



Fish & Wildlife *News*



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COURTNEY CELLEY/USFWS

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Greg Sheehan, Principal Deputy Director of the U.S. Fish and Wildlife Service

Strong Science Helps Us Overcome Real Problems

The U.S. Fish and Wildlife Service is a science-based agency, and each one of us should be proud of that description—I know I am—and work to uphold that ideal.

We use the best science available to make the best decisions that we can. And I expect us to always do this to ensure we are doing the best job we can for wildlife and the American public.

Will that always make everybody happy? Of course not. We will be accused of kowtowing to industry or alternatively adhering to unrealistic conservation ideals, or both!

But science remains, and will remain, a cornerstone of the Service.

We need good science to identify the needs of wildlife and habitat systems, and how we can meet those needs most effectively.

We need to ensure that the scientific and scholarly information that the Service considers in its public decision-making is accessible, robust, of the highest quality, and the result of the rigorous scientific and scholarly processes. In other words, that it is the best science available.

We need strong partnerships within the greater scientific community that will help generate good information and help grow the next generation of Service scientists.

You see across the nation—in refuges, field offices and hatcheries—that science hasn't disappeared. Our scientists are hard at work identifying and solving issues that stand in the way of conservation. Often in innovative ways.

For instance, Mary Poppins sings about “a spoonful of sugar” making the medicine go down. Who'd have thought it might be the answer to controlling the invasive *Phragmites*?

Apparently, biologists in New England, including Dr. Susan Adamowicz at Rachel Carson National Wildlife Refuge in Maine. They are testing their idea now.

And that's just one of the stories you will read in this issue of *Fish & Wildlife News* about science in the field.

Counting butterflies with lasers, using transponders commonly used in fish to help track birds, tracking fish with sound...the list goes on. Quite frankly, what our people are doing is mind-boggling.

I hope you take some inspiration from these stories: Science and scientists are thriving at the Fish and Wildlife Service! □



Biologists tag an Eastern hellbender.

GARY PEEPLES/USFWS

SCIENCE IN THE FIELD

Listening for Fishes at the Bottom of Lake Ontario

For generations, the Great Lakes have supported local communities and the world with fish for good eating, but overfishing, pollution and invasive sea lamprey have taken a toll on many native fishes, especially lake trout.

Several decades of hard work to control sea lamprey, in concert with strategic stocking of lake trout in lakes Ontario and Erie, is helping the trout, which is good news for anglers. Indeed, the second most angled fish in Lake Ontario in 2016 was lake trout. But lake trout still have a long way to go before they are self-sustaining without help from hatcheries.

To restore the lake trout population to a self-sustaining level, scientists need to know how well the fish are reproducing in the wild, if there is enough suitable spawning habitat and if they are finding it, and where they are spending most of their time feeding and growing.

Scientists are using high-tech techniques, including acoustic telemetry, to answer these questions and help restore Great Lakes fishes.

On a clear day in July 2017, fish biologists from the Service's Lower Great Lakes Fish and Wildlife Conservation Office ventured out to the middle of Lake Ontario and sank \$20,000 worth of scientific equipment. Not to worry, this was no accident. It



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was part of an effort to better understand fish movements in Lake Ontario.

For years these biologists have been tracking lake sturgeon and lake trout movements in and around the lower Niagara River. Now, in coordination with Canadian research partners, the project has expanded in scope to track fish as they move throughout Lake Ontario proper.

To accomplish this, they strategically place acoustic receivers on the bottom of the lake in a very large grid formation that will eventually blanket the whole lake. The receivers listen for sonic signals emitted from tagged lake sturgeon, lake trout, cisco, Atlantic salmon and other species. When a tagged fish swims near a receiver, its unique ID and date/time are recorded. With this lake-wide monitoring system, scientists can continue to unravel some of the mysteries of fish migration. For instance, with lake sturgeon in the lower Niagara River, high numbers of fish move into the river in the spring to spawn and then congregate just outside the river in the summer/fall. In the winter,

A freshly tagged lake trout ready for release.



nearly all the fish disappear from the river. It is clear they are moving out into the lake, and new research seeks to find out where they go and, eventually, why.

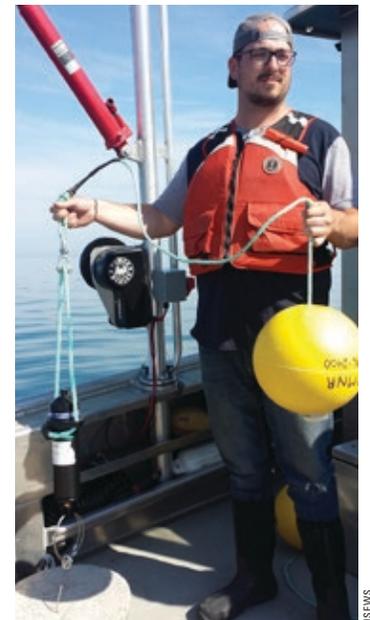
The more we know about where fishes go in the lake, the better we can protect and restore them. Identifying the chemical, physical and biological characteristics of areas of high use will provide a blueprint for re-creating these conditions through restoration projects. It will also make it possible to identify and protect areas at specific time periods that are critical to these species.

So, how do you recover scientific equipment (and the precious data within) resting 500 feet below the surface? The receivers are tied to a small buoy and attached to an 80 lb. concrete mooring block to hold them in place. To retrieve them, biologists drive a boat to the deployment site and send down a signal that causes the receiver and buoy to detach from the concrete and begin the long journey up to the surface. Then

it's just a matter of downloading the data, clipping the receiver to another concrete block and sending it back into the abyss. No matter how often they do it, the biologists always hesitate an extra beat before letting go and watching their gear sink from view.

Through the use of such cutting-edge technology, biologists are examining and unraveling the mysterious year-long movement patterns of fishes in the vast, deep, dark lake environment. This research will make a future of self-sustaining lake trout populations thriving in restored habitats possible. □

ERIC BRUESTLE, Lower Great Lakes Fish and Wildlife Conservation Office, Northeast Region



USFWS

The moment before sending the receiver down to the lake bottom.



Informative Waterbird Monitoring Means Moving Beyond Bird Counts.

More than a million snow geese stop off at Missouri River wetlands at Loess Bluffs National Wildlife Refuge in Missouri each fall and spring, while 50,000-plus northern pintails can be found in a single backwater lake at Two Rivers National Wildlife Refuge in Illinois on a November morning. Up to 50 percent of the Atlantic population of tundra swans can be found on refuges in eastern North Carolina during the winter.

These spectacular waterbird concentrations are just a few examples of amazing natural events occurring at refuges scattered across the four major migratory bird flyways. In most cases they are also the direct results of dedicated refuge staff, who “set the table” for these waterbirds by providing high quality wetland habitats for their transition from nesting grounds to wintering areas.

But a well-timed mix of water and vegetation doesn’t always work. Droughts, floods, vacant staff positions and equipment breakdowns often interfere with the best-laid plans. Even when everything comes together and the habitat “looks ducky,” early ice-ups, Indian summers and weather fronts impact large-scale bird movements and ultimately influence a refuge’s ability to reach their goals for supporting ducks, geese, swans and shorebirds during the nonbreeding season.



WILLIAM R. COATNEY

Some wetlands seem to be overlooked by the birds, perhaps just by chance or because of some subtle missing ingredient of the habitat. The factors behind the patterns of nonbreeding waterbirds aren’t always clear to managers. And with resources at a premium, leaving things to chance with the *Field of Dreams* “build it and they will come” approach is no longer a viable management strategy.

To help unravel this uncertainty surrounding how nonbreeding waterbirds respond to management efforts, refuge managers and biologists need information beyond bird counts. They need to document bird use in terms of their habitat management efforts and the return on investment. For wetland managers, that includes critical components such as water levels, various impacts to birds such as hunting or birding, and vegetation. Years of bird counts alone can, in the best cases, identify trends, but without information on water levels, impacts and vegetation, there is no context in which to place those trends, hampering managers’ ability to react to changes in nonbreeding waterbird habitat use.

Said another way, the practice of providing for the needs of nonbreeding waterbirds involves an iterative process of development and refining management

objectives, making efficient management decisions, and using research and monitoring to assess accomplishments and inform future management actions. This approach has been labeled Strategic Habitat Conservation (SHC).

Applying SHC to wetland management is definitely easier said than done, but progress is being made via the Integrated Waterbird Management and Monitoring (IWMM) approach. IWMM is a nationally approved monitoring protocol and associated online database to standardize data collection across flyways. The online database allows cooperators to enter their management actions, habitat response and bird use in a centralized database managed by the Avian Knowledge Network. This ensures management actions are documented and the monitoring data are collected consistently and accurately. In addition, these data can be archived and shared. Reporting tools have been built into the database and include a calculator for measuring the abundance of birds over a season, migration chronology curves, management action logs, vegetation cover summaries and a moist-soil seed production index.

Recently, researchers at the U.S. Geological Survey developed a novel approach to use this monitoring data to predict

More than 50,000 northern pintails can be found in a single lake.

dabbling duck abundance. Data were also used in local-scale projects at Mattamuskeet National Wildlife Refuge in North Carolina and Clarence Cannon National Wildlife Refuge in Missouri to make refuge-specific decisions related to managing multiple waterbirds. More recently, refuge staff in the Service’s Midwest Region evaluated dabbling duck densities across 12 units using a cost-benefit analysis. This approach supported the continued investment in two expensive-to-operate but highly efficient units and identified several smaller wetlands as money pits. The latter units could be repurposed for other objectives if the results are reproduced in following years.

As these examples show, IWMM is making certain those amazing natural events don’t disappear. □

BRIAN LOGES, Inventory and Monitoring Program, Midwest Region, and JOHN STANTON, Migratory Birds, Southeast Region



MORE INFORMATION

Summaries of projects and links to the full reports can be found on IWMMprogram.org.

SCIENCE IN THE FIELD

Researchers Work to Improve Monarch Counts with LiDAR Technology

Every year, monarch butterflies from as far as Idaho, Utah, Arizona and other Western states converge to spend the winter in tree groves along the Pacific Coast and at a few inland sites. Following the butterflies' arrival by late November, citizen scientists trek to these coastal overwintering sites—from Mendocino County, California, to northern Baja California, Mexico—to count them.

These volunteers of the Western Monarch Thanksgiving count must rise early to accurately assess monarch numbers before the sunlight warms the butterflies' wings and they flutter off in search of nectar or water.

Researchers are now testing a high-tech surveying tool, which would lead to increasingly accurate and expedient population estimates to use in conjunction with the manual estimates.

To summarize the current counting method, volunteers led by The Xerces Society for Invertebrate Conservation start by counting a portion of a cluster of monarchs and use that number to estimate the size of the remainder of the larger cluster.

Since its inception, experts have used the data to estimate the annual population of monarchs in the West. The 2017 count tallied 192,629 monarchs, the lowest number observed since



JOANNA GILKESONUSFRWS



JOANNA GILKESONUSFRWS

(Top) Overwintering monarchs cluster after a rain storm at Lighthouse Field in Santa Cruz, California. (Left) Dr. Louise Allen of Winston-Salem State University watches over the LiDAR machine as it scans Lighthouse Field in Santa Cruz, California.

2012 and notably down from 2016 when slightly fewer than 300,000 overwintering butterflies were estimated along the California Coast.

When the Thanksgiving count began in 1997, approximately 1.2 million monarchs were estimated at overwintering groves along the coast.

These data, made possible only through the efforts of dedicated volunteers, are gathered using

the only technique used for estimating monarch populations.

But a group from the Service, Winston-Salem State University in North Carolina and the U.S. Geological Survey is testing a method for estimating monarch populations using a system called Light Detection and Ranging, otherwise known as LiDAR. Developed in the 1960s, LiDAR is a remote sensing technology that uses light in the form of a pulsed laser to measure distances to

a target and is commonly used to map topography, generating three-dimensional information about surface characteristics. The target can be the leaf of a tree, a branch, a trunk or a monarch butterfly.

LiDAR has proved to be an effective tool for estimating hibernating gray bat populations, a species that exhibits dense-clustering patterns comparable to overwintering monarchs.

Dr. Nick Hristov and Dr. Louise Allen of Winston-Salem State University pioneered the use of LiDAR to estimate wildlife populations, almost by mistake.

“We began using terrestrial-based LiDAR to study the morphology of caves used by roosting bats, only to realize that we were missing an opportunity by not including the bats in »

our analyses—after all, bats were really just an extension of the cave morphology when roosting in there,” says Hristov. “The technology is uniquely suited for capturing rich three-dimensional data, quickly and very accurately.

“Such applications have allowed us to learn more about not only the number of roosting bats but also where in the caves bats roost, what they do when they are in there, when they move, how they structure their roost formations, etc.,” he says.

Hristov admits that using LiDAR to assess the size of overwintering monarch clusters will be considerably more complicated than with roosting bats. “We hope, with further developments of the associated technologies, to be able to gain new insights about this fascinating species and how best to support its conservation.”

In December 2015, Hristov, Allen and Ryan Drum, lead Service biologist on the Monarch Science Conservation Partnership, visited three key overwintering sites in California where monarchs were clustered to test the LiDAR concept to map the butterflies and the groves they occupy.

To count monarchs using LiDAR, overwintering sites are scanned twice: once while monarchs are present and once after dispersal from overwintering sites. By mapping surface area with and without monarchs and comparing the mapping images, it may be possible to produce precise estimates of overwintering colonies.

Use of the technology to measure monarch population numbers is in the early stages of testing, but if it works, researchers hope for a combined survey approach, in which citizen scientists would continue to monitor Western overwintering sites, while supplementing hand-counts with LiDAR technology at larger overwintering areas. The technology would be transferable and could be used to estimate the famous monarch clusters in central Mexico.

Because it is a mapping technology, LiDAR would also create 3-D maps of the overwintering sites to help the Service and partners track the quality of overwintering habitat in California, and eventually Mexico, from year to year.

“Our partners in California and Mexico play an important role in monitoring the monarch population each year. The data serve as the basis for our understanding of the monarch’s extinction risk and help to inform habitat goals across North America,” says Drum. “New technologies are empowering us to test key assumptions about overwintering numbers and can help improve the accuracy of our population estimates in ways that we hope can also help conservation efforts for bats, monarchs and other species.” □

JOANNA GILKESON, External Affairs,
Pacific Southwest Region

SCIENCE IN THE FIELD

The Secret Life of Flying Squirrels

Few people ever see a San Bernardino flying squirrel, particularly in flight. These nocturnal creatures spend most of their time high up in trees, venturing down only to forage for truffles, insects, bird eggs, pinyon pine seeds and other vegetation. This elusiveness makes it particularly hard for scientists to learn about this creature, which is restricted to mature forest in a small area of Southern California.

To better understand the squirrel’s life history and habitat use, the Service, San Diego Natural History Museum and other partners collaborated on a flying

squirrel project and enlisted the help of citizen scientists.

The partners began by placing “Have You Seen Me?” posters in shop windows and ads in local newspapers across communities in the San Bernardino Mountains, asking residents to report any sightings of the squirrel. From this initial engagement, they recruited some 50 residents who were excited to take a more active part in the project. They provided these volunteers with remote video cameras and trained them in data collection.

For Clark Winchell, Conservation Partnerships Program Division Chief in the Service’s Carlsbad »

Ambassador squirrels greet visitors at the Big Bear Alpine Zoo.



BIG BEAR ALPINE ZOO



JOANNA DILKESON/USFWS

A remote camera used to capture images of squirrels.

Fish and Wildlife Office, “efforts like the squirrel project increase awareness of the natural world around us, and give people a sense of ownership about species and habitats.”

At the start of the study, “most residents weren’t even aware flying squirrels are up here,” says Nole Lilley, one of the research participants.

The volunteers put out suet or bird seed to attract squirrels and set up the motion-sensing cameras to detect squirrels

coming in for the food. They could then upload the images along with location data to the web-based iNature database. For Lilley, participation in the project provided hands-on science education for his two children. “This was part of our home-schooling curriculum, and my children learned responsibility and technical skills.”

According to Kevin Clark, biotechnician with the Natural History Museum, cameras placed by the Lilley family and others “turned up squirrels everywhere.”

