bill's work helps support what all Alaskans love to do most—fish! We are proud of Bill's accomplishments, as well as our other staff and local partners involved with fish passage projects," says Regional Director Geoff Haskett.

Rice has been working collaboratively with local communities for more than a decade to design and construct fish-friendly road-stream crossings that also reduce the risk of flood damage, support construction jobs and help sustain community economic benefits associated with salmon. One of only seven fish passage engineers in the entire agency, Rice has a rare combination of hydrologic, engineering and interpersonal skills that he uses to build lasting partnerships that are actively improving fish passage in Alaska. He also shares his expertise outside Alaska to ensure that actions consider the needs of fish and other community needs. □

Southeast

The Service presented its first National Fire Safety Award to **Rocky Chesser**, a longtime maintenance supervisor with fire qualifications at Okefenokee National Wildlife Refuge in Georgia.

"The Branch of Fire Management created the award to recognize outstanding leadership and service in wildland fire safety," says says John Segar, Service Fire Director. "Rocky was chosen by an interagency panel for being key to ensuring a safe response to the 2011 Honey Prairie Fire."

The 309,200-acre Honey Prairie Fire burned for nearly a year, from April 2011 to April 2012, affecting most of the 402,000-acre Okefenokee Refuge. At the peak of fire activity, there were 202 engines, 112, dozers, 20 water tenders, 12 helicopters, six crews and 1,458 personnel assigned. Over the duration of the fire, there were no fatalities or serious injuries, and firefighters were able to contain most of the fire inside the refuge.

The Safety Award evaluation panel of local, regional and national experts in fire operations and safety rated nominees from across the Service using a standardized scoring system. Among Chesser's noted accomplishments were calm, consistent leadership supporting wildland fire operations during more than 30 years of service.

The Service wildland fire management program has maintained an exemplary safety record, with no deaths in the line of duty since 1981. □

Kenneth McCain, a federal wildlife officer at Lower Suwannee and Cedar Keys National Wildlife Refuges in Florida, has been named Refuge System Employee of the Year by the National Wildlife Refuge Association. During a 24-year career with the Refuge System, his willingness to go beyond the call of duty and his hands-on style of law enforcement have reduced transgressions significantly and saved the government thousands of dollars. A master at identifying illegal activities and unsurpassed at conducting interviews, McCain has gained the utmost respect from the public. Thanks to his public relations skills, he has inspired people to treat the refuges as if they were their own, and as a result local residents effectively "patrol" the refuges and watch out for rule breakers. In 2012, McCain also received the Florida Wildlife Federation's Wildlife Outdoorsman of the Year award. □

in memoriam

Service Dan Ashe memorializes former Assistant Director of External Affairs Beth Stevens

Today [February 27], we learned that our dear friend and colleague **Beth Stevens** passed away after a long, courageous battle with cancer. We mourn Beth's passing because we are sad to lose such a warm and indomitable spirit. We celebrate her life for the same reason.

I only vaguely recall my first encounter with Beth. It was a phone conversation, sometime in the early 1990s. I was a subcommittee staff director in the U.S. House of Representatives. She, I believe, was then in the Denver Regional Office. But in succeeding years, and especially those following February 1995, when I joined the U.S. Fish and Wildlife Service, our encounters were more frequent and memorable. Too numerous to recount now, but I'll share a few.

I was Assistant Director of External Affairs. She was deputy to Mike Spear, who was then-Director of the California-Nevada Operations office or "CNO" as we said in those days. I called at the behest of then-FWS Director Jamie Clark

to inquire about a Stone Lakes NWR acquisition that was rankling former Congressman Richard Pombo. With a polite, but definitely dismissive attitude that I later learned was quintessential Beth-ness, she suggested—"If the Director has an issue with Mike, then I suggest she should take it up with him directly." Ouch!

It was not until years after I first met Beth that I learned she was the daughter of the iconic U.S. Senator Ted Stevens. She never traded in her father's stock. Her flaws were few and fell lightly upon her; her strengths were many, shared generously, and were her own.

The years of the Bush-43 administration were challenging for the Service, maybe especially so in the Endangered Species Program. Beth was Deputy Assistant Director for Endangered Species, under Assistant Director Gary Frazer. She was a relentless advocate in a hostile environment. She took advantage of the administration's apparent cautions about taking on Ted Stevens' daughter; she took bullets when they finally figured out that she would not use her father as a shield.

