



# Fish & Wildlife *News*

**SPOTLIGHT**

**WSFR Works / 12**

Birdies and Other  
Wildlife / 18

No Floaters / 22

features

**SPOTLIGHT: WSFR Works / 12**

**Engine that Does / 14**

*Behind-the-scenes WSFR staff makes conservation work possible.*

by MELISSA A. CLARK, JUDY DRISCOLL and DONNA ZANGER

**Bear Necessities / 16**

*Montana Grizzly relocation provides rare close-up of a burly bruin.*

by AMANDA HORVATH

**Birdies and Other Wildlife / 18**

*Service grants help turn golf course to revitalized wetlands community.*

by ASHLEY MCCONNELL

**Remarkable But Understudied Fish / 20**

*Essential alligator gar research is underway in Oklahoma.*

by CRAIG SPRINGER

**No Floaters / 22**

*Deepwater release helps in rockfish conservation.*

by BRITTANY BLAIN

**MORE FEATURES**

**Wings of Hope: A Restoration Connection / 26**

*Conservation projects improve beaches for Great Lakes piping plovers.*

**Hearing Monarchs / 28**

*Inspiring conservation after listening to the delicate sound of butterfly wings in Mexico.*

**On the cover:**  
Red fox on  
Kodiak National  
Wildlife Refuge  
LISA HUPP/USFWS

departments

**From the Directorate / 1**

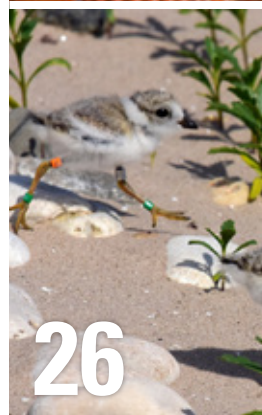
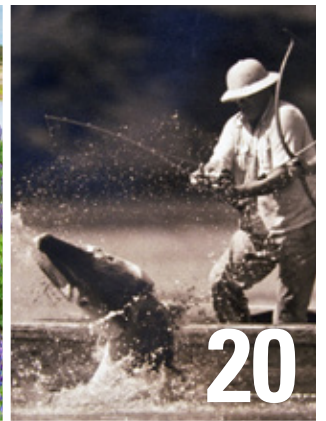
**News / 2**

**Field Journal / 24**

**Curator's Corner / 32**

**Life After the Service / 33**

**Our People / 34**





Margaret Everson,  
Principal Deputy Director  
of the U.S. Fish and  
Wildlife Service

# WSFR Works for Conservation

Have you heard of the U.S. Fish and Wildlife Service's Wildlife and Sport Fish Restoration Program (WSFR)? You may think it is all about hunting and fishing. But as Northeast Region WSFR Chief Colleen Sculley learned (p. 24), it is about so much more.

The WSFR Program's work supports much of the conservation going on throughout our country. The program administers funds and manages grants to state and tribal partners to keep our natural resources healthy and provide recreational opportunities.

Although many WSFR grant programs are national in scope, some are specific to regions. The program works in the Highlands Region (Connecticut, New Jersey, New York and Pennsylvania) with the Highlands Conservation Act Grant Program. The Great Lakes Fish and Wildlife Restoration Act Grant Program tackles issues in the Great Lakes Basin. And everywhere in between, grant programs support conservation and recreation activities.

Congress appropriates funds for some WSFR grant programs, but hunters and anglers have led the way, pouring billions of dollars into conservation through the Pittman-Robertson and Dingell-Johnson acts. When those funds are combined with the state license and tag sales sportsmen and -women pay each year, it constitutes the majority of funding for wildlife conservation in North America. It is stunning to think about what they have provided for conservation.

Through excise taxes on fishing equipment, small motor boat fuel and more, boaters and anglers fund aquatic education programs, improve boating access and ensure long-term conservation of coastal wetlands. They provide money for marinas to upgrade their facilities, help recreational boaters properly dispose of sewage and, of course, restore sport fish populations and habitats.

It's the same with hunters and recreational shooters. Their donations, by way of an excise tax on archery, hunting and recreational shooting equipment, help support hunter education programs, build archery and recreational shooting facilities, and maintain healthy wildlife populations and habitats.

And the amounts of money are sizable: More than \$1 billion this year is administered by WSFR.

Coordinating administration of more than \$1 billion would be a full-time job for most. For our WSFR folks, it is just part of what they do.

They also work hand-in-hand with grantees to make sure conservation happens.

And WSFR provides fiscal training for Service staff in many other programs, and provides valuable recreation and economic data through the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

This issue of *Fish & Wildlife News* highlights some of the amazing projects and people in WSFR. Enjoy! □



BRAD KROHN/USFWS

## Rainwater Basin Wetland Management District Helps the Herd

Employees of the Service’s Rainwater Basin Wetland Management District in south-central Nebraska found a way to help their neighbors when a large winter storm known as a “bomb cyclone” brought snow, wind and rain to the Central Plains in March. Runoff and rising streams and rivers flooded many parts of the Cornhusker State.

Rainwater Basin staff assisted two neighboring ranchers with emergency grazing when rising water flooded agricultural fields used for winter pasture, leaving mud too deep for cattle to walk through. To make matters worse, the flooding was right in the middle of the peak spring calving season. More than 400 animals were moved onto adjacent district lands where higher ground and ample food sources helped ranchers maintain their herds.

“Allowing adjacent landowners to use district lands is a way we could help our neighbors and protect the cattle they depend on,” says Brad Krohn, project leader for the Rainwater Basin Waterfowl Management District.