The second phase of the study focused on the San Jacinto Mountains. To determine if any squirrels remained in this portion of the species’ historic range, project partners set up cameras in areas between 4,000 and 8,000 feet in elevation. Unlike in the San Bernardino Mountains, not a single camera recorded a squirrel, Clark says.

Was there something about the habitat of the San Jacinto Mountains that was keeping squirrels away? To try to answer this, Stella Yuen, a University of California, San Diego intern with the Service, spent much of her senior year collecting and analyzing vegetation data from the San Bernardino Mountains. “There wasn’t much research on the San Bernardino flying squirrel’s habitat,” says Yuen.

The focus of her work was measuring vegetation near Lake Arrowhead. Her research indicated the squirrels prefer

areas with high levels of duff—leaves, twigs, stems, etc. that are in various stages of decay on the forest floor—close to a water source, but are less dependent on forest type than other subspecies of northern flying squirrel. Squirrels liked conifer and mixed conifer, with lots of old growth and closed canopy, according to Yuen.

Tree heights are similar between the two mountains, but tree diversity is greater in the San Jacinto Mountains, which has mixed oak, conifer-oak, and conifer communities. The key, however, may be relative canopy cover. According to Clark, “Even with more tree diversity and tree density in the San Jacinto Mountains, the overall canopy cover is lower there than in the San Bernardino Mountains.” Canopy cover appears to be the one factor that may explain the disappearance of the squirrel from the San Jacinto Mountains. But the habitat differences alone do not appear to be significant enough to explain why the squirrels appear to be in one area but not the other. “The positive news is that habitat quality does appear to be suitable if a future reintroduction is to be considered, says Clark.”

This summer, the project partners will undertake more surveys in the San Jacinto Mountains and may employ acoustic surveys to make a final determination about the squirrel’s presence in that portion of its range. □

JANE HENDRON, External Affairs, Pacific Southwest Region

The Threatened Higo Chumbo Cactus Resurges on Desecheo Refuge

It's hot, it's steep, there are so many spines around us. Our field team, from Island Conservation with the support from the Service and partners, is sweating, and we are tired. We are traipsing through the inhospitable habitat of Desecheo Island, Puerto Rico, looking for the threatened Higo Chumbo cactus. But eventually, our efforts are rewarded and we see one off in the distance. And then another, and another! We are so excited and happy we forget the trials and tribulations of the hike and just enjoy the sight of all these Higo Chumbos covering the mountains of Desecheo, a striking view forever to remain in our memories.

The Higo Chumbo is endemic to Puerto Rico with natural populations known only on the offshore

islands of Mona, Monito and Desecheo, west of Puerto Rico. The species has been extirpated from the main island of Puerto Rico, and in 1990 it was protected as threatened under the Endangered Species Act. Major threats include natural catastrophes such as hurricanes, habitat modification, low genetic variation and invasive species that eat the cactus. But now, efforts to restore its habitat on Desecheo National Wildlife Refuge, which encompasses the entire 360-acre island of Desecheo, are being rewarded.

On Desecheo Island, invasive vertebrates were introduced starting with the arrival of the first Europeans into the region in the 15th century. Invasive mammals, including goats and rats, proved

disastrous for the native cactus. Its numbers plummeted. Reports from botanists estimated approximately 430 adult and 120 juvenile Higo Chumbos in 1994. Fast-forward to 1999: Only five individuals were found on the island. Conservationists sounded the alarm. This cactus was on the verge of disappearing from Desecheo forever.

Searching for Higo Chumbos on the island to document its status was no easy task. We visited the island regularly from 2010 to 2013 and made meticulous records of the cactus. All accessible areas on the island were searched by a team of two, amounting to approximately 300 hours of searching during the study period. We marked each plant with a metal tag and recorded

GPS coordinates to mark their locations. We also took careful measurements of each cactus—its height, number of branches, everything we needed to know to assess the plant's health and the status of the population.

Our results were exciting and encouraging. We found and measured a total of 72 Higo Chumbos, with height and number of branches increasing consistently since 2010. We also observed individuals with flowers and huge yellow fruits, a good sign for the overall reproductive status of the population. Intensive efforts to remove invasive vertebrates have revived hope for the Higo Chumbo cactus. Now that the refuge is free of rats, the Higo Chumbo can stake its spiny, fruity claim to its natural habitat once again.

This turnaround is owed to the tireless (and sweaty!) efforts of field teams and partners, including the Service, Island Conservation, the U.S. Department of Agriculture, Bell Laboratories and Tomcat, who supported the project. Desecheo National Wildlife Refuge has faced a number of ecological challenges over the past century, but thanks to passionate, hopeful individuals, it seems that this incredible place is starting to feel like itself again. □

CIELO FIGUEROLA, Island Restoration Specialist, Island Conservation

Mona Island is one of three places the Higo Chumbo cactus lives.



Catching All the Asian Carp in St. Louis, Missouri

Catching one fish can be a fun and relaxing way to spend an afternoon; trying to catch 47,000 fish presents some extreme fishing challenges. Yet that is exactly what Service biologists and the Missouri Department of Conservation, U.S. Geological Survey and the St. Louis County Parks Department attempted to do at Creve Coeur Lake in St. Louis suburb Maryland Heights, Missouri.

The 320-acre lake had become infested with silver carp, a type of Asian carp that is known for jumping high out of the water when agitated by the sound of

a boat motor. This sometimes results in painful consequences when, in an effort to escape, one of these fish, weighing five pounds on average, hits a speeding boat's occupants.

Able to swim 30 miles per hour and evade fishing nets, hooks and lures, these fish are beyond the limits of standard modern fishing eradication techniques. So the partners looked to China, the country of origin for silver carp and other Asian carp species, for inspiration.

While silver carp populations have steadily increased in lakes and rivers of the United States, they continue to decline in China, where they are seen as a valuable source of nutrition. Partners deployed a Chinese "fish herding" technique to slowly

move fish across the lake into a confined space for removal.

In many areas where mass removal of Asian carp is necessary, very few native fish exist, underscoring the urgency to minimize the spread of invasive species. But when present, partners work to minimize impact to them. For the Creve Coeur Lake removal, trained staff sorted native fish from Asian carp and released the desirable species back into the lake or holding tanks.

Biologists used high intensity sound coupled with deep-water electric shock devices and floating nets to efficiently and effectively herd the fish. The technique was largely successful, until the fish formed a tight ball. But the carp refused to move

the last few feet into the desired removal location. Concerned the tight ball of fish would escape, the partners quickly assembled equipment and personnel to remove the fish from the water. They wrapped a net around the ball, and then physically removed the fish with a netting system and loaded them onto a machine on shore.

The successful removal of 47,000 silver carp was a monumental undertaking. From start to finish, the effort took three full weeks, 20 people, one track hoe, two skid loaders, 10 boats and a mile of net. Cool temperatures at night also created ice on the lake that had to be broken each morning before work could continue.

Creve Coeur Park Lake, once packed full of silver carp, is now largely free from them. After nearly a decade of competing with silver carp for food and space, native sport fish such as crappie have a chance to regain their foothold in the lake and create a desirable fishery for anglers. Once again, recreational boaters will be able to enjoy the lake without the excessive risk of jumping silver carp. The absence of the invasive Asian carp will also reduce the likelihood of smelly and unsightly fish kills at the scenic urban park. Through this partnership effort, it is anticipated the lessons learned will allow other groups to successfully remove Asian carp in invaded waters throughout the country. (See: *A War in the Water as Asian Carp Threaten Southeast*, p. 28) □

Some 47,000 invasive Asian carp were removed from Creve Coeur Lake in Maryland Heights, Missouri.



COURTESY OF MISSOURI DEPARTMENT OF CONSERVATION

Texas Refuge and Volunteers 'Bust' Ghost Fishing

Every year tons of blue crab, speckled trout, flounder and dozens of other fish species are caught on the Texas Gulf Coast, not to the delight of an angler, but accidentally caught in lost, unmoored or discarded crab traps. The wire-mesh traps can remain in the water for years "ghost fishing," with one trapped, decaying animal attracting countless others. These traps affect more than 40 species, including commercially and recreationally important fish such as sheepshead and black drum. Abandoned crab traps also damage boat propellers and frustrate those who enjoy wading the shallow coastal waters to fish.

To address the proliferation of abandoned traps in Texas waters, in 2001 the Texas Parks and Wildlife Department (TPWD) created the Abandoned Crab Trap Removal Program, a volunteer-driven effort that allows the public to remove crab traps during a 10-day crab trap moratorium in February. Since the program's inception, national wildlife refuge staff and volunteers on the Texas Coast have been pulling abandoned crab traps out of bays and marshes adjacent to refuge lands.

Aransas National Wildlife Refuge "serves a lot of important customers that depend on blue crab, including whooping cranes," says Laura Bonneau, the refuge's visitor services manager.



Laura Bonneau/USFWS

Aransas is the winter home of the only natural wild flock of whooping cranes, an endangered species. "The cranes migrate to the Texas Coast from Canada, and blue crab is one of their primary food sources here," says Bonneau.

But this problem affects much more than whooping cranes. Fish, other birds, sea turtles and people eat blue crabs. "This stretch of the Texas Coast has world-class fishing, and at Aransas you can fish from the piers or enjoy wade fishing," Bonneau says. "But we want to do more than just provide access to the bays: We want families to enjoy a great day of fishing." Removing abandoned crab traps is one way to do that.

Pulling the traps also helps to ensure that healthy crab and fish populations remain along refuge bays and waterways. This year, Aransas Refuge staff and volunteers collected 274 crab traps in San Antonio Bay, which borders the refuge. The San Antonio Bay Foundation and San Antonio Bay Partnership collaborated in the area-wide cleanup, which "netted" a total of 997 abandoned crab traps. This was double the number from previous years, likely the result of Hurricane Harvey.

According to TPWD, since 2002, efforts have resulted in the removal of 32,700 abandoned traps from Texas waters. □

Volunteers help with the wet, muddy job of pulling abandoned crab traps.

Post-Deepwater Horizon Oil Spill: Priority on Restoring and Enhancing Recreation in the Gulf of Mexico Region

The Gulf Coast beckons travelers and locals alike with promises of emerald waters and brilliant white beaches for boating, fishing, swimming and lazy lounging about. There are also untold acres of forested habitat waiting to be explored for bird watching and nature hikes. These recreational activities depend directly on the health of the Gulf's natural resources and the ability to access them. So the Deepwater Horizon drilling rig explosion in 2010 that ultimately fouled more than 43,000 square miles of the Gulf and its shoreline with 134 million gallons of oil was a body blow to both the environment and recreational activities in the area.

To assess the disaster's impact and remedy the damage, five Gulf state agencies and four federal agencies (including the Department of the Interior) came together to form the Deepwater Horizon Natural Resource Damage Assessment Trustee Council. The council has calculated that the public lost more than 16.8 million days of recreation due to the oil spill, and the council has allocated almost 5 percent of the final \$8.8 billion legal settlement reached with BP (the party most responsible for the disaster) to projects that provide and enhance recreational opportunities in the Gulf.

One such project that was recently completed is the rehabilitation of the Jeff Friend Trail at Bon Secour National Wildlife Refuge in Gulf Shores, Alabama. The popular one-mile loop now boasts new, longer-lasting composite-material boardwalks



NANCY REGALADO/USEFWS

several new viewing platforms and easier-to-navigate trail materials.

The oil spill had a devastating impact on the refuge. As first responders rushed about dealing with the oil washing up on its sandy beaches and vegetated shoreline, the Service had to restrict public access to the areas. That led to a loss of recreational opportunities and diminished the refuge visitor's experience.

The Department of the Interior is in the process of implementing two other Trustee Council-funded projects, both at Gulf Islands National Seashore in Florida, aimed at offsetting some of the

recreational opportunities lost during and after the Deepwater Horizon oil spill: a \$10.8 million beach enhancement project involving the removal of tons of debris that resulted from roads being damaged during several storms and hurricanes, and the \$4 million purchase of two ferries that will begin to carry visitors between the City of Pensacola, Pensacola Beach, and the Fort Pickens area of Gulf Islands National Seashore in Florida this summer, thus improving pedestrian access to the park and reducing auto traffic on the park's roads.

The Trustee Council has approved other recreation-focused projects along the Gulf Coast that will,

One section of the newly restored Jeff Friend Trail at Bon Secour National Wildlife Refuge in Gulf Shores, Alabama.

among other things, create artificial reefs (for fishing, scuba diving and snorkeling); improve boat ramps at state parks; rehabilitate fishing piers; and develop ecotourism and environmental education venues. □

NADINE SIAK, External Affairs, Southeast Region

Take Me Fishing...for the Very First Time!

"I want to go fishing," replied 3-year-old Jacob when his mom, Tennille Folks of Clayton, North Carolina, asked him what he wanted for his fourth birthday. Mrs. Folks was stumped. "I had no idea where to go, because as parents we have never fished in our whole lives. I think he got the idea from watching fishing videos," she says.

Mom was determined to put together a fishing trip for Jacob. She started searching online and came across a fishing event posted on Facebook called Family Fishing Fiesta. The event showed promise. They could borrow rods and reels, get free bait, and see some exhibits about water safety, wildlife conservation and endangered species. So on April 21, the Folks (mom, dad and the two

boys) headed out to Jordan Lake, a 45-minute ride to make little Jacob's birthday wish come true.

Upon arrival at the White Oaks Recreation Area, volunteers got the Folks situated, handed them a map and directed them to the casting station. Jacob and his 6-year-old brother, Christian, playfully attempted to catch and reel-in big, colorful fish-like, plastic toys that were laid on the ground before them. The eye-hand coordination takes some getting used to and aiming can be challenging, just like in real-life fishing!

As the boys were casting on solid ground without luck, the event coordinator, Cecelia "CC" King, was passing by. She saw the boys and decided to linger

and enjoy such an innocent sight. After all, these kids and others like them are the reason why she has been putting together this event for the North Carolina Wildlife Resources Commission, three years in a row. It didn't take long for King to jump in. The 20-year environmental outreach educator was soon kneeling next to Jacob, looking eye-to-eye and giving him pointers. Shortly after, he reeled in his first catch. "Now, can we go for the real fish?" asked Jacob with a big smile.

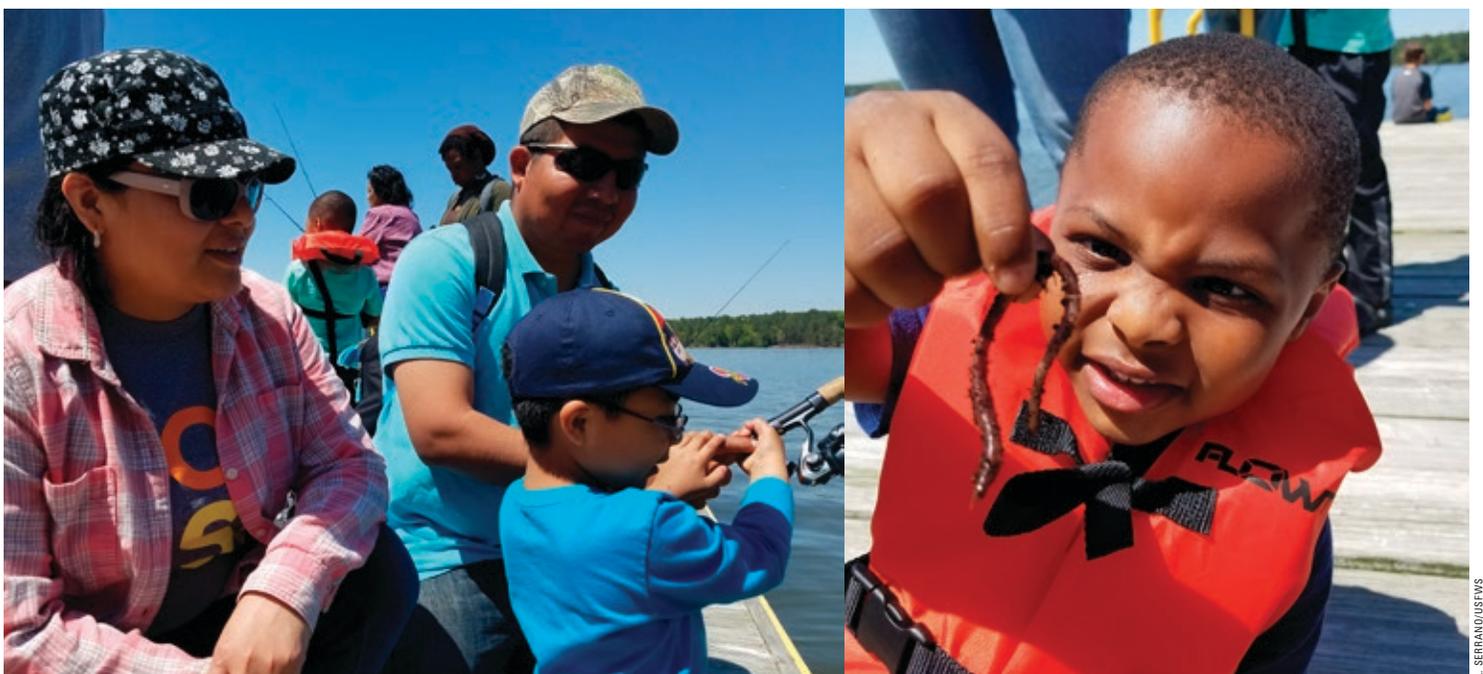
The family moved on, grabbed poles and bait, and stopped by the Chatham Sheriff Department's exhibit. Officers gave Jacob and Christian free vests and showed them how to fit them properly. Finally! They made their way to the fishing dock and found a clearing from where to cast, along with other families trying a new pastime activity. Minutes later, the Hernandez family arrived at the dock. Mr. Hernandez learned about the

event on QuePasa, and was lured by the prospect of giving his 5-year-old son, Hector, a new experience.