When frustrated, she was known to resort to "F-words"—Furniture and Fabric. She loved to furnish. It was an outlet for her, which helped many of us lesser beings as we tried to make our offices appropriately executive.

She traveled to China with me and Teiko Saito in September 2010. We successfully repaired U.S.-China Panda policy. She took my wife shopping for pearls. Although she initially discouraged me from doing so, she later thanked me for toasting the late-Senator Ted Stevens to our Chinese hosts, and identifying him as a WWII Flying Tiger. She was asked to tell his story, and did, reflecting great admiration for the person she called "Dad." The Chinese repeatedly and graciously toasted her, in honor of her father. I never saw her prouder.

While in China, she began having abdominal pain. When we got back, she was diagnosed with ovarian cancer. In the succeeding months and years, she was the definition of graceful defiance. A stronger will I have never witnessed. Her sense of humor, in the face of a too-grim reality, was startling and comforting.

I last had the pleasure to see her this summer in Anchorage. We had dinner. I blanched when she joked that the combination of radiation and steroids had her looking like "Uncle Fester." Then she just laughed that little Beth-laugh, and said, "Come on, Dan, you know it's true." We laughed and talked, and she told me what I was doing well and not-so-well, as a good friend is supposed to do. The next day, she took me shopping to get the pearl ring that she said my wife should have bought in China. It was not so much an invitation as an order—"Come on, we'll go shopping. Call Barbara, and find out if she wants silver or gold."

Michael Gerson wrote a piece about mortality in *The Washington Post*. It included this passage and quotation:

"Cancer is a horror, but it is also a metaphor. Each of us is conceived with a seed of mortality that can't be surgically removed. It grows until it kills us, hopefully after a long life that honors the incredible, temporary privilege of living. We are, as W.B. Yeats harshly put it, 'fastened to a dying animal.'"

I am fortunate indeed, that my temporary privilege of living intersected with that of Beth Stevens. I am sad that the animal to which she was fastened has given out so seemingly prematurely. But then again, it was carrying the weight of a quite significant being.

Beth Stevens was a woman and non-scientist who made a career in a male- and science-dominated profession. She distinguished herself, her gender, her organization and her country. She was the daughter of one of history's most powerful U.S. senators, but if he walked through the door of the U.S. Fish and Wildlife Service today, he would be distinguished, not as a powerful parliamentarian, but as the father of Beth Stevens. Our colleague. Our friend. Our mentor. And now our beloved memory.

And wherever she is today, I'm sure she is furnishing the place! □

Midwest

Burton W. Rounds of Big Fork, Minnesota, a longtime Service employee, died March 25, after a long illness. He was 89. He began his Service career in the office of Missouri River Basin Studies in Montana in 1948. He moved to the Service offices in Minneapolis-St. Paul, Minnesota, in 1952, eventually leading the Wetlands Program. He received several performance awards and was recognized by the Department of the Interior and the Service for contributions to safety. □

Pacific

Javier Gutierrez of McNary National Wildlife Refuge, part of Mid-Columbia River National Wildlife Refuge Complex in Washington, died March 13 from injuries suffered earlier this year. He was a heavy equipment operator who supported fire operations. In a FaceBook post, Pacific Region Regional Director Robyn Thorson says: "He was considered 'indispensable' among his colleagues. Mid-Columbia NWRC Manager Charlie Stenvall said that 'much of what has been accomplished at McNary over the past two decades bears Javier's fingerprints.'"

As important as his work was, Thorson adds that Javier's "colleagues emphasize his enormous contribution to the refuge from his friendship and his willingness to work with anyone to help get the best work done. He contributed to the refuge family at work and away, serving as a godparent to children of some of his co-workers, as a mentor to co-workers, and as someone who was always open to learning and trying new approaches." □

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parting shot

Kids at the Children's Tree House Nature Explore classroom at the Service's National Conservation Training Center get into the spirit of International Mud Day in June. International Mud Day encourages kids to get in touch with nature through the wonders of mud.

COURTESY OF THE CHILDREN'S TREE HOUSE STAFF

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