“The economy in Nebraska depends on livestock and agricultural producers,” says Brad Krohn, project leader for the Rainwater Basin Waterfowl Management District. “These are our communities, and allowing adjacent landowners to use district lands is a way in which we could help our neighbors and protect the livelihood they depend on so dearly.”

Cattle are not new to the district. At different times of year, grazing is used to maintain healthy grasslands and wetlands. Cattle mimic the historic foraging of other herbivores, such as deer and bison, and play an important role in keeping grasslands in an early successional stage and sustaining the nutrient cycle used by other wildlife. □

## Plant Once Presumed Extinct Now Flourishing Following First-Year Planting Success

The San Fernando Valley spineflower, once believed extinct, is flourishing in the hills above the Santa Clarita Valley in Los Angeles County, California.

Botanists had planted seeds of the tiny buckwheat as part of a multiyear effort that kicked off in December to re-establish the plant across its historic range. After abundant rainfall, those seedlings are now growing in the thousands across eight sites in the county.

“It’s pretty exciting for this first year of introductions to be such a success,” says Cat Darst, assistant field supervisor of the Service’s office in Ventura. “This year’s success is telling us that this can work.”

In 2017, the Service signed an agreement with FivePoint Holdings, the landowner of Newhall Ranch, to ensure the San Fernando Valley spineflower would continue to grow in its native habitat while plans get underway to build a master-planned community, which will

bring 21,500 homes and 75,000 permanent jobs to the area.

The robust Candidate Conservation Agreement outlines plans to establish plants in new and existing sites and manage the species long term, as well as conserve more than 1,500 acres within Los Angeles and Ventura counties to support spineflower conservation. As a result of these conservation measures, the plant, once considered a candidate for listing under the Endangered Species Act, is no longer at risk of becoming endangered.

“This is really astonishing,” says botanist Anuja Parikh as she observes thousands of tiny San Fernando Valley spineflower plants at one of the introduction site. »

Botanists observe markers where San Fernando Valley spineflower seeds were planted in December. After abundant rainfall, seedlings are now growing in the thousands across eight sites in the county.



ASHLEY MCCONNELL/USFWS

She and husband Nathan Gale were among the first to rediscover the San Fernando Valley spineflower in Los Angeles County in 2000 and have been working as botanists on the ranch for nearly two decades. They are part of a team that has developed a plan to protect and conserve the spineflower.

FivePoint has dedicated more than \$8 million to fund the establishment of the spineflower and long-term conservation and management of the new sites, as well as \$10 million in habitat enhancements and endowments for long-term management efforts of existing populations.

The Service will continue to evaluate implementation and effectiveness of conservation measures over the next 10 years. "The level of commitment to this plant is unprecedented," Darst says. □

ASHLEY MCCONNELL, External Affairs, Pacific Southwest Region



San Fernando Valley spineflower.



JULIA SCRIBS/USFWS

## Urban Partnership in Houston Gets Students Out Hunting

Thanks to a Service-led partnership, 16 high school students from Houston had two hunting adventures—and one experience of a lifetime.

The students, most of whom had never been hunting or even held a firearm, participated in a white-tailed deer hunt on Aransas National Wildlife Refuge and/or a feral hog hunt on a private lands.

"I've been wanting to go for a long time, and this year I went twice already," says Roland Yanez, a freshman at Furr High School: An Institute for Innovative Thinking. "It was my first time ever going."

The Service's Houston Community Partnerships and Engagement partnered with Furr and the Texas Youth Hunt Program (TYHP) on the pilot program to introduce

urban youth to hunting, a sport they might not otherwise have access to. The hunts were conducted over two weekends and encompassed the full experience, including camping, cooking over a campfire and field dressing harvested animals.

"On Aransas we harvested white-tail deer, and I got a buck and a doe," Yanez says. "I had a lot of fun cleaning them."

When not sitting in a hunting blind, the youth hunters practiced on targets, reviewed safety and hunter ethics, and learned wildlife identification and natural history. They engaged refuge staff and private landowners, and saw first-hand how hunting is used as a land management tool to maintain wildlife populations and eradicate exotic species. In all, the young hunters were able to harvest four deer and two feral hogs.

During the school year, TYHP, an organization dedicated to creating the next generation of

A volunteer hunt guide oversees this first-time hunter.

hunters, conducted two hunter education safety courses at the school certifying 19 students, four teachers and two parents. The group also provided firearms and ammunition for both hunts, a cook and volunteer hunting guides, one for each student. In order to participate, students had to successfully complete the hunter education safety class and maintain a certain grade point average.

The Service helped establish the partnership and coordinated hunt opportunities on Aransas Refuge and private lands.

The pilot program was such a success that Furr has committed to incorporating TYHP's hunter education safety courses into the curriculum annually, and scheduling is underway for the two weekend hunts, on public and private lands. □

## Atlantic Sturgeon Reproducing in the James River, Virginia

Many believed the Atlantic sturgeon were gone from the Chesapeake Bay watershed. They hadn't been sighted in rivers that fed the bay for decades. But a few experts, including Albert Spells, Virginia Fisheries coordinator for the Service, thought otherwise, and they worked to recover this fish, engaging concerned citizens, scientists, commercial watermen, state and federal agencies, nonprofit groups, educators, graduate students and volunteers.

Conservation, however, takes commitment to playing the long game, especially when the species you wish to restore is long-lived and doesn't reproduce until it's at least 10 years old. But, winning is possible with great partners, a lot of volunteers and dedication to solving unknowns.

Atlantic sturgeon, one of the oldest and largest fish on earth (growing upward of 14 feet long and weighing more than 800 pounds) were once found in huge numbers along the Atlantic Coast and coastal rivers from Canada to Florida. They were an important food for indigenous peoples along the coast and likely saved Jamestown colonists from starvation.