None of the boys, Hector, Jacob nor Christian, caught fish that day, but they had fun. To improve chances of catching fish, CC encourages first-time and novice anglers to visit Community Fishing Program (CFP)-designated sites. More than 40 lakes in North Carolina are stocked with catchable-sized channel catfish from April-September. Anglers can also borrow rods and reels free of charge at many CFP sites. The CFP sites are operated by the commission and local governments. The commission provides 75 percent of the operating funds, which come from the Service's Sport Fish Restoration Fund, while the local government funds 25 percent and provides the fishing site. □

LILIBETH SERRANO, External Affairs, Southeast Region

(Right) The Hernandez family tries out fishing. (Left) Little Jacob Folks explores a squirmy earthworm during his first fishing outing at Jordan Lake in North Carolina.



Science in the Field

Developing the best science to conserve the nature of America is not easy. There are always hurdles, and as Dan Collins, Migratory Bird Coordinator for the Service's Southwest Region says, "Science always leads you to more questions." But every day, Service staff and partners are out there working on the science of conservation. Here are just a few of their stories.



Lahontan National Fish Hatchery Complex crews install a weir at the mouth of Glen Alpine Creek. The fish barrier is installed once a year to prevent non-native rainbow trout from hybridizing with spawning Lahontan cutthroat trout upstream of Fallen Leaf Lake.

Making History

Lahontan Cutthroat Trout Returning to Fallen Leaf Lake

by DAN HOTTLE



With a little help from state and federal fisheries biologists, highly revered Lahontan cutthroat trout, which disappeared from a California alpine lake more than 80 years ago, are making their way back home.

“Decades of overfishing and habitat degradation in the Lake Tahoe Basin caused these unique native fish to vanish from the system all the way back in the 1930s, and now we’re working to bring them back where they belong,” says Stephanie Byers, a senior fisheries biologist for the Lahontan National Fish Hatchery Complex in Gardnerville, Nevada, which has been raising a broodstock of the famed species since 1995.

Operating under a fisheries conservation agreement with the California Department of Fish and Wildlife that was signed last May, the hatchery complex and its partners have ramped up efforts to reintroduce threatened Lahontan cutthroat trout back into the Fallen Leaf Lake watershed that neighbors Lake Tahoe. Restoring the fish in the lake began in 2002, and according to biologists,

returning the native trout species back into a high mountain lake has not been without challenges: The low nutrient production of the crystal clear, 6,300-foot-elevation lake means there’s less for newly minted and stocked young Lahontan cutthroat trout to eat.

Additionally, the introduction of non-native species such as rainbow, and brown trout into the system nearly a century ago adds the risk of hybridization, as well as of Lahontan cutthroat trout becoming food themselves.

“The number and diversity of non-native species present in the Lahontan cutthroat trout’s historic habitat and the ability for them to interbreed with non-native trout species such as rainbow trout adds another layer of challenges,” says Sarah Mussulman, senior environmental scientist with the California department.

As part of a recent agreement, the California Department of Fish and Wildlife receives Lahontan cutthroat trout eggs from the hatchery and raises the species in its American River Hatchery in Gold River, California, to help restore recreational fisheries in the eastern Sierra region. >>

“We knew early on that if our partners could get Lahontan cutthroat trout back into their historic habitat and work to give them a fighting chance, they’d possibly be able to recover on their own,” says Byers. “That meant suppressing non-native trout species and creating a niche for them in their native environment with improved stocking management.”

Several years of research showed that in order for young, reintroduced Lahontan to have a better chance at surviving, more strategic stocking methods needed to be incorporated.

“Rather than stocking large numbers of Lahontan cutthroat trout at a time in one portion of the lake, our crews now stock smaller batches more frequently throughout areas of the lake where there are more natural places for them to hide,” says Service fishery biologist Jason Smith. “In addition, we wait until the summertime so that we can stock larger Lahontan cutthroat trout into the warmer, upper thermocline layer of the lake at a time in the season when predatory lake trout are down deeper in colder waters.”

Smith says that the changes in stocking locations and timing gave the fish a critical adjustment period to acclimatize to the lake and more quickly seek cover from predators. The results paid off quickly. In 2012, after reintroduction approaches were refined, the lake’s population numbers began to slowly turn in favor of Lahontan cutthroat trout.



(Top) Lahontan National Fish Hatchery Complex fishery biologists Jason Smith (left) and Thomas Bland search for Lahontan cutthroat trout in Glen Alpine Creek. Biologists use snorkeling equipment to learn more about the reintroduced species’ spawning behavior in the Fallen Leaf Lake system. (Bottom) A young Lahontan cutthroat trout is caught by an angler in Fallen Leaf Lake.



DAN HOTTLE/USFWS

COURTESY OF CLYDE ZARBEI

That same year, stocked and tagged Lahontan cutthroat trout were observed attempting to spawn into Glen Alpine Creek at the lake’s inlet once again.

“This summer, within three days of stocking, we observed hundreds of cutthroat gathering at the mouth of Glen Alpine Creek,” says Smith. “It was the first time we’d observed that many stocked Lahontan cutthroat trout migrating all the way across the lake to instinctually seek out their historic stream habitat.”

The gains have biologists excited, and the success has drawn attention from local residents who support the conservation effort.

“The agency partners have taken great steps to work with local homeowners and other interested groups for the success of this effort as well as for other Lahontan cutthroat trout recovery efforts in the Tahoe Basin,” says Sarah Muskopf, an aquatic biologist with the U.S. Forest Service’s Lake Tahoe Basin >>

Management Unit. “The long-term outcome of returning these large, lake-dwelling cutthroats is something we’re all excited to see.”

“We’re thrilled to be a small part of the effort to bring back the lake’s native species,” says Dave Bunnett, director of Stanford University’s Sierra Camp, which incorporates information about the restoration project into naturalist programs it provides for more than 3,000 camp guests each year. The university owns lakefront property including portions of Glen Alpine Creek where the hatchery complex installs and monitors a fish barrier, called a weir, every season to block the spawning of non-native trout.

“It’s always fun when we get to observe [U.S.] Fish and Wildlife Service biologists stocking fish from our sailing dock, knowing that we’re helping to bring back a native fish that can only be found in this part of the world,” Bunnett says.

Lake residents and other visitors who come from afar for the famed species also have the chance to help the recovery effort by submitting fish measurements and other critical data on Lahontan cutthroat trout they catch to Service biologists.

Anglers can call a hotline to report Lahontan cutthroat trout catch in the lake.

Returning Lahontan cutthroat trout to Fallen Leaf Lake revives a historic fishery, improves shoreline angling opportunities and provides the chance to reinvigorate the watershed’s ecosystem as a whole.



DAN HOTTLE/USFWS

Lahontan National Fish Hatchery Complex fishery biologists Jason Smith (left), Roger Peka and Thomas Bland (right) electrofish the mouth of Glen Alpine Creek that leads to Fallen Leaf Lake. The fisheries crews are hoping to learn more about the spawning behavior of reintroduced Lahontan cutthroat trout in the system.

“The return of spawning Lahontan cutthroat trout is not only historic for the lake, it also means that nesting bald eagles and black bears may also return in greater historic numbers to Glen Alpine Creek one day,” Muskopf says. □

DAN HOTTLE, External Affairs,
Pacific Southwest Region

Too Much Sugar

Researchers work on a sweet solution to a sticky problem

by LAURI MUNROE-HULTMAN

A boardwalk passes through a stand of *Phragmites australis* at Parker River National Wildlife Refuge in Massachusetts.



STEVE DROTTER

When you're a biologist at a site named for a famous environmentalist, you feel a responsibility to do your job with the planet in mind.

Just ask Dr. Susan Adamowicz, the Land Management Research and Demonstration Area biologist for the Northeast Region of the Service, stationed at Rachel Carson National Wildlife Refuge in Maine. Tasked with finding the best ways to manage wildlife habitat, Adamowicz takes inspiration from Carson as she plans her research projects.

In 1962's *Silent Spring*, Carson, who also worked for the Service, sounded the alarm about pesticides that imperiled wildlife and people alike. She knew that many of the synthetic chemicals used to control unwanted plants and insects were dangerous to more than their targets. For a healthy environment, Adamowicz also seeks other solutions.

Today, Adamowicz hopes she has found a new one, with the help of a University of New Hampshire researcher.

A 'consummate invasive species'

Phragmites australis, or common reed, is an aggressive, non-native marsh grass that pushes out native wetland plants. It is known for its tall (up to 18 feet), feathery, golden stalks.

Phragmites is plentiful in the high salt marsh of the Great Marsh, the largest continuous stretch of salt marsh in New England. Three thousand acres of the 20,000-acre marsh in eastern Massachusetts lie within Parker River National Wildlife Refuge.

The invasive grass changes the structure of the salt marsh, filling natural channels and tidal pools where waterbirds, fish and invertebrates would otherwise find food and safety. Many wildlife species find its dense patches impassable, and in the fall, when the stalks die back, stands of the



In the field, *Phragmites* plants were isolated using tubes made of bottomless five-gallon pails.

GREGG MOORE/UNH

plant turn to tinderboxes primed for wildfire, putting nearby homes and businesses at risk.

Biologists have long searched for effective ways to control *Phragmites*. It's a determined adversary, however. Like those birthday candles that re-ignite—it springs back to life just when it seems defeated.

According to Adamowicz, "*Phragmites* is the consummate invasive species. If you cut it or burn it, it comes back. If you can flood it for six months, that might kill it, but flooding is not always feasible."

Restoring natural tidal flow to coastal marshes is the preferred way to fight *Phragmites*, but replacing culverts, filling ditches and improving drainage takes time. Treating it directly is necessary to keep it in check in the meantime.

There has been no good way to do that. Herbicides work in certain locations but pose a risk to native vegetation and groundwater—certainly not a solution Rachel Carson would embrace.

So Adamowicz teamed up with Dr. David Burdick, research associate professor and interim director of the Jackson Estuarine Laboratory at the University of New Hampshire, to explore innovative ways to control *Phragmites*. One of the methods they tested was sweet and simple.

Turning the tables

Burdick had a hunch that sugar, the same kind you put in your coffee, might be *Phragmites*' Kryptonite.

Each summer, rising air temperatures and increased plant growth stimulate bacteria in salt marsh soils to convert organic matter and oxygen into carbon dioxide, water and energy—a process called >>

aerobic (“with air”) respiration. The activity quickly uses up soil oxygen, forcing other groups of bacteria to make energy using anaerobic (“without air”) respiration.

One byproduct of anaerobic respiration is hydrogen sulfide gas, a potent toxin for plants as well as people. At typical levels, the gas is not deadly to most native plants, but it can be toxic to *Phragmites*.

Burdick thought increasing bacterial anaerobic respiration, and therefore hydrogen sulfide levels, could kill the invasive. He couldn’t control air temperatures, but he could increase fuel for the bacteria—using glucose in the form of table sugar.

“Because *Phragmites* is a master at getting oxygen to its roots for its own respiration, we could use this strength to kill it,” he says. “By elevating soil hydrogen sulfide levels, we might stimulate the plant to oxidize the gas into a strong acid that it may not be able to tolerate.”

Pour some sugar on it

Burdick and his team first tested their idea in the greenhouse. They soaked *Phragmites* plants with bay water for three hours every two weeks to mimic the flooding that high-marsh plants get during the extra-high “spring” tides that come with the full and new moons each month.

Some plants (the control) received only the bay water; others got water with table sugar; still others water with extra salt; and the remaining, water with sugar and salt.

“This is another tool in our toolbox, and it’s nontoxic to wildlife, which is very desirable.”

Dr. Susan Adamowicz

Both the sugar- and sugar-and-salt-treated plants showed signs of stress within weeks and eventually died. Only the plants that received plain bay water or bay water with added salt lived.

The sugar-treated plants had very high soil acidity, possibly caused by sulfuric acid, the product of hydrogen sulfide oxidation. This supported Burdick’s theory.

Next, Burdick and Adamowicz headed to Parker River Refuge to set up a field study in the northern part of the Great Marsh. The research was supported by federal funds for Hurricane Sandy recovery and resilience projects.

They isolated individual *Phragmites* plants and applied the same treatments as in the greenhouse. Sugar and salt were put on the plants every two weeks, after the spring tides flooded the marsh.

The plants that got sugar showed far greater mortality than the other treatments, even with uncontrollable environmental factors, such as rain—a clear sign that sugar is not sweet to *Phragmites*. >>



In the greenhouse study, plants receiving sugar or sugar-plus-salt (right, top and bottom) showed clear signs of distress within weeks of treatment.

GREGG MOORE/JNH

Refining the technique

Adamowicz is pleased with the study results so far and eager to set up more field trials. She's exploring ways to treat *Phragmites* with sugar and salt more efficiently and broadly, perhaps using a backpack sprayer to apply corn syrup at more-frequent intervals than every two weeks.

“This is another tool in our toolbox, and it's nontoxic to wildlife, which is very desirable,” she says. “The more complicated response to *Phragmites* is ecosystem restoration, but in the meantime, we need a fast-acting tool to help native plants come back and buy time.”

If Rachel Carson were alive today, she would approve of this environmentally sound method—and just might be thinking, “Sweet!” □

LAURI MUNROE-HULTMAN, External Affairs,
Northeast Region

(Top) Dr. David Burdick takes notes in the field at Parker River Refuge during field testing. (Bottom) Parker River Refuge protects 3,000 acres of the Great Marsh, the largest continuous stretch of salt marsh in New England.



GREGG MOORE/JNH



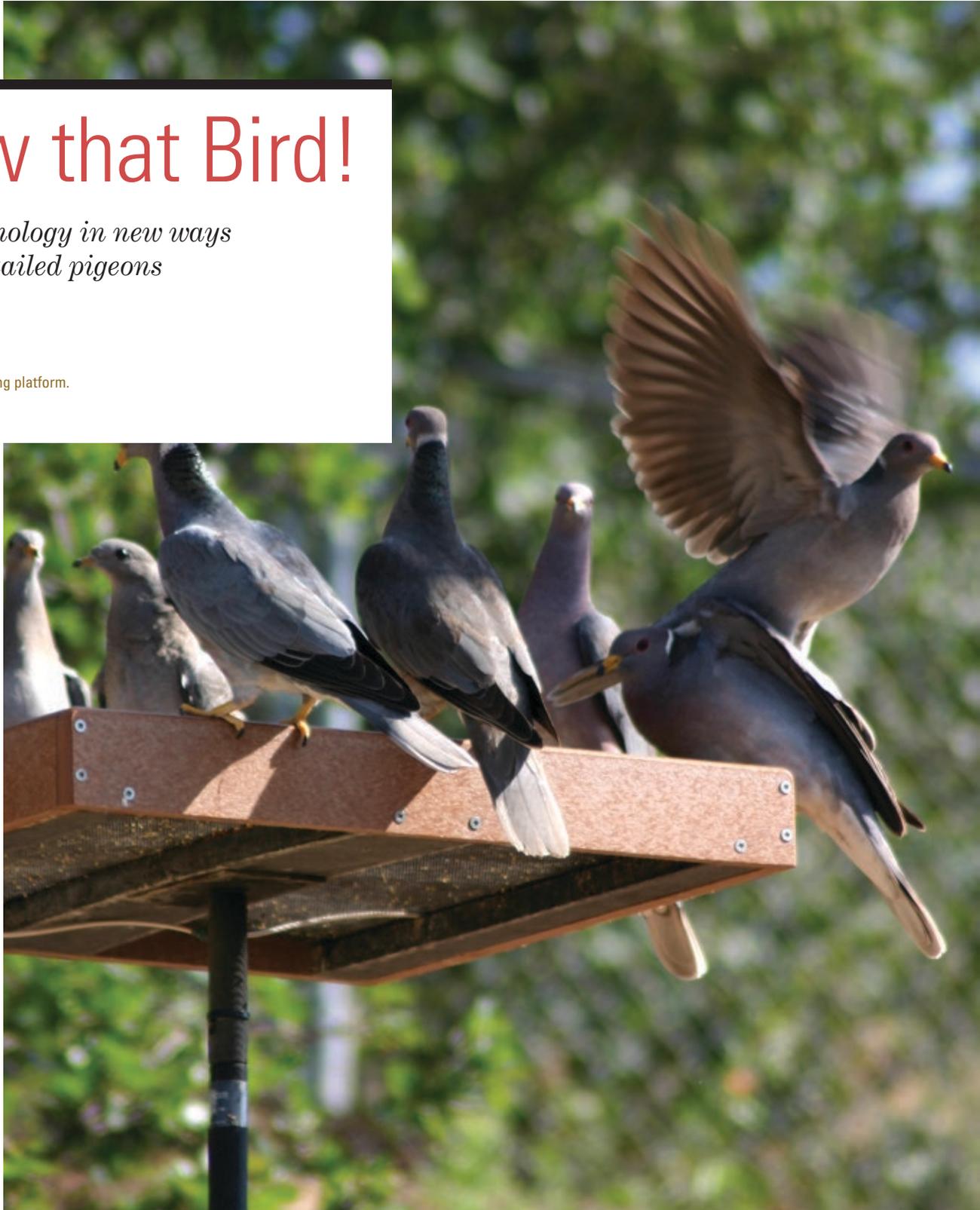
MATT POOLE/USFWS

Follow that Bird!

*Using old technology in new ways
to study band-tailed pigeons*

by AISLINN MAESTAS

Band-tailed pigeons on feeding platform.



Aristotle once put forth two theories for explaining why certain birds were observed only during certain times of the year: transmutation and hibernation. According to the famed philosopher, summer redstarts would annually transform themselves into robins in the winter, just as golden warblers would change into blackcaps. For those species without the ability to transform, he offered up hibernation as an explanation: When swallows and kites disappeared in winter, Aristotle claimed they could be found buried in the ground.

These ideas, as fantastic as they may seem today, persisted for centuries. It was not until the 19th century that researchers began to genuinely track and study bird migration. In 1804, John James Audubon used silver string tied around birds' legs (the first bird band), to see if a pair of eastern phoebes returned to the same nest year after year. By the end of the 19th century, European naturalists were banding birds in earnest, fitting numbered metal bands to birds and plotting the locations where they were later recovered.

Today, new technologies allow researchers to digitally track and study birds in ways never before imagined. Radio telemetry allows researchers to track bird behavior and movement without having to recapture or recover the individual. Then came satellite telemetry, which provides researchers with a minimum of four data points a day, for 365 days a year.

As with all new technologies, however, there are downsides. Satellite transmitters are expensive (one unit can cost about \$3,000), rely on batteries that often don't last the entire lifespan of many bird species and are still too large to fit on medium to small birds.

Understanding these pros and cons of available tracking methods (bands, radio tags, GPS), bird biologists with the Service's Southwest Region have recently started using a combination of technologies to track bird patterns.

For decades, fish biologists have used passive integrated transponder (PIT) tags to monitor and study fish populations. These tiny transponders (which are also commonly used to "chip" dogs and livestock for tracking purposes) provide researchers with the ability to track individual animals over time and space. By acting like a barcode, these transponders are dormant unless activated by a scanner, which is set up in a specific location. This gives them a much longer lifespan and reduces both their cost and size. PIT tags respond to a low-frequency radio signal emitted by a scanning device. The tag then sends a unique code back to the scanner where it is recorded.

"The PIT tag acts like a fingerprint," says Scott Carleton, Migratory Bird Chief for the Southwest Region. "If used correctly, they can last the entire lifetime of an individual."

With these benefits in mind, Carleton and his research partners decided to try using PIT tags to help research migration behavior of band-tailed pigeons.

The band-tailed pigeon is the closest genetic relative to the passenger pigeon and the only native pigeon species in North America. There are two distinct populations of the species in the United States: the Pacific Coast population and the Interior population. The latter, sometimes referred to as the "Four Corners population," occurs in the dry mountain forests of the Four Corner states: Arizona, Colorado, New Mexico and Utah.

Though they are considered to be common in their range, the species has steadily been declining. According to the North American Breeding Bird Survey, North American populations of band-tailed pigeons declined more than 2 percent per year between 1966 and 2014 (amounting to a cumulative decline of 63 percent).

In 2014, the Service recommended changing the hunting regulations for this game species. In the six states where harvest of the species is currently allowed (California, Oregon, Utah, Colorado, New Mexico and Arizona) the bag limit was reduced to two a day from five a day.

"This is a species we have very limited knowledge about. To date, harvest information has been our primary source of monitoring data for band-tailed pigeons," says Dan Collins, Migratory Bird Coordinator for the Southwest Region. "It is unclear if the declines are the result of harvest or something else, such as changes in climate or land use across their range. Our goal with this project is to develop management strategies to allow for the continued sustainable harvest of the species, and to determine if, how and where we may need to implement conservation efforts." >>



SCOTT CARLETON/USFWS

(Top) New Mexico homeowner, collaborator and bird lover Joe Fitzgibbon assists with the collection of data. (Bottom) A band-tailed pigeon is weighed.



SCOTT CARLETON/USFWS

Beginning in 2013, the Service formed a partnership with the New Mexico Department of Game and Fish, New Mexico State University, and U.S. Geological Survey (USGS) to study the migration behavior of band-tailed pigeons. Carleton, a bird biologist with a background in fish biology, proposed using PIT tags to monitor and track the species.

“Because these birds are believed to have high site fidelity within and between years, we hoped the tags would reveal how frequently they are visiting foraging sites per day and across the breeding season. Then, we hoped they could be detected again when they returned in the spring from their wintering grounds in northern Mexico” to the same breeding sites, says Carleton, explaining what biologists wanted to uncover.

Today, more than 500 band-tailed pigeons have received PIT tags in New Mexico at three monitoring sites in the Gila, Jemez and Sacramento mountains. Close to 60 percent of tagged individuals have been detected again after they return from the wintering grounds. With the cooperation of private landowners, researchers spend several months each year tagging birds and setting up scanners at each site to look for PIT-tagged birds.

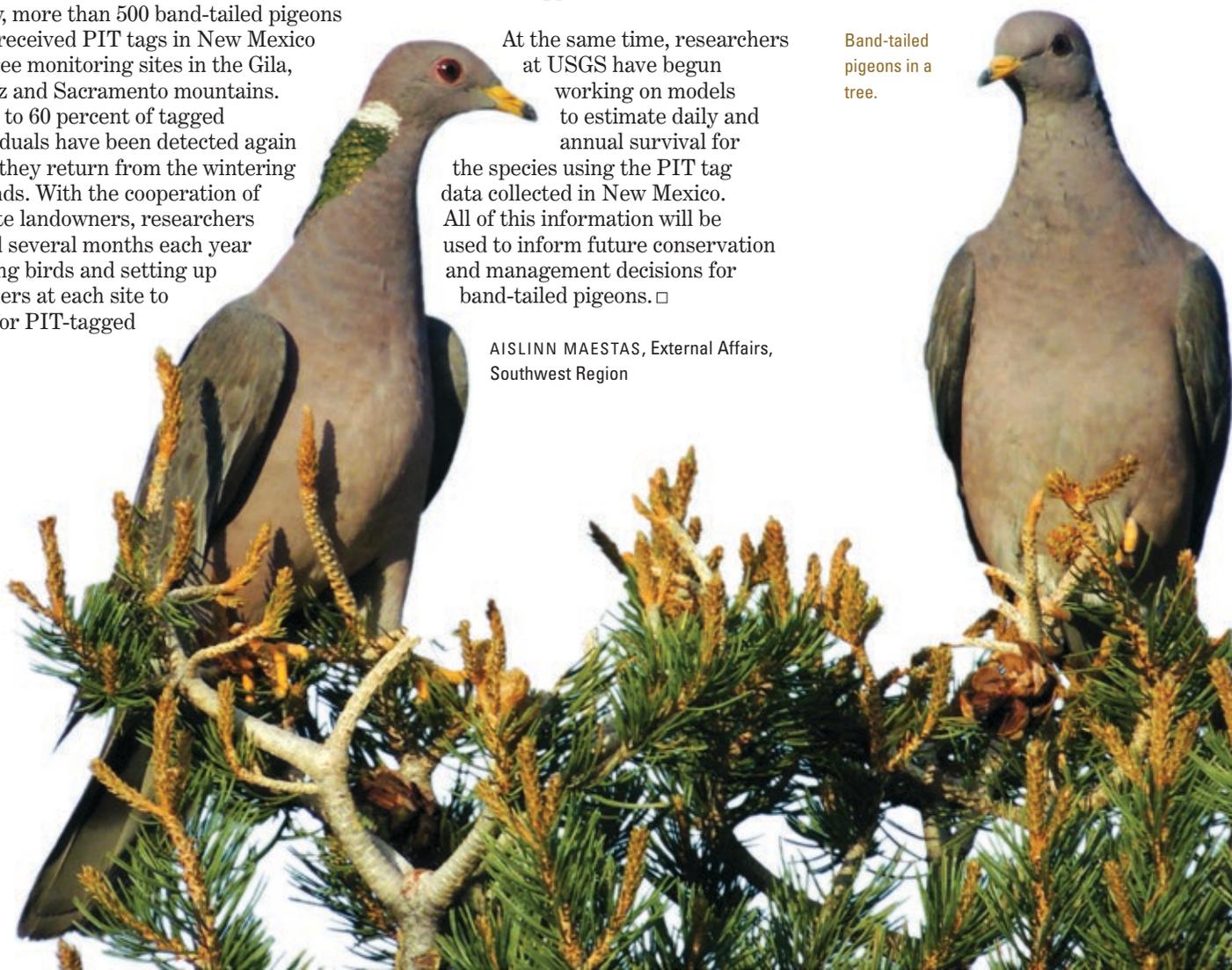
The PIT tags provide data on local area use and help estimate survival. In addition, satellite platform transmitter terminals (PTTs) are tracking individual band-tailed pigeons and increasing understanding of their movements across the larger landscape. Initial data from the research are revealing new information about the species. For example, at all three sites, PTTs have revealed band-tailed pigeon movement patterns within the United States, identified new wintering areas in northern Mexico and provided detailed information on how frequently pigeons visit foraging sites.

“This is interesting information, but science always leads you to more questions,” says Collins. “We will soon expand our work to include Colorado and Arizona to see if what we are learning in New Mexico applies to other areas.”

At the same time, researchers at USGS have begun working on models to estimate daily and annual survival for the species using the PIT tag data collected in New Mexico. All of this information will be used to inform future conservation and management decisions for band-tailed pigeons. □

AISLINN MAESTAS, External Affairs,
Southwest Region

Band-tailed
pigeons in a
tree.

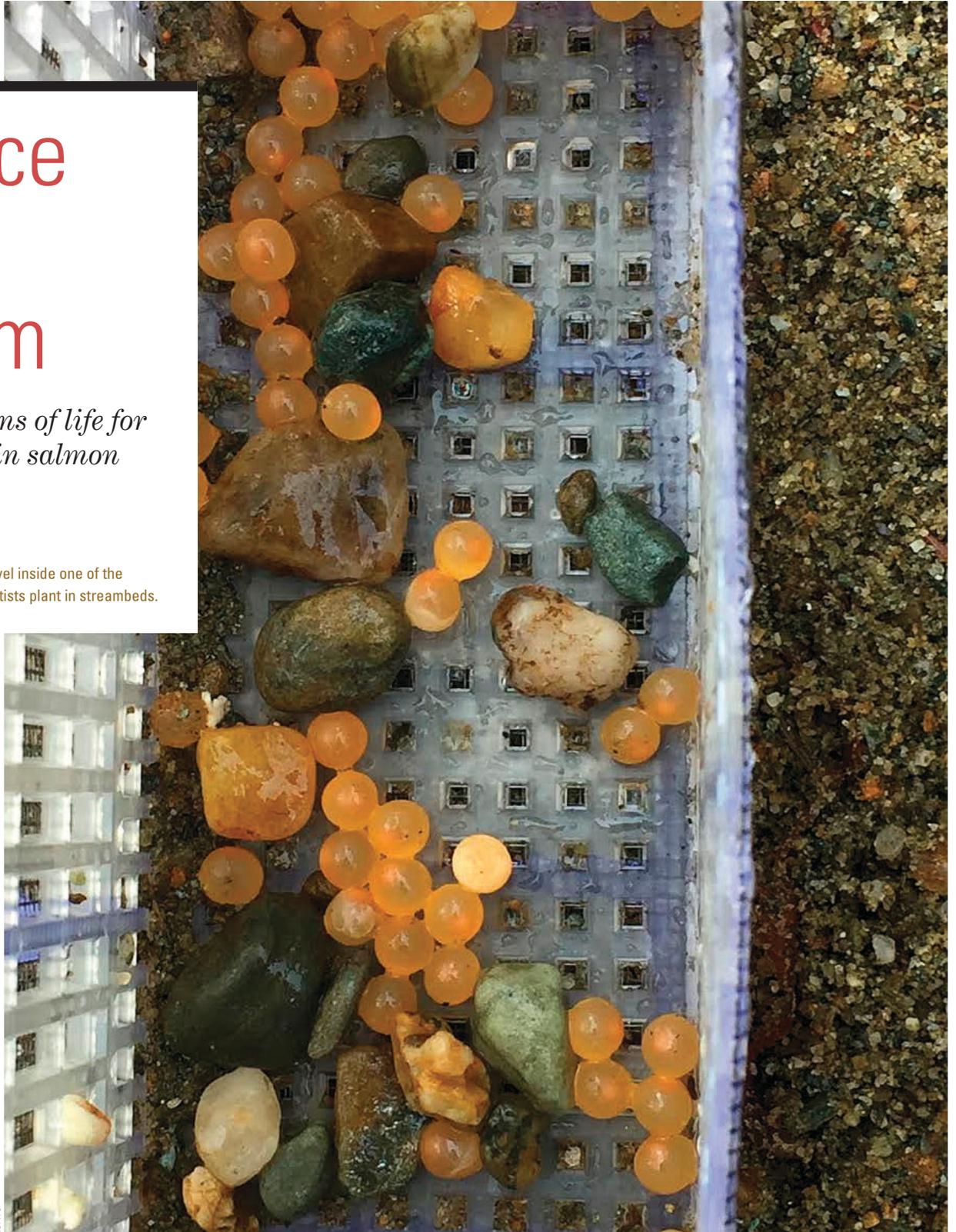


Science in the Stream

*Looking for signs of life for
Lake Champlain salmon*

by BRIDGET MACDONALD

A mix of salmon eggs and gravel inside one of the
artificial nest boxes that scientists plant in streambeds.