During the great "Caviar Rush" or "Black Gold Rush," in the late 1800s, Atlantic sturgeon became a highly prized fishery. Harvest peaked at 700,000 pounds in Chesapeake Bay waters alone in the late 1890s with a total of 7 million pounds in landings from all East Coast states. By 1989,



RYAN HAGBERTY/USFWS



CHARLES FREDERICKSON/JAMES RIVER ASSOCIATION

(Top) Atlantic sturgeon are coming back in the Chesapeake Bay watershed. (Left) The Service's Albert Spells (left) and Matt Balazik, with the Engineer Research and Development Center for the Army Corps of Engineers, collect sturgeon.

"We learned that there was a larger population of sturgeon using Virginia waters than previously realized, and we had evidence of successful spawning. Our efforts encouraged others to start looking for sturgeon in the bay."

a mere 400 pounds were reported in all of the United States, with few records of them returning to the Chesapeake Bay. Within a hundred years, a species that had lived on the planet for hundreds of millions of years had been overfished.

But Spells and Jim Owen at the Virginia Institute of Marine Science (VIMS) didn't think it was gone. "You know," Owen said to Spells one day "they're catching sturgeon on the James and the York [rivers], but the watermen aren't gonna tell you about it unless you put something

in it for them." Spells agreed and began cobbling together pots of money from the Service, Virginia, Maryland and the Chesapeake Bay Foundation (CBF) to implement a reward program, "so we could verify if sturgeon were returning to our rivers and tag them" Spells says. "In 1997, a \$100 reward (later \$50) was offered to commercial watermen who caught an Atlantic sturgeon in Virginia and kept them until the Service could tag and release the sturgeon back into the rivers. In less than a year, they had caught 303 fish, including 2- and 3-year-old fish," he adds.

Besides overfishing, other factors were impacting the sturgeon's survival—pollution, loss of spawning grounds due to heavy siltation, bycatch (fish caught in fishing gear targeting other commercial species) and ship-strikes.

In 1998, the Atlantic States Marine Fisheries Commission called for a moratorium on sturgeon fishing, and all 15 states complied. The goal was to protect sturgeon for 20 years, allowing them to reproduce and their populations to grow. Then in 2012, National Oceanic and »

Atmospheric Administration (NOAA) Fisheries listed four populations of Atlantic sturgeon as endangered, one of which was the Chesapeake Bay.

“Our coast-wide tagging program helped us learn where sturgeon go, but we still weren’t finding evidence of spawning or young of year fish,” fish born in that year, says Spells. Finding these super young, less than a year-old fish is significant because it indicates where the adults have been spawning.

*“There’s no way...we would have learned all that we know now if not for the many partners advocating and working to save this species.”*

Matt Balazik, biologist with the Engineer Research and Development Center for the Army Corps of Engineers, and his team with the Virginia Commonwealth University’s (VCU) Rice Rivers Center, collected 153 young of year Atlantic sturgeon in the James last fall. “This was the first finding of young of year that anyone can recall since...March 2004,” Balazik says. Before that, “the last time we had evidence of sturgeon spawning in the James was 1979,” he says.

“Through Matt’s research, we learned a lot” Spells says. “For example, we discovered that the sturgeon spawn in the fall, when everyone thought they only spawned in spring.”

“There’s no way, however, we would have learned all that we know now if not for the many partners advocating and working to save this species.”

Whether it was a researcher developing fishing gear to reduce bycatch but keep striped bass fishing effective, partners building spawning reefs or finding better sturgeon sampling techniques, Spells says, “It took universities (VIMS, VCU, University of Maryland), NGOs (CBF, James River Association), the states, Fish and Wildlife Service, NOAA, Virginia Sea Grant, and many volunteers working together to find and recover Atlantic sturgeon.”

Atlantic sturgeon may have been pulled from the brink, but they aren’t recovered yet. It may take decades for them to rebuild their populations. But through science, environmental regulations, improvements to spawning grounds and outreach, we are saving this amazing prehistoric fish, just as it once saved Jamestown. □

CATHERINE GATENBY, Fish and Aquatic Conservation, Northeast Region

## Albatross Wisdom’s Family Grows

A Laysan albatross chick hatched by Wisdom, the world’s oldest known wild bird, continues to flourish at Midway Atoll National Wildlife Refuge and Battle of Midway National Memorial.

The chick hatched in early February, so it is nearly the time when it will leave the island to fly out to sea, or “fledge”—Laysan albatross chicks fledge at 5 or 6 months.

Wisdom is at least 68 years old, has raised an estimated 31 to

36 chicks in her lifetime and is still going.

Wisdom was first sighted at her nest site on November 29 and laid an egg soon after. It is uncommon for albatross to return to, lay and hatch an egg every single year. However, Wisdom and her mate have done this at Midway Atoll in Papahānaumokuākea Marine National Monument each year since 2006.

Albatross spend 90 percent of their life at sea where they soar over the ocean for days on end and rest on the waves to feed on squid and fish eggs. All albatross return nearly every year to the place they were born. Millions »



Wisdom’s mate Akeakamai stands over their newly hatched chick.

BOB PEYTON/USFWS

of albatross return to Midway Atoll each year to nest and raise their young. This behavior is known as “nest site fidelity,” and it makes places with large colonies of nesting birds, such as Midway Atoll, critically important for the future survival of seabirds, including Wisdom. In 2017, the chick that she fledged in 2001 was observed just a few feet away from her current nest, marking the first time a returning chick of hers has been documented.