USFWS

Each spring, around the same time sap starts to flow in sugar maple trees in the Northeast, salmon eggs are beginning to hatch inside underwater nests, called redds, dug by females in rubbly streambeds in the fall. Within a few weeks, Service scientists will be pulling on snorkels and dry suits and slipping into streams to look for the young salmon as they emerge from the gravel.

“We keep a temperature probe in the water from fall through spring, and based on that, you can calculate when they are likely to emerge,” explains Bill Ardren, senior fish scientist for the Service’s Lake Champlain Fish and Wildlife Conservation Office. It’s at about 45 degrees Fahrenheit, hence the dry suits.

How do they know where to look? Scientists are out in those streams in the fall, too, marking the locations of redds, and making a few nests of their own. They bury containers about the size of a box of butter in streambeds at the depth of a natural redd, tether them in place with a chain, and stock them with gravel and fertilized eggs.

The artificial nests give scientists a way to evaluate habitat quality in streams based on the amount of fine sediment that ends up inside the box (which can suffocate eggs) and the degree of scour on the chain (an indication of strong currents that can wash eggs away).

The real nests give them a way to evaluate something bigger: the long-term viability of the Atlantic salmon population in Lake Champlain.

For a long time, the outlook wasn’t good.

“A lot of things need to be right for salmon to have a full lifecycle,” Ardren explains. Adults must migrate to spawn in streams where juveniles mature for two or three years before migrating to the ocean—or in this case, the lake. They go through several phases, with distinct habitat needs.

In the 1800s, a lot of things started to go wrong for salmon in Lake Champlain: overfishing, agricultural runoff, development and the deal-breaker for a migratory fish species: the damming of rivers. Blocked from spawning grounds upstream, salmon could not reproduce, and by the end of the 19th century, the native Atlantic salmon population was gone from the lake.

But not forgotten.

In 1972, the Service partnered with the Vermont Fish and Wildlife Department and the New York State Department of Environmental Conservation to restore Lake Champlain’s Atlantic salmon population.

Where do you begin when trying to re-establish a species that’s been missing from a system for nearly a century? With eggs, of course. The ones they used were developed from a salmon strain originating in Sebago Lake, Maine. The idea was to seed the lake with the next generation of salmon and let nature do its thing.

But nature couldn’t do its thing. Salmon faced some of the same problems as before, and some daunting new ones.

First, the influx of young salmon in the lake from the stocking program caused a population boom for a parasitic fish called sea lamprey, endowed with a suction-cup-like mouth lined with concentric rings of jagged teeth. When sea lamprey find a host fish, “They use that suction cup to

stick to its body and scrape a hole through its flesh with their tongue,” explains Steve Smith, a fish biologist at the Lake Champlain office. A single sea lamprey kills 40 or more pounds of fish in its life as a parasite.

Just when scientists had gotten the sea-lamprey problem under control through application of lampricide chemicals in streams to kill larvae and temporary barriers to trap adults during seasonal migrations, a new problem surfaced.

In 2003, an invasive fish called alewife appeared in the lake, crowding out rainbow smelt, the native food source for salmon. Alewife carry an enzyme called thiaminase that digests the vitamin B1 in the intestines of salmon, which can lead to neurological dysfunction and decreased survival in adults and offspring. So eating alewife could be deadly for salmon.

Scientists were dismayed, but not deterred. “We’ll never get rid of alewife,” says Service fish biologist Nicholas Staats. “We just have to manage around them.”

So they responded with a variety of experiments in the field and in hatcheries designed to support “evolutionary rescue” of salmon, by breeding salmon to be more tolerant to thiaminase and restoring habitat so salmon lifecycles can play out naturally in the streams.

Then, nature started doing its thing.

“It wasn’t until recent years that we even began to look for natural reproduction,” says Brian Chipman, a fisheries biologist for Vermont Fish and Wildlife who has been involved in the restoration program for 30 years.

Last summer, nearly 50 years into the restoration effort, they found the first naturally born Atlantic salmon discovered in the basin in more than 150 years. >>



(Top) To jumpstart recolonization, scientists stock tributaries to Lake Champlain with young salmon raised in hatcheries. (Bottom) Scientists assess habitat quality and look for nest boxes in a very cold stream.



The juveniles, called fry, were discovered in two tributaries that would have been inaccessible to salmon back when the restoration program began: the Boquet River, which flows into the lake from the Adirondacks, and the Winooski River, the largest tributary to the lake. The Service supported a major dam removal on the Boquet in 2015. Each fall, scientists now transport salmon beyond the steep cascades where the dam once stood to spawning habitat upstream. Biologists use a “trap and truck” program to deliver salmon to spawning habitat above a series of three hydroelectric dams on the Winooski.

“It’s only been recently that we restored the system enough that salmon can colonize these rivers, and we are doing a lot of work in the field and hatcheries to help reintroduce them to different areas and improve their returns to these rivers,” Ardren says.

But fieldwork also helps scientists recalibrate their efforts based on what they actually see on the ground.

“Salmon haven’t been here in a long time and we have some preconceived notions about where they will spawn, but we learn a lot based on the places they actually choose,” says Ardren. “Looking at aerial »



(Top) Field technician Zach Eisenhauer holds an 11-pound salmon caught, assessed and released in the Boquet River. (Bottom) Scientists involved in the salmon restoration program in Lake Champlain dive headfirst into their work.



photos showing where we found redds teaches us where we should focus on restoration work to support a functioning river.”

And they are finding more evidence in the field to indicate that despite all of the known challenges and unexpected setbacks, half a century’s work to reestablish salmon is paying off.

The naturally born fry, for instance. A graduate student compared the genetics of the fish that were transported above the cascades in the Boquet River to those of the fry discovered the following year; it turns out the fry were parented by salmon that got above the cascades on their own.

“That is an interesting twist,” Ardren says. “We wanted to jumpstart their migration because previous assessments showed that passage there was difficult at low flow, but we now have hope they will get up on their own.”

That’s the goal. Service staff and partners study salmon at every stage of their complex lifecycles and intervene to support their needs, in hopes that someday they won’t have to anymore. □

BRIDGET MACDONALD, External Affairs,
Northeast Region

A War in the Water

Invasive Asian carp threaten native fish in the Southeast and spark a battle for survival

by DAN CHAPMAN

A fish biologist holds a bighead carp.



RYAN HABERTY/USFWS

The stretch of the Tennessee River in Eastport, Mississippi, is considered the most aquatically biodiverse in the nation, teeming with sportfish and at-risk snails and mussels.

Locals boast that Pickwick Lake, where Mississippi, Alabama and Tennessee come together, is “the smallmouth bass capital of the world.” Catfish and buffalo fill commercial anglers’ nets. Marinas lining the reservoir’s roads attest to Pickwick’s huge economic impact. Yet the Tennessee River, and a way of life, is under siege.

The silver carp, a voracious, fast-moving and highly invasive species ravaging the Upper Mississippi River, has set its sights on the Tennessee, Cumberland, Yazoo and other Southern streams.

Reservoirs downriver in western Kentucky, for example, have been invaded by carp, which out-muscle juvenile bass and other filter-feeders for food. Last November, 75 silver carp were gill-netted by biologists at Pickwick; other trips, though, turned up no carp. The carp’s DNA was even discovered last fall in Gunterville Lake—140 miles upriver from Pickwick.

And there’s more: The black carp, another highly invasive Asian import, appears to be following on the heels of the silver carp and gobbling up mussels and snails.

“They’re progressing this way and they’re going to keep migrating. I don’t care what you do,” says Jimmy Dees, manager of the Eastport Marina on Pickwick Lake in Mississippi. “They’re going to deplete the fish in this lake. The long-term impact could cost a lot of money.”

Not if Angie Rodgers, Dan Schwarz and a platoon of federal and state biologists from the Great Lakes to the Gulf of Mexico have their way. Rodgers and Schwarz, with the Service, are tracking the carps’ upstream push.

Of immediate concern for the Mississippi-based aquatics experts: an invasion of the Tennessee-Tombigbee Waterway, which allows passage to Mobile Bay and the Gulf of Mexico.

“The Southeast is a hotspot of biodiversity, so we’re trying to prevent further declines in at-risk species. It’s a big threat,” says Rodgers. “There’s not a magic bullet to get rid of them. It’s just a matter of working together to slow their movement and potential impact.”

‘Eradication is the ultimate goal’

Silver, black and two other carp species were imported from Southeast Asia in the 1970s to help clean catfish farms and wastewater treatment ponds of weeds and parasites. Flood waters helped them escape an Arkansas farm. The fish headed up the Mississippi River and into the sinew of tributaries that reaches into 31 states and Canada. Locks and dams don’t always impede their march.

The silver (and bighead) carp’s notoriety mostly centers on tributaries to the Great Lakes and fears that it could damage the region’s multibillion dollar a year fishing industry.

Now, it’s the South’s turn to worry. Crappie, bream and black bass abounded across many of the lakes and oxbows in Mississippi’s Yazoo River basin 20 years ago. Fisheries’ biologists surveyed four oxbows last year and discovered that silver carp made up 90 percent of the fish stock.

The fish, which can reach 40 pounds, traveled up the Ohio River and into the Tennessee and Cumberland rivers landing en masse in Lake Barkley and Kentucky Lake about a decade ago. Bass anglers increasingly complain of fewer landings and blame the carp.

Researchers at Tennessee Tech, supported financially by the Service, wrote in a recent report that “all empirical and anecdotal evidence points to a rapid expansion of [Asian carp] upstream in both river systems and into their tributaries and successful reproduction by silver carp in the headwaters of Kentucky Lake.”

Tech and Murray State University tagged more than 100 silver carp in Kentucky Lake and 10 in Pickwick. Underwater acoustic telemetry will determine where the fish are headed. The first round of results is expected by summer.

“We are trying to figure out population distributions within reservoirs,” says Mark Rogers who runs the U.S. Geological Survey’s (USGS) Cooperative Fishery Research Unit at Tech. “Eradication is the ultimate goal. But suppression and the prevention of carp moving upriver is really what we’re striving for.”

Not far behind, black carp were caught within the last year in Barkley and Kentucky, their southernmost foray to date.

An ‘underwater rainforest’ in peril

Silver and black carp pose a double-barreled threat to a river’s ecosystem. Silver eat plankton—algae and other microscopic organisms—the basic food source for native fish. Black are molluscivores, with human-like molars, and they prey upon snails and mussels, many of which live across the Tennessee River basin and are listed as threatened or endangered. >>

LEFT: DAN CHAPMAN/USFWS. RIGHT: COURTESY OF THE ASIAN CARP REGIONAL COORDINATING COMMITTEE



(Left) Angie Rodgers and Dan Schwartz ready to search for silver carp on Lake Pickwick. (Right) Similar to bighead carp, silver carp have their eyes set low on the face.



Asian carp, in general, can consume up to 20 percent of their body weight daily.

“And they are a lot more fecund than our native species, reproducing sooner in life and having more eggs,” says Schwarz, a biologist at the Private John Allen National Fish Hatchery in Tupelo, Mississippi. “Carp may out-compete our fry for food. We may lose an abundance of native species.”

The Tennessee Aquarium, upriver in Chattanooga, and the University of Georgia released an alarming study last year detailing the Southeast’s most diverse, and imperiled, waterways. Three-fourths of the nation’s fish species and 90 percent of all American mussel and crayfish species live within 500 miles of Chattanooga. The report, funded by the National Fish and Wildlife Foundation, labeled the region’s biodiversity “a veritable underwater rainforest.”

The Tennessee River watershed is blessed with aquatic biodiversity—and cursed with threats from runoff, pollution, development and invasives.

The system is home to dozens of state or federally protected mussels (including the Southern combshell), crayfish, snails and fish (such as the pygmy madtom).

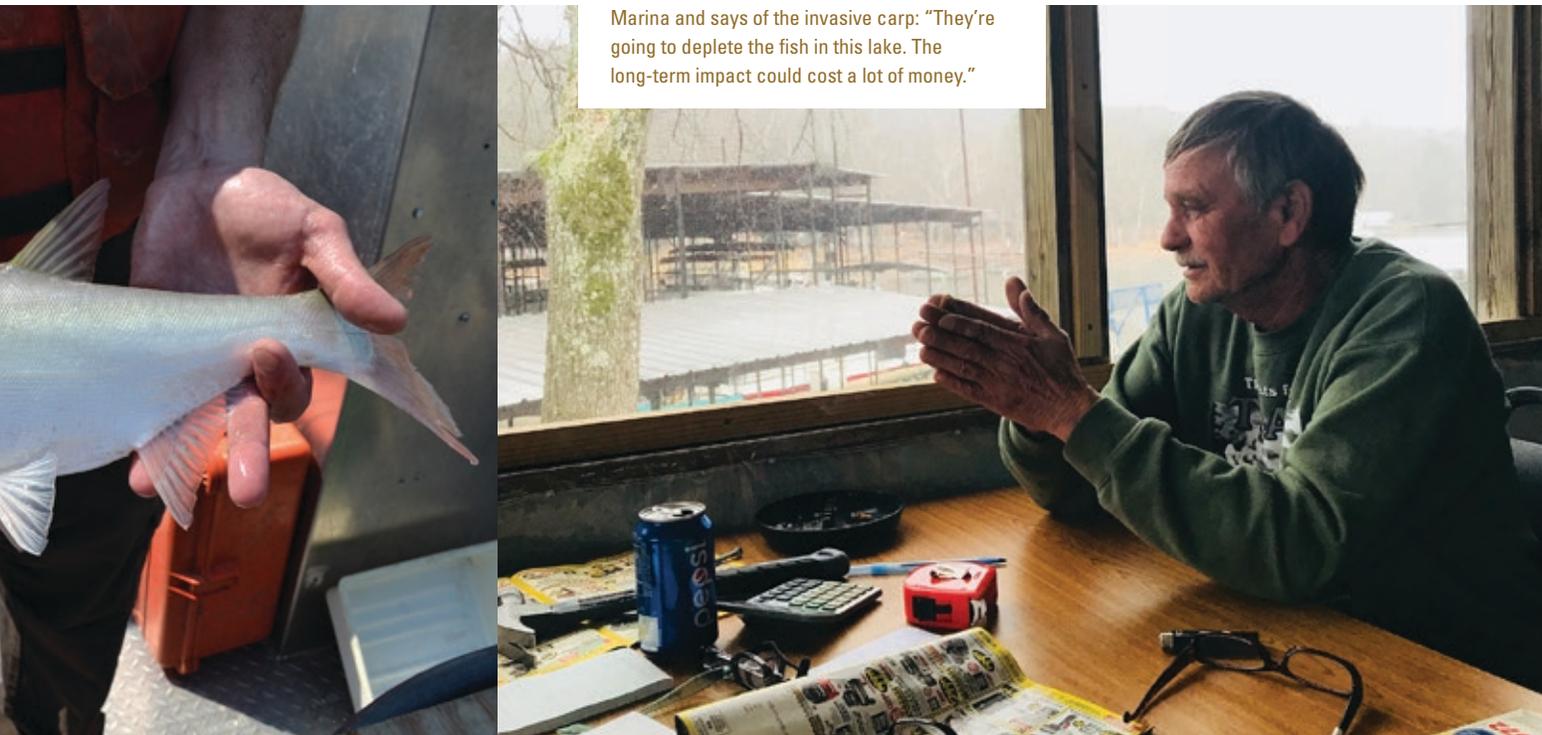
Yet more than mussels and fish are at risk. Ask Johnny Robinson, a commercial fisherman who gill-nets across Pickwick Lake.

“We’ve seen a bunch of carp; every year it gets worse and worse,” says Robinson, who wholesales fish to cities across the region. “A lot of days we’ll catch 20 or 30 of them. They stay in the same type water that buffalo do, so we catch less and less buffalo and more and more carp.”

Locals also worry the sportfishing industry will suffer if the carp conquer Pickwick.

“They got a big problem in Kentucky Lake and ours is getting pretty bad, too,” says Roger Stegall, a fishing guide renowned for landing large smallmouth bass. “Seems like they’re real calm ‘til sunny days and then they come to the surface and you see ‘em in big schools. They are a nuisance, recreation-wise.” >>

(Below) Jimmy Dees manages the Eastport Marina and says of the invasive carp: “They’re going to deplete the fish in this lake. The long-term impact could cost a lot of money.”