“She’s incredibly powerful as a symbol of why we do what we do, and people all over the world pay attention to her,” says Service wildlife biologist Beth Flint (see: Flint honored, see p. 35).

Wisdom is rewriting history about our understanding of “survivorship,” Flint says, “how long birds live and how often they breed.”

Raising the next generation of albatross is no easy job. Albatross return starting in October to meet their mate and will spend approximately seven months on Midway Atoll to incubate and raise their chick. Albatross lay a single egg, and both parents take turns incubating it for a little over two months. When not on parenting duty, Wisdom and mate Akeakamai forage for food. This process takes up so much time and energy, so most Laysan albatross do not lay an egg every year.

“Because Laysan albatross don’t lay eggs every year and when they do, they raise only one chick at a time, the contribution of even one bird to the population makes a difference,” says Bob Peyton, project leader for Midway Atoll Refuge and Memorial.

For the first years of their lives, albatross grow and mature at sea. Starting around age 5, Laysan albatross return to their home colony during breeding season and begin the search for a mate — a process that can take years. During nesting season, juvenile albatross can be found all over Midway Atoll practicing elaborate courtship dances or dozens of ritualized movements. When they find that special bird to dip, bow and preen with, the pair stays bonded for life.

There aren’t many places left for Laysan Albatross to nest, and Midway Atoll is by far the most important colony in the world. Nearly 70 percent of the world’s Laysan albatross, almost 40 percent of black-footed albatross and endangered short-tailed albatross all rely on Midway Atoll. In addition to albatross, 20 bird species live on Midway Atoll. In total, more than 3 million individual birds call the refuge and memorial home.

Service biologists are working to restore the habitat seabirds need at Midway Atoll and remove threats such as invasive predators because protecting the future for seabirds means protecting the places they call home. □

## Saving Endangered Hawaiian Seabirds on Kauai

Work to establish a new colony for some of Hawaii’s most imperiled seabirds will continue this fall at Kilauea Point National Wildlife Refuge, on the northern-most point of Kauai.

Since 2015, the Service and partners have been translocating endangered ‘ua’u (Hawaiian petrels) and threatened ‘a’o (Newell’s shearwater) from Kauai’s rugged, mountainous interior, where the birds are under threat from introduced predators, including feral cats, rats and pigs, as well as loss of breeding habitat.

These dangers, coupled with collisions with power lines and attraction to artificial lights, have dramatically reduced populations of the ‘ua’u and ‘a’o on Kauai.

The effort to create a new, protected colony of these birds is part of a larger, strategic effort to protect the two species and help their populations recover. Over the last four years, 112 translocated chicks have successfully fledged from the refuge.

The 7.8-acre translocation site is protected within a predator-proof fence on the refuge. The fence is made with stainless steel mesh buried three feet underground with an upper hood that prevents the incursion of predators. This is one of the best tools available for conservation of seabird colonies. Such fences now are more frequently used against introduced predators plaguing native birds, plants and even small endangered tree snails in Hawaii. »



ANN BELLOUSPWS

The fence at Kilauea Point National Wildlife Refuge is designed to keep out predators.





A Hawaiian petrel is carefully removed from its burrow.

In 2018, the refuge again provided a home for 20 'ua'u and 19 'a'o. Over the course of several weeks, the chicks were fed and cared for by a dedicated team of biologists and volunteers until they fledged—finished molting into adult plumage and left the nest site.

"We are doing our best to give them a good start here so they are best prepared to thrive once they fly out to sea," says Hannah Nevins, of project partner the American Bird Conservancy. "The healthier they are when they depart their nest to fly out to sea, the better the chances they will return to breed."

The 2018 project was not without its challenges. A record-breaking rain event last April flooded the nearby Hanalei Valley and part of the refuge. Nearly 50 inches of rain fell in 24 hours, nearly blowing out a drainage culvert under the predator-proof fence. In addition, Hurricane Lane drove in significant rains in mid-August.

"We experienced a difficult year with many close-calls due to unanticipated weather events, but despite these challenges, we are pleased to have completed another successful year of this important seabird recovery project," says Heather Tonneson, project leader for the Kauai National Wildlife Refuge Complex.

The Nihoku Ecosystem Restoration Project, as it is called, will continue this year, with more 'ua'u and 'a'o being translocated to the refuge. Numerous national, state and local partners are collaborating on this work.

"Working with partners is essential for the recovery of seabirds on Kauai," says the Service's Aaron Nadig, the Kauai Island team manager. "Partnerships and projects like this help make significant progress for the conservation and recovery of endangered and threatened species throughout Hawaii." □



## Connecting with Students Through Skype

As a longtime follower of the Service's Sacramento Fish and Wildlife Office Twitter feed, Debra Toor was very familiar with the field office's work to implement the Endangered Species Act. And a tweet about work to document survivors after a wildfire prompted the Skype in the Classroom educator to invite a Sacramento Office biologist to participate in a Skype classroom session about conservation and the "Surveying for Survivors" site visit. Skype in the Classroom is a free Microsoft educational program.

The tweet included photographs of the devastating 2017 Nuns wildfire and biologists surveying the area for surviving wildlife. "The tweet showed photos of the scientists doing something, studying the environment—and it was a proactive thing," says Toor.

"I just really want kids to be excited and empowered about conservation because they watch the news, they see documentaries, they see statistics—they are frightening. They really get worried when they hear about

Dr. Marsha J. Moorman's ninth-graders investigated the impact of wildfires on wildlife using Skype in the Classroom.

these wildfires, and they're devastating for humans as well. I want them to know there's hope and scientists are trying to find ways to figure things out for the better."

Toor specializes in vulture conservation education and uses Skype to partner with K-12 schools around the world to educate students about the importance of conservation and their role in protecting wildlife. She showcases the work of biologists with video clips and images and recently began inviting biologists and other scientists to join her—expanding the focus from vultures to a wide variety of wildlife species.

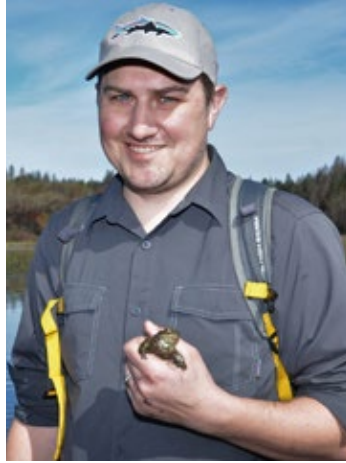
Leif Goude represented the Sacramento Office and walked the students through every aspect of the site visit from sterilizing waders to data collection. "The world is more connected and with the Skype session, it's easier to connect with groups that cannot see or experience the work firsthand," says Goude. "I enjoyed engaging with students because of their »

curiosity and interest in endangered species. Hopefully they'll have an appreciation for conservation in the future."

Goude's outreach made it all the way to Augusta, Georgia, where ninth-graders attending Historic Lucy Craft Laney Comprehensive High School took part. "The session with biologist Leif Goude provided students with a unique learning opportunity," says their teacher, Dr. Marsha J. Moorman. "We did enjoy the Skype experience."

Based on some of the feedback from the students, it is clear that the objectives of the session were met. According to one student, "I learned that humans have to preserve a lot of the wildlife, especially those like the [California] red-legged frog because they help to keep the ecosystem balanced."

"Reaching the NextGen through Skype in the Classroom allowed us to expose young people to science early in their education. Few students have the opportunity to speak to a biologist or participate in a science-focused virtual fieldtrip, but with this technology it's possible. I'd love to see some of these students pursue internships with the Fish and Wildlife Service and even consider a career with the agency," says Jennifer Norris, Ph.D., field supervisor of the Sacramento Office. Skype in the Classroom is just one of many outreach efforts her office



Service Biologist Leif Goude holds a western toad that survived the Nuns wildfire.

supports to promote conservation among youth and the general public; which was once limited to the office's jurisdiction in northern California, but now is much broader.

Toor plans to partner with the Sacramento Office again with the hope of expanding the experience to additional schools, "I'm doing this is to make conservation science accessible to educators and introduce students to why and how conservation scientists are studying wildlife and their habitats. I'd like to see more schools connect with biologists to experience real-world conservation science." □

VERONICA DAVISON, External Affairs, Pacific Southwest Region

WSFR WORKS

## No Rod? No Problem

**Warning:** Students who visit their local libraries in Maryland may get hooked on... fishing!

While you may have thought libraries are only for books and quiet spaces, they offer so much more. Thanks to the Maryland Department of Natural Resources (DNR), some libraries in the state now offer access to all the gear you need to get outside and catch your first fish.

This is an exciting way to equip families with fishing gear while also teaching them about the local ecosystem.

Through the Library Loaner Program, which received financial support from the Service's Wildlife and Sport Fish Restoration Program, families can improve their fishing technique and fish identification while also learning about water quality and indicators of fish health. Information on how to purchase a fishing license is also available at the library and online.

By teaming up with local scouts, fishing clubs and fishing enthusiasts, libraries ensure the equipment is as good as new and in working order. Each library receives five rods and plenty of tackle from the Maryland DNR.

Last year, libraries that participated reported loaner fishing rods were booked »

A woman learns about fishing at the library in Carroll County, Maryland.



CARROLL COUNTY PUBLIC LIBRARY

months in advance. Waiting was no inconvenience, as many families were eager to give the sport a shot. One regular patron to the Carroll County Public Library put a rod on hold for his son to try. He was very enthusiastic and commented, "Every time I think the library can't get any better, you provide something special like this!"

Ron Buffington, president of the Central Region Chapter of the Coastal Conservation Association Maryland, helped kick off the program last year. Inspired by new anglers getting the chance to participate in the Library Loaner Program, he donated additional rods and gear. "It was great to see kids participating in the program with one another, but friendships among parents transpired as well. Some even made future plans to get together and go fishing."

At the Ruth Enlow Library, the pond out front was a popular fishing (and frogging!) hole for first-time anglers. To everyone's surprise, excited anglers made sure the pond critters got a chance to visit inside the library as well.

Once the news on the Library Loaner Program began to spread, more libraries in Maryland were eager to participate, and as many as five more libraries may be joining in on the fishing fun this year. □

WSFR WORKS

## Idaho Continues work on YY Males, an Approach for Eradicating Invasive Fish Populations

Idaho Department of Fish and Game (IDFG) fisheries researchers and fish hatchery staff continue research on developing monosex fish populations whose offspring can produce only male progeny.

Stocking these males, which have two Y chromosomes (YY) rather than the usual XY arrangement, into a body of water with an undesired fish population of the same species could change the sex ratio to all males within a few generations. The unwanted fish population would eventually fail to reproduce and therefore die off. Once accomplished, IDFG would stop stocking YY-male fish and fisheries managers would then restock that body of water with a more desirable fish species.

In the West, non-native brook trout, introduced in the early 1900s, are difficult to eradicate and often threaten native salmonid populations. Brook trout were selected for the first YY project because they are short-lived and quick to sexually mature, which enable researchers to rapidly develop the hatchery broodstock and test the technique in a natural environment.