DAN CHAPMAN/USFWS

Dangerous, too. Boat motors and other loud noises spook silver carp who then jump clear out of the water. Anglers and water skiers, increasingly, tell of the big fish flying into their boats or knocking them over. A decade ago, a silver broke the jaw of a teenager riding an innertube on Lake Chicot in Arkansas. Stegall was guiding on Mississippi’s Lake Ferguson three years ago when a 30-pound carp jumped over his boat.

“We’ve still got good fishing here, but these jumping carp [are] what I’m really afraid is going to hurt our lake as far as tourism and fishing,” says Robinson, the wholesaler. “If things get as bad as some places up north, you’ll hardly be able to run a boat without them jumping in.”

The front line in the war’

Rodgers and Schwarz, the Service biologists, idle the jon boat in Indian Creek, a cove feeding into Pickwick Lake. Ten silver carp were captured, tagged and released here last November. Rodgers checks a telemetry gauge that tracks the carps’ movements.

“This is the front line in the war on silver carp for Tennessee and the Tenn-Tom waterway,” she says, as a blue heron passes overhead.

The Service and other federal agencies work closely with states to combat the carp. It’s a maddening and expensive challenge. The U.S. Army Corps of Engineers, for example, recommends spending \$275 million—on electric barriers, noise generators, and a new lock and channel—to keep Mississippi River carp from the Great Lakes.

In addition to research by Tennessee Tech, the state, the Service and USGS are considering “noise barriers” at various dams along the Tennessee River. High frequency sound waves would be blasted at the carp to keep them from advancing further upriver. (See: *Catching All the Asian Carp in St. Louis, Missouri*, p. 8)

“I’m most concerned with the fish getting into eastern Tennessee where we don’t have them now,” says Frank Fiss, fisheries chief for the Tennessee Wildlife Resources Agency. “We still have an opportunity to slow them down and are using all available means.” □

DAN CHAPMAN, External Affairs, Southeast Region



(Clockwise from top left) 1. Leaves of Texas wild-rice weave in San Marco River currents. 2. Since 2013, the Texas Comptroller has dedicated more than \$1.7 million for spot-tailed earless lizard research. 3. The Texas blind salamander is native only to waters of the Edwards Aquifer. 4. The Houston toad Safe Harbor Agreement between Texas Parks and Wildlife and the Service, finalized in 2017, facilitates partnerships with nonfederal landowners to recover the Houston toad on private lands. 5. The Texas pimpleback freshwater mussel is one of the Central Texas Candidate freshwater mussel species.



PHOTO COURTESY JON WRIGHT (UNIVERSITY OF TEXAS AT AUSTIN)



RYAN HAGERTY/USFWS



PAIGE NAJVAR/USFWS



RYAN HAGERTY/USFWS

Behind the Headlines

Proactive partnerships in Texas address endangered species issues | by ADAM ZERRENNER

The Endangered Species Act often makes headlines, but in reality, the majority of conservation work under the act goes on with little fanfare and to great effect. At the core of these efforts are usually solid and productive partnerships. In Texas, as in many other parts of the country, the Service is fortunate to be part of a number of stakeholder-driven, voluntary conservation programs that involve diverse groups coming together to solve complex conservation problems. These efforts, along with the Species Status Assessment (SSA) process, help the Service and partners create voluntary, proactive species conservation that works for everyone.

Texas is dominated by privately owned lands with a rich natural and agricultural heritage. It is also home to some of the fastest growing regional economies in the country, particularly along the I-35 corridor from Austin to San Antonio. Due to the high number of endangered species in this part of the state, local communities have come up with ways to balance economic development with the recovery of federally protected species and the conservation of other natural resources throughout this region. The Edwards Aquifer Habitat >>

Conservation Plan serves as a prime example where diverse stakeholders worked together to ensure water security for San Antonio and irrigated agriculture with continuous spring flow at the state's two largest springs to benefit endangered species that call the springs home, such as Texas wild rice. Numerous other voluntary conservation programs are in place in central Texas that demonstrate how the recovery of listed species can be balanced with economic growth, including the recent Range-wide Houston Toad Safe Harbor Agreement, which offers landowners benefits for voluntarily conserving toad habitat and was developed with Texas Parks and Wildlife.

Species status assessments

SSAs are a key tool in developing such conservation agreements. The Service uses the SSA process to ensure that the best and most comprehensive science informs ESA decisions. It gives Service biologists more time to spend on species science rather than on document review.

The science-focused process to develop an SSA creates opportunities for proactive stakeholder and expert engagement to ensure the Service is using the best available scientific information. Proactive engagement and communication about the ecological needs of a species and its potential threats can help foster greater transparency with states, outside experts, and other stakeholders. This common understanding of what wildlife species need can lead to beneficial voluntary conservation programs for species and ecosystems.

Engaging states and other partners

In 2014, the Service began developing a seven-year listing work plan that outlined how and when it would make future determinations to address ESA listing petitions. Developing the plan involved engaging states to ensure it considered ongoing and future research and voluntary conservation programs. In Texas, the Texas Parks and Wildlife Department, Texas Comptroller of Public Accounts,

other state agencies, universities and stakeholders were important partners.

Working with stakeholders as part of the Texas Comptroller's Endangered Species Task Force, which has received \$15 million from the Texas legislature for at-risk species research in the last six years, has helped to identify species for state-funded research and voluntary conservation programs. This task force includes a number of state agencies and a diverse group of other stakeholders. Partners focus resources toward species well in advance of the completion of the SSA or any ESA-listing decision.

Spot-tailed earless lizard

One ongoing example of how stakeholders can be involved in the SSA process is the effort for the spot-tailed earless lizard. The spot-tailed earless lizard is found in parts of central and west Texas that includes the oil- and gas-rich regions of the Permian Basin and Eagle Ford shale formation. In 2011, after reviewing a petition to list the species, the Service decided to complete an SSA and determine whether to move forward with a proposed listing by 2020. Little was known in 2011 about the lizard; historic survey data and some recent survey efforts indicated the species appeared to be in a decline.

Since 2013, the Texas Comptroller has dedicated more than \$1.7 million for spot-tailed earless lizard research. Research funded for the lizard includes large multi-year survey efforts across south and west Texas, genetic research to understand the species' taxonomy, radio telemetry studies for understanding home range, movement and habitat use, and habitat models to estimate potential habitat and loss of habitat. This research was funded to support the SSA process and was closely coordinated with the Service.

As part of this funded research project, updates are provided to stakeholders. This information may lead to the development of voluntary programs for stakeholders

interested in being involved in proactive conservation efforts for the lizard. Should these efforts materialize, they, along with the research results, will be integrated into the future SSA for the species.

Freshwater mussels

At-risk freshwater mussels occupy numerous rivers across the state of Texas. Since 2014, the Texas Comptroller has dedicated more than \$3.6 million for scientific research, and stakeholders meet monthly to discuss mussels and voluntary conservation programs available to help them.

By working closely with stakeholders and experts, the Service ensures that outside groups contribute to multiple mussel SSAs scheduled for development in the next few years.

Ingredients of proactive partnerships

In Texas, proactive partnership with the state and numerous stakeholders is working. A key factor in the success is the improved relationships and trust that has developed as a result of the increased transparency and partner engagement through the SSA process. The use of the SSA process has increased the proactive involvement of our partners and has increased their regulatory certainty in situations where they may be impacted by an ESA listing. Additional financial resources dedicated by the Texas Comptroller and Texas Parks and Wildlife have also been instrumental by funding research and supporting possible voluntary stakeholder conservation initiatives.

By moving away from a reactive approach to one that promotes proactive partnerships, together we are creating opportunities for long-term conservation of species while recognizing and addressing the potential economic issues in the state. □

ADAM ZERRENNER, Austin Ecological Services
Field Office, Southwest Region

Seeing the Tree, Not Just the Lion

*A botanist's mission
to save our natural
landscapes*

by ASHLEY SPRATT



KENDRA CHAN/USFWS

Santa Cruz cypress, Lane Mountain milk-vetch and Island bedstraw. Few people know them by name, but we can attribute their continued existence on earth, in part, to Service botanist Connie Rutherford and her lifelong commitment to their recovery.

“This is much more than just a job for her,” says Ray Bransfield, Rutherford’s husband of 27 years and a wildlife biologist for the Service (they met on the job).

“I remember Connie and our son sitting on their haunches in the middle of a field of wildflowers in the Panamint Valley.” It was a banner year for wildflowers in 1998. Bransfield describes a moment captured on film that epitomizes his wife’s love of wild places and natural landscapes, a love she nurtured traveling the world as a diplomat’s daughter and lifelong adventurer. Bransfield and Rutherford passed on their love of the outdoors to their children, Tyler and Terra.

Rutherford’s childhood was spent overseas in Venezuela, Iran, Canada and Indonesia, impressing upon her at an early age the stark contrasts between urban and natural landscapes. Her family settled in California when she was an adolescent and she recalls sleeping on the roof of her parents’ house in Long Beach “to get away from the TV, the noise, to just look at the stars.”

Later, Rutherford cut short her travels around Europe to take an introductory botany class at the University of California, Davis, in 1973.

“I had never taken a science class before,” she says. She can hardly contain her excitement as she recalls the pivotal moment more than 45 years ago, when she fell in love with the world of plants.

(Previous page) Rutherford (right) examines California seablite, a rare species of flowering plant endemic to San Luis Obispo County.

“We learned about photosynthesis. I was mind blown!” she exclaims. “How miraculous is it that plants can take carbon dioxide, water, soil and sunlight, and through this remarkable process of photosynthesis, make oxygen and carbohydrates for all the rest of life on earth to live and eat!”

Rutherford attributes to her mother the adventurous spirit that led her to become a firefighter in Olympic National Forest, a backcountry ranger in Rogue River National Forest and a natural resource surveyor in the Alaskan tundra. “My mother was a trailblazer, a pull-yourself-up-by-your-bootstraps, self-made woman. She left home at 17, learned to fly and became a decoder for the U.S. Department of State,” she says. “She had a willingness to go off into the unknown, and taught me to leave myself open to the learning experiences that the world has to offer.”

Rutherford graduated with a bachelor’s degree in plant sciences from the University of California, Santa Cruz, in 1975. She went on to pursue her master’s degree at Humboldt State University.

Rutherford argues that our society turns a blind eye to plants’ contributions to our world.

“Show a person a picture of a lion in a tree. What do people see? They see the lion,” she says. “But people don’t realize the tree is the anchor of the ecosystem, providing shelter and food for all of the wildlife that uses that landscape.”

Rutherford admits she is often asked the question, “But why do plants really matter?” For her, the answer is simple. We, and the rest of life on earth, need them to survive.

“Plants are working so hard for us, keeping our watersheds intact, pumping out oxygen, keeping our pollinators around so we can have agriculture,” she says. “They are critical to the whole web of life.”

Rutherford saw that first hand as a Peace Corps volunteer in Haiti from 1985 to 1987. At the time, Haiti had already lost 95 percent of its forests due to agriculture and other land uses. Communities faced extensive soil erosion and the waters surrounding the country were clogged with sediment from agricultural run-off. Rutherford worked alongside the Food and Agriculture Organization, a branch of the United Nations, to help villagers set up tree nurseries in their backyards to replenish the soil, thus allowing them to continue their food crops of beans and corn, while stabilizing the small plots of land on which families farmed and lived.

Rutherford returned to California after two years with the Peace Corps in Haiti. “I realized that we have a better chance to conserve our wild landscapes, and I knew I had to be part of that effort.” >>

Connie Rutherford and son Tyler exploring amid wildflowers in the Panamint Valley in California in early spring 1998.



COURTESY OF RAY BRANSFIELD



“It’s like squares in a quilt that are stitched together,” she says. “If the threads start loosening, the squares start to detach, and the whole quilt eventually falls apart.”

Rutherford spent the next three decades working to recover some of the many species of rare plants in southern and central California, some of which teetered on the edge of extinction in the 1980s due to habitat loss and fragmentation from urban expansion, agricultural conversion and recreation.

In 1990, the Service was petitioned to list more than 100 plant species in southern California under the Endangered Species Act (ESA). Rutherford, a botanist for the Bureau of Land Management (BLM) at the time, was hired by the Service to analyze their status based on the best available science, ultimately leading to ESA protections for many.

Rutherford’s work, along with that of her co-worker Tim Thomas, led to the protection of 13 plant species on the northern Channel Islands. She and her colleague worked with the National

Park Service and U.S. Geological Survey to develop a conservation strategy for those species. The strategy outlined what the plants needed to recover, set goals to reduce threats and helped guide management of the islands.

She also worked with natural resource professionals from the Department of Defense and BLM to study in depth the Lane Mountain milk-vetch, a species that only exists in the Mojave Desert. The plant, once thought extinct, was rediscovered in 1985. Rutherford and husband Ray spotted a new population of the plant a few years later, and she returns every spring to conduct surveys with natural resources staff from Fort Irwin and BLM. She suggests that the more we learn about rare plant species, the better chance we have at recovering them and conserving the ecosystems in which they live and thrive.

Connie Rutherford has dedicated more than three decades to the recovery of rare plants in southern and central California.

“It’s like squares in a quilt that are stitched together,” she says. “If the threads start loosening, the squares start to detach, and the whole quilt eventually falls apart.”

Those stitches strengthened in Santa Cruz County when conservation work allowed the downlisting of the Santa Cruz cypress from endangered to threatened under the ESA in 2015. The cypress, found in the Santa Cruz Mountains of San Mateo and Santa Cruz counties, was protected as an endangered species in 1987 due to threats from logging, development and agricultural conversion. Rutherford says the ESA listing focused conservation resources on recovery planning and projects in partnership with the >>

California Department of Fish and Wildlife, California Department of Parks and Recreation, San Mateo County and conservation efforts by private landowners in Santa Cruz County.

“We chipped away over the years to address issues like habitat protection. We worked to understand the ecology of the species—especially its response to wildfire—and established seed collections,” she says.

The number of known trees in 1987 was 2,300. Today, improved data indicate some 33,000 to 44,000.

“I think one of the things that’s so remarkable about Connie is how she works with people,” Bransfield says. Bransfield has observed his wife’s knack for networking and building partnerships that have helped contribute to the recovery of listed plant species such as the Santa Cruz cypress.

Rutherford has mobilized universities, land managers, nongovernmental organizations and research institutions across southern and central California to support rare plant conservation.

With three other botanists, she established Botswap, a forum for dialogue across the botanical community to share information and resources along the Central Coast region. “We need to have that dialogue,” she says. “We need to make sure we have the best information to help us reach our goals, while at the same time putting a name and a face on our agency.”

Botswap has since been replaced by another collaborative group, headed by the Land Conservancy of San Luis Obispo County that is focusing on conserving unique dune habitats and their constituent species, including Nipomo lupine. After years of securing support for research on the species, Rutherford is heartened to see that the combined efforts of the Land Conservancy, the University of California, Santa Barbara, and the Santa Barbara Botanic Garden may have finally turned



JENNY MAREK/USFWS

a corner and put this plant back on the road to recovery.

Rutherford has also served in numerous leadership roles for more than 28 years with the California Native Plant Society, a large network of partners from academics to nonprofits dedicated to plant conservation. She is currently working on a committee to promote a certification program for professional botanists in California.

“Connie’s decades-long, active engagement with the plant research and conservation community enables her to collaborate with species experts to address questions that contribute to conservation of our listed plants,” says Cat Darst, Connie’s supervisor and Assistant Field Supervisor for the Service in Ventura. “These relationships are critical to help our partners recognize what steps are needed to recover our listed plant species.”

When asked what advice she would give to budding botanists, she says, “If you have the opportunity to get out and work in the

Rutherford serves as an educator and mentor to young biologists.

world, volunteer; take on internships, see different parts of the country, the world, do it! Learn how land-use planning works, how laws and regulations work, and learn how to communicate and work with all different types of people.” She adds, “And don’t be afraid to ask questions. Seek out mentors in your field. Seek out people who have spent their lives studying what interests you. Those experiences and that knowledge are irreplaceable.”