The YY technique begins in a hatchery, where young brook trout are exposed to low-doses of a naturally occurring female hormone, estradiol, which has no effect on female fish but causes



IDFG HAYSPUR FISH HATCHERY

male fish to produce eggs when they mature. The egg-producing males are crossed with standard males, which produces about 25 percent YY-male offspring. Those offspring are used to produce another generation that will theoretically produce exclusively male offspring when bred with any other brook trout. Brook trout produced in the program for stocking in the wild are not exposed to any hormones and appear like all other brook trout, but they carry two male chromosomes instead of one male and one female.

IDFG researchers first presented what they called "proof of concept" findings for YY brook trout at the August 2016 American Fisheries Society national meeting in Kansas City. Those pilot study results, documenting successful reproduction of released YY males in the wild, generated much excitement in the fisheries science community. Since the pilot work, IDFG researchers Pat Kennedy and Kevin Meyer have ramped up the field research effort considerably, and Idaho is currently evaluating the efficacy of YY brook trout in controlling or eradicating undesired brook trout populations in six alpine lakes and seven small streams.

YY-male brook trout broodstock.

Last winter, staff of IDFG's Hayspur Fish Hatchery, led by Kevin Kincaid, distributed YY brook trout eggs to three Western partner states for further evaluation of YY-male stocking for brook trout population control. An IDFG-led YY brook trout technical team has been conducting tri-annual coordination conference calls with personnel from the egg recipient states to ensure important remaining research questions are addressed and to prevent duplication of efforts.

Based on the promising early results on brook trout, IDFG has begun preliminary trials to develop the method for other species including undesired walleye, lake trout and common carp populations. Substantial progress has been made with key aspects necessary for development of YY broodstocks for all three species. Though much work remains, it is quite possible that a YY male broodstock for at least one additional species will become available for field research in the next five to seven years.

This work has progressed with funding support from the Service's Wildlife and Sport Fish Restoration Program. □

WSFR WORKS

## Boaters Keep Washington Waters Clean, Safely Disposing of Nearly 11 Million Gallons of Sewage

With funding from the Service's Sport Fish Restoration Clean Vessel Act Grant Program, pumpout stations help divert sewage from coastal and inland waters throughout the country by giving recreational boaters a place to offload their sewage quickly and safely, preserving water quality.

In the state of Washington, boaters diverted nearly 11 million gallons of sewage from coastal and inland waters last year. In recent years the number of pumpouts in Washington has increased as boater demand has risen, and more stations are planned. The newest Clean Vessel-funded pumpouts are set to be completed this summer at the Shaw General Store in the San Juan Islands.

In addition to funding the construction and maintenance of more than 140 pumpouts, dump stations and floating restrooms across the state, the Washington State Parks Clean Vessel Program has been a key partner of Pumpout Washington—the public outreach program managed by Washington Sea Grant. Over the last decade, the Pumpout Washington team has engaged tens of thousands of boaters, explaining the importance of properly disposing their sewage. With support from the Clean Vessel Program, Pumpout



WASHINGTON STATE PARKS

A boater uses a free public pumpout facility at the Port of Olympia-Swanton Marina, which was constructed with funding from the Washington Clean Vessel Program.

Washington has distributed more than 10,000 pumpout adapter kits to boaters, making it easier for them to empty their boat's head.

Improved sewage management has led to better water quality for fish and wildlife, a lowered illness risk to people recreating in the waters or eating locally caught fish or shellfish, and greater protection of public health. The improved water quality allowed the Washington Department of Health to remove shellfish harvest restrictions on nearly 700 acres of commercial shellfish beds, including portions of commercial shellfish areas around 20 Puget Sound marinas, determining that they would no longer be classified as prohibited.

The Washington Clean Vessel Act program is part of the Clean Vessel Act of 1992 administered by the Service's Wildlife and Sport Fish Restoration's Program. Money for the grants comes from the Sport Fish Restoration Fund. □

WSFR WORKS

## Largest Public Shooting Range in Florida Welcomes Hunters, Everyone

With \$4 million in Wildlife and Sport Fish Restoration (WSFR) and matching grants, Florida in 2017 built the largest public shooting range in the state at the Triple N Ranch Wildlife Management Area.

In 2019, WSFR support helped finance an archery course at the range, Triple N Ranch Shooting Range.

All the work fulfills a key goal of WSFR projects: hunter education.

"Thanks to federal grant monies through the Wildlife and Sport Fish Restoration program and contributions from other partners, the Florida Fish and Wildlife Conservation Commission was able to accommodate the growing demand for a facility to safely support the needs of recreational target shooters, hunters and hunter-safety students at Triple N Ranch Shooting Range,"

says Bill Cline, section leader for hunter safety and public shooting ranges at the Florida Fish and Wildlife Conservation Commission (FWC).

Hunters, recreational shooters, and other sportsmen and -women have always been some of conservation's biggest supporters, and "this public shooting facility features supervised rifle and handgun ranges, a sporting clays course and a classroom for hunter safety students to gain the skills and knowledge for safe, responsible hunting," Cline says. It also offers introductory courses for the public to learn what hunting and shooting are about.

For instance, in May, the range hosted the first-ever Osceola Woman's Shooting and Outdoor Event. Women learned firearm safety and were introduced to shooting, archery and other types of outdoor recreation.

FWC operates the range within the wildlife management area, land managed for both conservation and recreation. »

A young person learns firearm safety.



FWC



AVERY BRISTOL/FWC

Practicing at Triple N Ranch Shooting Range.

This offers people an important opportunity to learn more about nature and develop a connection with it. FWC describes the land of a WMA as “more rugged than parks and [with] fewer developed amenities.”

You will find white-tailed deer, wild turkeys and other game to entice hunters to explore Triple N Ranch beyond the shooting range. But hunters and non-hunters alike will thrill to species such as the gopher tortoise or federally endangered red-cockaded woodpecker.