As for the future of plant conservation, Rutherford says there’s one thing that we need to work toward. “As a society, we’ve decided that conservation of our natural resources is a value that we uphold. There’s education that needs to continue to take place, so that our kids don’t only see the lion, but they also see the tree.” □

ASHLEY SPRATT, External Affairs, Pacific Southwest Region

MUSEUM OBJECTS COME TO LIFE

This is a series of curiosities of the Service's history from the U.S. Fish and Wildlife Service Museum and Archives. As the first and only curator of the museum, Jeanne M. Harold says the history surrounding the objects in the museum give them life.

A Curator's Work Is Never Done

Not too long ago a student attending a class at NCTC dropped down to the museum to ask a question. He was from a different agency, BLM I think, and he suspected that a curator could help him. He had a very old brass buckle or button that he had found on the beach in Florida. He was wondering if I could help him identify it, tell him its age or anything about it. Wow, that is some overwhelming confidence in a complete stranger who is just a curator. After a little searching on the Web, I could tell him it was British because it had a crown with three feathers on it.

It was the symbol of the Prince of Wales. Wouldn't have had a clue without the Web. Easy knowledge at our fingertips.



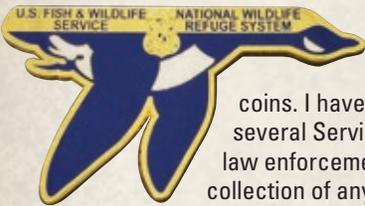
PHOTO: FRY1989, CREATIVE COMMONS



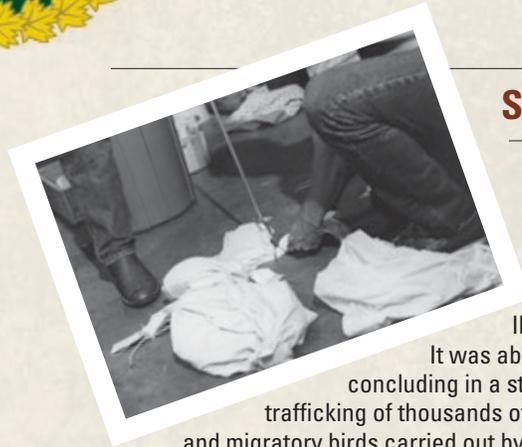
Murie Cabin in a Car

One of our most beloved objects is a scale model of Olaus and Mardie Murie's cabin, which has been on display at NCTC for years. It is a beautiful hand-made model that is about 4 foot by 3 foot, and it was made by volunteers of the Murie Foundation. It is an exact replica of the house, and you can look into it from the cut-out in the roof. It includes all the furniture down to a tiny framed photograph of Mardie with John Denver sitting atop the diminutive mantle. It is almost like being in the cabin yourself. There are even intricate deer and a porcupine in the yard outside. The funny part of this story is that years ago an intern and I had to go pick it up in Moose, Wyoming, and drive it back to NCTC. The stares we got when people passed us were amusing and frequent. It is not often that you pass an SUV carrying an entire cabin in it!

Challenge Coins



I think that one of the coolest trends that has come down the pike is challenge coins. I have seen many of them from several Service programs, especially law enforcement. We would like to start a collection of any and all challenge coins that have to do with the Service, and eventually put them on display here at NCTC. So, if you have a coin you would like to donate to our museum, please send them to me! (Email me at <jeanne_harold@fws.gov> for an address.) Round, square, triangular or shaped like the blue goose flyer, we will be overjoyed to have the coin collection for future display, the more the merrier.



Snakes on a Plane

I was recently reading a Department of the Interior news release from July 1981 titled "Live Animal 'Sting' Reveals Massive Illicit Market in U. S. Wildlife."

It was about an 18-month investigation concluding in a sting operation involving the trafficking of thousands of snakes, turtles, lizards and migratory birds carried out by more than 175 individuals. At that time, hundreds of thousands of these animals were being taken from the wild in the United States and sold in the thriving black market and smuggled into Europe and Japan. Many of the animals moved through the Atlanta Wildlife Exchange, a wholesale reptile business in suburban Atlanta run by undercover agents. Many of the snakes and reptiles were extremely dangerous. This sting operation was conducted by about 200 federal and state wildlife conservation officers. The Service estimated back then "that at least 100,000 venomous and nonvenomous snakes are shipped secretly through the U.S. mail annually...[and] masking tape is commonly placed over the rattles of rattlesnakes so they won't be heard." Wow, talk about snakes on a plane. These airmail flights would be Samuel L. Jackson's worst nightmare. The Service continues to fight wildlife trafficking at home and abroad. You go, FWS officers!



Missing Meetings?

Retirement brings many changes to your life, some good and eagerly anticipated and some not as much. No more a slave to the alarm clock, no more deadlines or restrictions. Those are good things. But you might also feel a sense of loss at no longer having authority or a clear mandate to stay involved in fish and wildlife resource issues. You might have anticipated being out of the loop or missing the closeness with like-thinking colleagues, but you might be surprised that things you thought you disliked you now miss, like meetings with friends and friendly adversaries alike. At least, that's what I found.

So once you've retired and have caught up on the many domestic tasks and honey-dos that you've neglected for so long, what's next? Travel? Personal projects? Just plain relaxation? Sure, all of these and more. But you will still miss some of your old life and some of your working buddies. And you'll never really lose interest in things fish and wildlife or in what's going on with the Fish and Wildlife Service, once you're no longer there to tell them how to do the right things and how to do things right. There is a great way to maintain your connections with colleagues and to continue your involvement with fish and wildlife matters. It's called the Association of Retired U.S. Fish and Wildlife Service Employees, or FWS Retirees for short. And in case you wondered, we do it all while having fun.

Every 18 months or so at some of the most interesting and scenic places throughout the country, we hold an FWS Retirees Reunion where we get together for a week with former colleagues and active Service personnel to socialize, keep informed and tour local attractions. We have met on the Atlantic, Pacific and Gulf

coasts, the heartland of the United States and on the Big Muddy. And frequently, we return to our historic home at the National Conservation Training Center in Shepherdstown, West Virginia.

At each reunion, we have informative presentations and discussions on such diverse subjects as gray wolves in the northern Rocky Mountains, wildlife and border issues along the Rio Grande, and whooping crane recovery efforts and migration problems. And to top off each reunion, we have our Reunion Banquet and silent auction. Our banquet speakers have included such notables as author Doug Brinkley and Joel Sartore, conservationist, author and photographer extraordinaire and a Fellow of the National Geographic Society.

A highlight of each reunion is having the FWS Director or Deputy Director discuss current happenings in the Service and the Regional Directors keeping us abreast of local issues. This reunion is no exception. And lest you think we just sit and listen, we almost always let them know our feeling on how things are going and what directions we think the Service needs to take. We also let them know we stand ready to help whenever needed. And as an organization some 3,000 strong, unfettered by the rules that might restrain government employees, we have significant influence.

Our 2018 venture was along the scenic Oregon Coast the first week in May. About 135 or more retirees and active Service members attended.

So as you think about life after retirement, please don't hesitate to join us and keep alive some of those things that drove you during your careers. Keep in touch with your colleagues, stay involved and effective in matters of importance to you, and most of all, have a ball doing it. □

JIM MCKEVITT, Secretary/Scribe, Association of Retired Fish and Wildlife Service Employees



Laura Bonneau, visitor services manager at Aransas National Wildlife Refuge in Austwell, Texas, gives retirees a tour of Aransas during the 2015 reunion.

COURTESY FWS RETIREES

All folks who at one time worked for the Service or were members of a Friends group are automatically members of the nonprofit Association of Retired Fish and Wildlife Service Employees (FWS Retirees Association). They can become active members who stay up-to-date with their former agency and its issues, and connect with former colleagues.

The FWS Retirees Association aims to foster camaraderie among retirees and active employees; recognize and preserve the rich history of the Service and the many contributions of employees; foster the preservation and use of objects and information relating to the Service's unique history; and involve present and past employees in the history and heritage of the Service.

Our members and their families and friends enjoy reminiscing at reunions, traveling, gathering stories, conducting oral history interviews and mentoring.

Find out more about us at our website, <fwsretirees.org>.

transitions

Pacific Southwest



Retiree **Dwight Harvey** worked in the Sacramento Fish and Wildlife Office for 23 years.

As a fish and wildlife biologist in the Division of Conservation Banking, he worked with local, state and federal agencies—as well as consultants and private landowners—to establish more than 25 conservation banks totaling 14,000 acres for the permanent protection and management of 16 plants and animal species on the endangered species list. Dwight has been the office's resident chef, preparing an array of creative meals over the years, and plans to pursue a career as a private chef and children's book author in retirement. □



Pete Sorensen, supervisory fish and wildlife biologist at the Palm Springs

Fish and Wildlife Office, retired in March after more than 41 years with the federal government. During his tenure, Pete worked on a great diversity of listed species in California including

Peninsular bighorn sheep, San Francisco garter snake and Santa Cruz long-toed salamander.

He began his federal career with the Bureau of Land Management in the mid-70s and transferred to the Service's first listed-species-only field office in the country, in Sacramento, California, in 1980. He also spent time at the Carlsbad Fish and Wildlife Office before finishing his career at the Palm Springs Office, where he most recently worked on a proposed rule to reestablish Sonoran pronghorn in California. Despite his departure, Palm Springs biologists will continue to implement his visionary and effective endangered species work. □



In March, **Rick Farris**, wildlife biologist and section 7 coordinator for the

Service in Ventura, California, retired after two decades with the agency. In that time, one of his fondest memories occurred while working on the Tejon Ranch Habitat Conservation Plan. The 272,000-acre ranch is the largest single private landholding in California. "During one of my visits, we had reached a hill overlooking the Antelope Valley. It was raptor migration season, and we could see 'kettles' of hawks, falcons and eagles soaring wherever there was a good updraft. They would ride the thermal to a great height, then glide to the next one and repeat

the process, covering huge distances with little effort. Seeing hundreds of raptors soaring together in these swirling clouds was one of those moments that reminded me that what I was working for was worthwhile."

Not everyone sees that, though. Rick says that one of the most difficult things in the job was one of the most basic: "convincing people that conservation is worthwhile; that it's an effort to protect something we should all cherish." Nevertheless, Rick will miss the job, especially the people. "I value my time working with others in the office more than anything. I've always had excellent mentors and I've wanted to be the same for other people. There's a great sense of accomplishment when you can explain a difficult concept and have someone understand it and take it with them."

In retirement, Rick hopes to advance his woodworking skills and build musical instruments. He also plans to just "enjoy life with my wonderful wife who will retire in June after almost 30 years as a biology professor." But he still plans to "further conservation in some way, whether through activism or volunteering with conservation organizations."

And he offered some advice for biologists who are just starting their careers with the Service: "Stick with it. No one else is going to do your job as well as you, and no one cares more than you. At some point, I came to realize that if someone with less concern for our natural world was doing my job, they wouldn't bother to notice something extraordinary, like a mass migration of songbirds or

habitats worthy of preserving when possible, like Tejon Ranch. You are the ones who care the most or else you wouldn't have dedicated your careers to conservation. You are the best ones to carry out the Service's mission." □

Lori Rinek, Section 10 biologist, retired from the Bay-Delta Fish and Wildlife Office at the end of March. □



Slader Buck (seen with Jill Terp, refuge manager at San Diego National Wildlife Refuge) retired on March 20. Deputy project leader at San Diego National Wildlife Refuge Complex for 18 years, he served in the federal government, all in conservation, for 36 years.

Slader has always had a passion for getting people outdoors, personally and professionally, and expanding public access to all types of outdoor recreation. □

Northeast

The Service's Northeast Region celebrated the contributions of several employees who retired between December and March. Collectively, they dedicated centuries to public service, and they leave a legacy of professionalism and accomplishment. We wish them success and fulfillment in the next phase of their lives and thank them for their commitment to the American public and wildlife conservation in the Northeast.

Steve Boska: Steve Boska served the country for 51 years. A Vietnam veteran, he spent 20 years in the Air Force, retiring as a chief master sergeant, the highest enlisted rank. He then worked for 31 years as a maintenance mechanic at Potomac River National Wildlife Refuge Complex. He says he "lived for the job" and left the shop every night with a smile and the personal reward of doing meaningful work.

Deborah Carter: During her time as recovery permits coordinator at New York field Office, Deb Carter worked to create a community of practice among regional recovery permits coordinators by establishing a forum for discussing interpretation and application of law, regulation and policy; developing more-efficient permit-processing and program-management procedures; and ensuring national consistency in program implementation. She also helped develop a regional strategy for implementation of the Recovery Permits Program in the Northeast and helped guide the development of a programmatic

Regional Director's Recovery Permit to authorize routine recovery activities conducted by Northeast Region employees.

Christal Cutler: Christal Cutler worked for the Service for almost 27 years. For the past 21 years, she worked in the Contracting and General Services Division, and held a Contracting Officer's Warrant and a Grant's Officer's Certificate. Christal worked with the Hurricane Sandy Contracting Division and managed several multimillion-dollar construction contracts. She and her team received the Northeast Region Eagle Award in 2017 for their contributions to and support of Hurricane Sandy resilience projects.

Ronald Essig: As a fisheries biologist with WSFR since 1991, Ron Essig greatly advanced sport fish restoration in the Northeast through state partnerships. Ron is widely recognized for his expertise in fisheries research, surveying, propagation and restoration, particularly related to marine species. He is also a renowned fisheries scientist. After serving as chapter and division president of the American Fisheries Society (AFS), he led the national organization as president from 2015 to 2016. Ron received the prestigious Dwight A. Webster Memorial Award from the AFS northeastern division in 2016.

Ward Feurt: Ward Feurt worked for the Service for 46 years—on national wildlife refuges in New Mexico, Oklahoma, Texas and Florida; in regional offices; and most recently at Rachel Carson National Wildlife Refuge in Maine, where he retired as refuge manager. During his tenure, the refuge fledged

412 piping plover chicks and conserved more than 1,170 acres of wildlife habitat. Ward hired and mentored hundreds of new conservation professionals during his career. His dedication to conservation of wild places, his promotion of strong partnerships, and his love of Rachel Carson Refuge has left the refuge a much better place. Says Ward: "A productive career distinguished by the fantastic people with whom I worked."

Alexander Hoar: Alex Hoar, fish and wildlife biologist for Ecological Services, helped initiate and complete the Penobscot River Restoration program that opened up more than 1,000 miles of Maine's Penobscot River. He helped lead the team that successfully negotiated a 50-year agreement with Exelon to improve fish passage at the Conowingo Dam and successfully led the largest Federal Energy Regulatory Commission program in the Service.

Thomas Jasikoff: Tom Jasikoff, who retired as refuge manager at Montezuma National Wildlife Refuge, seized upon the opportunity for growth and landscape-level conservation at Montezuma by working with partners, including the New York Department of Environmental Conservation and Ducks Unlimited, to create the Montezuma Wetlands Complex, one of the largest and most ambitious wetland restoration and enhancement efforts in North America. It has been recognized as an important bird conservation area by many conservation organizations and has been highlighted in many

conservation plans. As project leader, Tom oversaw implementation of an alternative strategy to conserve vital natural resources in the area by establishing the St. Lawrence Wetland and Grassland Management District.

Cynthia Britton Lane: Cindy Lane served as deputy refuge manager at Great Dismal Swamp National Wildlife Refuge in Virginia and North Carolina for more than two decades. Cindy supervised the day-to-day operations of the refuge and guided completion of the station's Comprehensive Conservation Plan from 2002–2006. She held the refuge together during several wildfires, including the largest fires on record in 2008 (4,600 acres) and 2011 (6,500 acres). She was instrumental in ensuring Service trust resources were protected and enhanced to the greatest extent. In 2017, Cindy was recognized by the Northeast Region Law Enforcement Chief for her continued support of the National Wildlife Refuge System law enforcement program.