Cline told the Orlando Sentinel in 2017: “We like wild things and wild places, and we need to teach the next generation that.”

“We want to teach them to be good stewards of the land and to respect the land.” □

## WSFR WORKS

## A River Will Run Through It! WSFR Grant Helps Restore the Swan River in Colorado

Heading west from Denver is like a trip back in time. Old mine shafts, tailings and abandoned mills dot the landscape, silent reminders of the importance gold and silver mining once played in Colorado’s history. Although the Gold Rush has been over for almost a hundred years, its effect on the landscape can still be seen all across the Centennial State. During the frenzy to extract gold and gain wealth, many streams and rivers were altered, banks dug up, water diverted, and discarded rocks and ore left at every bend.

The Gold Rush hit Swan River in Summit County, Colorado, hard. The once-robust river was buried under tons of cobble, a result of the past dredging for gold. Surface continuity among three major tributaries, the North, Middle and South forks of the river, was lost, and long stretches are still invisible on the landscape. The three forks have no confluence, as stretches of the three streams disappear under rock and mining cobble.

“This area is covered with dredge gravel that was left behind from dredge boats moving down the river looking for gold,” says Jason Lederer, resource specialist for Summit County Open Space and Trails.

To help restore this important river, the Service’s Wildlife and Sport Fish Restoration Program (WSFR) provided a \$135,000 Sport Fish Restoration grant to Colorado Parks and Wildlife to remove cobble from dredge mining tailings on approximately 3,500 linear feet of the Swan River.

When complete, the Swan River Restoration Project will restore and reconnect the three main tributaries, consisting of more than 15 miles of river, which have been disconnected since the late 19th century. Once restored, native fish can return and freely migrate throughout the watershed of more than 20,000 acres.

“Upon completion, the project will provide public opportunity for angling, wildlife viewing and other outdoor recreation,” says Steve Jose, the WSFR Chief in the Mountain-Prairie Region. “Ultimately, native aquatic species will repopulate the Swan River, helping to restore this watershed.”

The multiyear project, started in 2015, is a partnership among the Service, Summit County, the Town of Breckenridge, the U.S. Forest Service, Trout Unlimited, Colorado Parks and Wildlife, and the Colorado Water Conservation Board.

“So far, partners have restored approximately 2.5 miles of the Swan River,” Jose says.

Left to right, Steve Jose, Mountain-Prairie Region WSFR Chief; Bob Curry, Deputy Assistant Director of WSFR; and Jim Guthrie, fiscal initiatives coordinator at Colorado Parks and Wildlife, check out the work on Swan River.

The use of WSFR funds in restoration efforts such as the Swan River project is critical to restoring waterways, allowing native fish to return while increasing sport fishing opportunities for the public.

“Native brook trout and mottled sculpin have already recolonized the completed segment,” Jose says. “We are seeing early signs of a restored aquatic ecosystem that will provide a functioning fishery and opportunity for public access to angling and other fish and wildlife-related activities in the years to come.”

Once complete, the Swan River will be fully restored with ripples, pools and glides, creating aquatic habitat that was present before mining.

“Hopefully, in 10 years you will never know we were ever here,” Lederer says. □

STEVE SEGIN, External Affairs, Mountain-Prairie Region



AMANDA HORVATH/USFWS

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*Service program  
administers funds to  
states for conservation  
and recreation.*

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Otter Creek Marsh in Iowa was in part  
funded with Wildlife and Sport Fish  
Restoration dollars.

If a state were to say it had received a grant from the Service's Wildlife and Sport Fish Restoration Program (WSFR), one possible response might be "Which one?" WSFR has multiple grant programs, including ones targeting boating access, coastal wetlands, hunter education, multistate conservation, sport fish restoration, tribal wildlife and wildlife restoration. // Congress appropriates money for some of the grants. The funds for others come from excise taxes on hunting, shooting and fishing equipment, and boat fuel. // Take a read of just a few of the projects WSFR has helped finance. »



# Engine That Does



*Behind-the-scenes  
WSFR staff makes  
conservation work  
possible.*

By MELISSA A. CLARK, JUDY  
DRISCOLL AND DONNA ZANGER

(Above) In the early 1930s many species, such as the black bear, turkey and wood duck, dropped to record low numbers. The Wildlife Restoration Act (1937) created the funding process that led to these animals' recovery.

(Below) Like owls, fiscal staff are highly proficient specialists navigating unseen in their ecosystem of grant and project management.



JOELLEN HARRIS/USFWS

Imagine someone working on a conservation project; who do you picture? For many of us, the image that comes to mind is a field biologist. But those on-the-ground projects would not be possible without the fiscal staff, which shepherds grants from cradle to grave.

**Y**ou may not realize the role that Service fiscal staff plays in bringing conservation projects to fruition—it's more than tracking numbers; it's about building partnerships. In the Wildlife and Sport Fish Restoration Program (WSFR), fiscal staff provides unparalleled customer service and technical assistance for both internal and external partners.

“The partnership with our grantee agencies is an engaged, collaborative and dynamic relationship,” says Kelly Sliger, Pacific Region grants fiscal officer. “We work within laws, rules and regulations, but take pride in being creative and working together in order to achieve the goals of our partners. This has

resulted in what we feel is a decades-long ‘family’ atmosphere that has led to the longstanding and rewarding success of the program.”

Fiscal staff navigates a mountain of requirements to transform a grant proposal into on-the-ground conservation, education, recreation or access. The compliance and audit work that fiscal staff does go a long way toward ensuring conservation.