Daniel Leahy: For more than 26 years, Dan Leahy has been a positive force for protecting publicly owned places to hunt, fish and enjoy nature in the Northeast. As a land acquisition specialist, Dan helped protect 292,791 acres of land—37,712 acres that became part of the National Wildlife Refuge System and 255,079 that were acquired by states and other partners through grants administered by the Wildlife and Sport Fish Restoration Program (WSFR). Well-known for his expertise, deeply thoughtful manner, and creative problem-solving, Dan elevated the Northeast Region's WSFR land-acquisition program to one of the best in the nation. »

Mark McGee: Mark McGee began his career with the Service at Chincoteague National Wildlife Refuge as a temporary law enforcement seasonal employee in December 1991. He served concurrently in the U.S. Coast Guard from 1983 until 2013. By November 1994, he was leading the complex law enforcement program at Chincoteague, responding to 2,723 incidents in his first full year. Mark served as an instructor at Federal Wildlife Officer Basic Training and as the National Incident Commander. He also worked with other law enforcement agencies to protect the Eastern Shore.

Sandra Perchetti: Sandy Perchetti served as the volunteer and community partnership coordinator at New Jersey's Edwin B. Forsythe National Wildlife Refuge for nearly 23 years. During that time, she served as the Northeast Region volunteer coordinator and received a Northeast Region Eagle Award and a Communication Champion Award. In 2012, she was awarded the Legend Award for her achievements in bridging the gap between children and the outdoors. The award is presented annually by the American Recreation Coalition, in partnership with the Service, National Park Service, Bureau of Land Management, Bureau of Reclamation, Forest Service, U.S. Army Corps of Engineers and Federal Highway Administration. Sandy has left a legacy of kindness, good humor and inspiration for the volunteers, visitors and colleagues whose lives she has touched.

Susan Robinson: After starting at the Federal Aviation Administration, Sue Robinson spent most of her nearly 27-year federal career with the Service. She worked first for Ecological Services in New Jersey. In 2009, during the IT consolidation, she became part of the Division of Information Technology Management in the Northeast Regional Office. Sue offered outstanding customer service, always with good humor, to offices throughout the region, supporting networks, software and VIDEO Relay. She also had a national role, becoming known as a premier mobile device expert and creating a more positive experience for Service customers.

Janith Taylor: Janith D. Taylor retired after 36 years of service for the National Wildlife Refuge System. Jan started at Carolina Sandhills National Wildlife Refuge in 1982 and held positions at Great Swamp National Wildlife Refuge and Edwin B. Forsythe National Wildlife Refuge. She became regional refuge biologist in 1993 and the Chief of the Division of Natural Resources and Conservation Planning in the Northeast Regional Office in 2012. Jan had a national impact with her co-authorship of the "Resources of Concern Handbook," and was one of the main authors on the Habitat Workgroup of Fulfilling the Promise, along with many other peer-reviewed publications. She is known for her cutting-edge data management applications, use of geospatial technology and her innovative approaches to address natural resource management issues.

John Warner: John Warner came to the Service from the Federal Energy Regulatory Commission, and his experience at that agency made him an extremely effective hydropower biologist for the New England Field Office. Throughout his career with the Service, John developed close relationships with staff from other federal and state agencies and hydropower NGOs. It was these partnerships, coupled with his ability to work cooperatively with industry, that led to a number of successful, complex settlement agreements, achieving substantial resource benefits.

Bill Zinni: Bill Zinni's habitat conservation work for the National Wildlife Refuge System brought him into contact with many in the Service family during his 35-year career. As a realty specialist, he was instrumental in the establishment of new refuges—including Lake Umbagog, Canaan Valley, John H. Chafee, and Great Thicket—and the expansions of many others. Bill is also a talented musician who found numerous ways to inspire and uplift people with his fish and wildlife themed music over the years. He was instrumental in the creation of the Refuge Centennial Songs of the System CD and has regularly performed with his Fish & Wildlife Service band over the years in and outside of the Northeast Region. □

Headquarters



Tim VanNorman, Chief of the Division of Management Authority—Branch of Permits in the

International Affairs Program, retired after more than 25 years with the federal government, including 24 years with the Service.

Hailing from El Paso, Texas, Tim achieved a bachelor of science in forestry and wildlife management from Stephen F. Austin State University in Nacogdoches, Texas, in 1983, and a master of science in wildlife management from Texas A&M University in 1987 with a thesis on the nutritional aspects of wild turkey distribution.

With brief stints as a camp director in New Mexico, bartender in England and zookeeper in El Paso, Tim's career in international conservation began in earnest in 1991 during his Peace Corps service in Botswana. As game warden of Gemsbok National Park, Tim put his wildlife and habitat management training into practice, developed personnel management skills and built a first-hand understanding of the challenges and complexities of international wildlife conservation.

He joined the Service as a biologist in 1994 with the Office of Scientific Authority for the Convention on International Trade in Endangered Species of

Wild Fauna and Flora (CITES), and served as an Endangered Species Act (ESA) listing biologist. Beginning in 2001, Tim devoted 17 years to leading the Branch of Permits, supporting his staff through the challenges of reviewing applications for upward of 40,000 permits per year under CITES, the ESA and other laws for a wide variety of activities ranging from the import of zoo animals, to foreign travel with exotic pets, to the import of sport-hunted trophies, to the international sale of rosewood guitars. He graduated from the Service's Advanced Leadership and Development Program (ALDP) in 2013.

Tim's work with the International Affairs Program took him to the four corners of the world as he represented the Service at meetings of the CITES Conference of the Parties in Chile, Thailand, the Netherlands, Qatar and South Africa, as well as meetings with international stakeholders and foreign governments.

Tim looks forward to his next chapter, where he'll enjoy time with daughter Hannah and wife Janine, and shift focus to his passion for sustainable living. He and **Janine**, newly retired from the Branch of Foreign Species in the Service's Ecological Services Program, plan to restore a 600-acre property in upstate New York through cob and straw bale construction, sustainable agriculture, and wildlife and habitat management. They hope that the property will ultimately become home to a multigenerational intentional community of like-minded friends and family, and an environmental education center where local students and families can learn about natural history and permaculture. □

honors

Southeast



The winner of the 2017 Sam D. Hamilton Award for Transformational Conservation Science is **Bill Uihlein**, Assistant Regional Director for Science Applications in the Southeast Region

For several years, Bill has been working with the Service and broader conservation community to define how to ensure landscapes in the Southeast are capable of sustaining populations of fish and wildlife range-wide at desired levels. Under Bill's leadership, the Service is leading an effort to be more collaborative (internally and externally) and strategic in targeting conservation activities to achieve true large-scale conservation in the Southeast.

Bill was a driving force in efforts to unite conservation leaders from 15 state and 13 federal agencies, who have joined together into a shared, long-term vision called the Southeast Conservation Adaptation Strategy (SECAS). Through Bill's coaching, mentoring and determined persistence, SECAS is making great progress, transforming how agencies and businesses achieve their missions.

SECAS has become a shared vision among federal, state, nonprofit and private organiza-

tions, which are now coordinating their actions and investments to focus on common goals by using science to design and achieve a connected network of habitats and waters that supports thriving fish and wildlife populations. □



The Service has won a **Federal Energy and Water Management award** from the Department of Energy for the Southeast Regional Office building (Seen: award recipients, members of the Department of Energy, and other Service staffers, including Principal Deputy Director Greg Sheehan on the far right). In FY2016, the Service completed an extensive energy retrofit on the existing Southeast Regional Office building. The high performance, sustainable 62,685 gross square-foot facility underwent a total modernization, resulting in 980 MMBTU in annual energy savings, avoiding at least 202 metric tons of greenhouse gas emissions.

Projects installed include a high efficiency 215-ton capacity chiller system with individual double-filtered air handlers on each floor with updated automated controls, energy recovery unit on the roof with hot gas reheat with field provided sensor, energy recovery wheel and outside air intake by CO2 monitoring per floor, and airtight duct sealants.

Other energy efficiency strategies make this project exemplary: cool roof; high R-value double pane windows with window films; daylighting; energy-efficient fluorescent and LED lighting; and PC power management through efficient computer purchases and controls. Low VOC-emitting carpets, paints, and adhesives contribute to a healthy indoor environment. Upgraded low-flow fixtures conserve more than 757,000 gallons of potable water annually. Further reducing greenhouse gas emissions, employees are encouraged to use alternative methods of transportation when commuting to and from the office, with the provision of places to secure bicycles and locker rooms with showers. □

Northeast



Martin "Marty" Miller, the Chief of the Division of Endangered Species in the Northeast

Region, has won the 2017 Science Leadership Award, recognizing him as an outstanding science leader, relationship builder and tackler of complex policy situations through science.

Marty has established himself as an expert on all things Endangered Species Act (ESA) and manages his high-functioning team in a considerate and strategic manner.

Marty demands the highest quality scientific work from himself and his team, yet does so in such a way that his team feels supported and energized to do better. He is unwavering in his dedication to ensuring the best science is appropriately applied to ESA decisions, whether it is a listing determination, a habitat conservation plan or an ESA consultation with another federal agency.

He believes in empowering his team to “be science leaders” and participate in the scientific community through collaborating with other scientists, serving as peer reviewers and on graduate committees, presenting at scientific conferences, and authoring numerous scientific publications.

Marty also supports his staff in working on national teams that are defining the next evolution of ESA policy for national ESA section 7 consultation streamlining guidance and the new Species Status Assessment process. □



Wendi Weber, Northeast Regional Director for the Service, has received the 2018

Robert McDowell Award for Conservation Management Excellence, the highest honor awarded by the Northeast Association of Fish and Wildlife Agencies (NEAFWA).

The Robert McDowell Award was established by the NEAFWA directors to honor career professionals who have made significant contributions to fish and wildlife conservation in the northeastern United States and eastern Canada.

As Regional Director, Weber oversees Service activities in 13 states—from Maine to Virginia—and the District of Columbia. She currently leads more than 800 employees at more than 130 offices, including 72 national wildlife refuges. Weber has worked for the Service since 1998 but also has experience working for state fish and wildlife agencies in both Georgia and Florida.

“Throughout her career, [Weber] has consistently demonstrated the essential principles of collaboration and cooperation with conservation partners at all levels. She is deeply respected and appreciated by her colleagues in the state fish and wildlife agencies in the northeastern states,” said NEAFWA President James Connolly in presenting the award.

“While it’s always been true that effective conservation requires collaboration, our award winner has excelled at the difficult task of motivating and inspiring citizens, key stakeholders, elected leaders, policymakers and colleagues in other agencies—both state and federal,” Connolly said. “Indeed, our award winner understands that conservation today does not happen in the absence of partnerships and teamwork.”

Weber was cited specifically for her leadership in region-wide Service and state efforts to restore Atlantic Coast habitats in the aftermath of Hurricane Sandy. She also was recognized for guiding the Service and state efforts to restore White River National Fish Hatchery in Vermont, which was nearly destroyed by Hurricane Irene in 2011. At the dedication ceremony to reopen White River in 2017, Vermont U.S. Sen. Patrick Leahy called the effort “a story of heroics.”

Nowhere has Weber’s leadership been more evident than in the work of Northeast states to conserve the New England cottontail, Connolly said.

“Because of long-term, landscape-scale habitat alteration throughout their native range, the New England cottontail is indeed in perilous condition. With careful attention to the requirements of the Endangered Species Act with a focus on the congressional intention of the act—namely conserving and restoring rare species—[Weber] has proven the value of cooperation and collaboration in conservation.”

He added that the approach works, and success with the New England cottontail effort has proven to be a respected model. It is now used in other landscape-scale conservation efforts, such as protecting monarch butterflies. □

Southwest



Matthew Butler, Ph.D., a biometrician in the Division of Biological Sciences,

Refuges, in the Southwest Region, has won the 2017 Rachel Carson Award for Exemplary Scientific Accomplishment for his rigorous scientific work for whooping cranes and lesser prairie-chickens.

His work is helping to ensure that the most appropriate, best available, high quality scientific and scholarly information is available to advance stewardship for these species.

Matt led the development of an improved and peer-reviewed survey protocol for whooping cranes. He also conducted a population viability analysis, determined that juvenile recruitment most influences population recovery and analyzed influences on juvenile recruitment. Together, these scientific contributions are steering management toward habitat protection along the Texas Gulf Coast and refocusing research toward understanding the declines of whooping crane recruitment on breeding areas in Canada. »

For lesser prairie-chickens, Matt led the team that developed aerial survey techniques for lesser prairie-chickens, which has provided population estimates, new lek locations, and areas to target for monitoring and conservation. This information informs on-the-ground conservation by identifying how energy development can be steered away from places favorable to lesser prairie-chickens. □

in memoriam

Northeast



Bill Ashe, career Service employee and father of Dan Ashe, former Director of the Service, died December 14 at the age of 88.

Bill Ashe began his career with the Service as a realty specialist, identifying pieces of land that are particularly important for wildlife and working to purchase them, in effect creating and expanding the nation's national wildlife refuges. During his career, he

protected more than 840,000 acres throughout the country, including land that is now part of J.N. "Ding" Darling Refuge in Florida, Okefenokee Refuge in Georgia, Sevilleta Refuge in New Mexico, as well as Oxbow Refuge in Massachusetts.

In 1975, Bill became the Deputy Regional Director for the Northeast Region, adjacent to the Oxbow Refuge. He quickly became ingrained in his community, serving on the Harvard Planning Board and as a Selectman. Bill also served as the president of the Nashua River Watershed Association, where he worked with partners to protect thousands of acres of land. When Fort Devens Army Base was closed in the mid-1990s, Bill helped ensure the transfer of another 836 acres of land from the Army to the Service, further expanding the Oxbow Refuge.

Bill's willingness to take on controversial issues for the benefit of America's wild places and his knack for mentoring others inspired many who worked beside him.

Because of his many contributions to the Oxbow Refuge, just one piece of land protected by Bill throughout the years, Oxbow in 2016 held a dedication ceremony for the Bill Ashe Visitor Facility, a beautiful new building that will host educational programs to connect people with nature. □

Pacific Southwest

Christopher Gregory, 47, a fish and wildlife biologist for the Palm Springs Fish and Wildlife Office in California, died March 15.



In Palm Springs, Chris dedicated much of his time to studying and conserving the

federally endangered Casey's June beetle and the Western burrowing owl, a species of concern in California. He also focused on conserving Peninsular bighorn sheep and spent many evenings and early mornings in the field conducting wildlife research on those three species with his wife, Noelle Ronan, also a fish and wildlife biologist in the Palm Springs Office.

He worked with local communities to reduce the impacts of high-usage recreational trails on the species. He was effective at fostering partnerships with various collaborators to promote strong conservation efforts and was especially adept at winning research grants to further the recovery of the three species. Chris also loved reptiles and amphibians.

Three years ago, Chris was diagnosed with a type of lung cancer that commonly affects nonsmokers. Throughout his treatment, he focused on fighting the illness and continued to live life to the fullest. He worked for wildlife conservation as passionately as ever, even in the weeks

preceding his death. His strength and positivity was an example to many.

Chris studied wildlife conservation around the globe. He received his bachelor's in wildlife, fish and conservation biology from the University of California, Davis; his master's in wildlife ecology and conservation biology from the University of Florida, Gainesville; and his doctorate from Griffith University in Queensland, Australia. He had environmental conservation affiliations across the world, too.

The Carlsbad and Palm Springs Offices will remember Chris for his dedication to furthering conservation in the desert of California, and the persistence, determination and positivity he emanated throughout his time with the Service. □

Southeast

Pat Metz, a longtime refuge ranger at Savannah National Wildlife Refuge in Georgia, died February 25.

She was well-known for the long hours she worked and the perfection she demanded.

In a 2010 profile of Pat when she retired after 32 years on the job, she told the *Savannah Morning News*: "I never thought of it as a job. It was more like a calling, like a priest. This is what I wanted to do." □

Fish & Wildlife News

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Pretty in Pink

In a visit that seemed to celebrate Valentine's Day, a flamingo plunked down its long slender legs into a salty marsh at the San Diego Bay National Wildlife Refuge. It wasn't for a short visit, however, as it stayed for more than three months—and counting. With the nearest wild flamingo population thousands of miles away, it is thought to be an escapee because it is banded and the right secondary feathers are clearly clipped. But alas, no has claimed it. The pink surprise has attracted news crews, neighbors, and birders flocking to see the wayward bird happily foraging and filtering plankton on the recently restored salt marsh.



Lisa Cox/USFWS

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