“Working in the fiscal branch serves a key role for the WSFR Program, and I take great pride in ensuring the protection of these funds,” says Tracey Vriens, Pacific Southwest Region grants fiscal officer. »



“This program is a user pay/user benefit program, so it is funded by excise taxes by those who hunt and fish. The best part of working for this program is the people and how hard they work every day to ensure the success of this program.”

This view is widely shared across the country by fiscal staff and grantees. While fiscal staff is always there to provide assistance and advice, members go the next step and offer training to internal staff and grantees to ensure all new requirements and processes are well understood and followed.

“We’re often called on to teach complex fiscal concepts like program income, safety margins and indirect costs, and how they benefit the WSFR Program by protecting and enhancing the funds used to carry out the work we’re all so proud of,” says Sherry Martin, Southeast Region grants fiscal officer. “We have to be able to listen and understand the challenges states face in accomplishing WSFR projects, and we need to maintain open, respectful communication with both fiscal and program staff, internally and with our

WSFR grants fiscal officers, left to right, Tracey Vriens, Pacific Southwest Region; Maria Sanchez-Maes, Mountain-Prairie Region; Kelly Sliger, Pacific Region; Judy Driscoll, Northeast Region; Donna Zanger, Midwest Region; Tj Mihan, Alaska Region; Cheryl Rodriguez, Southwest Region; and Sherry Martin, Southeast Region.

state partners.”

“We deeply appreciate the people in the fiscal branch,” says Doyle Brown, federal aid coordinator for the Missouri Department of Conservation.

While WSFR is best known for its work with states on grants associated with the Wildlife and Sport Fish Restoration acts, the program also offers its fiscal expertise to other Service programs. Examples include working with Ecological Services on Coastal Wetlands Grants, with External Affairs and Native American Liaisons on Tribal Wildlife Grants and with Migratory Birds on funding partners’ work on priority research and monitoring needs.

“The WSFR Program helps us manage this program by making sure we follow department policy for awarding funding through grants or cooperative agreements,” says Tom Cooper, Midwest Region Assistant Regional Director for the Migratory Bird Program. “They assist in every step along the way from developing our notice of funding opportunity through closing out the grant or cooperative agreement when the work is completed. We rely heavily on their expertise to make sure all policies are followed as we manage this program.”

While internal and external partnerships are valued within the program, these

partnerships are often not well understood by people who are not directly involved in the grant processes. Randy Curtis, federal aid coordinator for the New Hampshire Fish and Game Department, spent the first half of his career working on hunter education programs, which are supported by WSFR grants. Looking back, he remembers knowing only the basic aspects of the grant program. Once he took on his new role as federal aid coordinator, his appreciation for the program changed.

“What I did not fully appreciate was all of the ‘behind the scenes’ work that was needed to make it possible for project staff to implement their work,” says Curtis. “The necessary and valuable work of WSFR fiscal staff and our own state fiscal staff can’t be overstated. None of the good things happens on the ground without them!”

Come fall, partners will have the chance to develop relationships with new fiscal staff as the WSFR Program welcomes contracting and general services federal assistance staff to the program.

“The opportunity to bring the remaining financial assistance staff together with WSFR staff creates an opportunity for great efficiency and synergy,” says Scott Knight, Chief of Financial Assistance Support and Oversight Division for WSFR.

Additionally, partners will have access to even greater technical expertise through the continued professionalization of the financial assistance role with a department level training certification.

“An analogy comes to mind when I think of the role fiscal staff plays in delivering of conservation through our program,” says Knight. “They are the engine of the financial assistance car. You don’t see it when you look at the car, but try going somewhere if it doesn’t do its job!” □

MELISSA A. CLARK, External Affairs, and DONNA ZANGER, WSFR, Midwest Region, and JUDY DRISCOLL, WSFR, Northeast Region



JOELLEN HARRIS/USFWS

# Bear Necessities

*Montana Grizzly relocation provides rare close-up of a burly bruin.*

By AMANDA HORVATH

AMANDA HORVATH/USFWS

Biologists examine a grizzly bear to assess its health.

We all need our space. Grizzly bears need a lot of it! Female grizzly bears require a home range of 50 to 300 square miles, while males need 150 to 600 square miles of space to forage.

**G**rizzly bears generally emerge from hibernation and begin actively foraging from March through May. Denning for winter hibernation typically starts in October or November. Females give birth during the denning season and continue raising their young for 2 and a half years. Human-grizzly bear interactions in the wild, and sometimes even in one's backyard, can occur any time during the non-denning season.

The Service continually works with state wildlife agencies, private landowners, tribes and other partners across the United States to support ongoing wildlife conservation »

and monitoring efforts. Increasing human and grizzly bear populations in the American West (the latter resulting from decades of coordinated and collaborative recovery efforts) also mean an increased potential of human-grizzly interactions.

### Feeling Cagey

When wildlife biologists at Montana Fish, Wildlife and Parks (FWP) received a call in April 2018 reporting a grizzly bear eating seeds and suet from bird feeders around homes in the town of Whitefish, Montana, they quickly swooped in to safely capture the large mammal and relocate it to a less densely human populated area. The goal was to decrease the potential for human-wildlife conflict. Montana FWP is annually supported by grant funding from the Service's Wildlife and Sport Fish Restoration Program and the Service's Grizzly Bear Recovery Program to manage wildlife in this way — partnering with others to protect people and wildlife.

### A Closer Look

When a bear needs to be relocated, biologists take the opportunity to collect valuable data. First, the bear must be sedated. Eye drops are then applied to keep the bear's eyes lubricated. Its eyes are also covered with a clean cloth to ensure they remain free from dirt or debris.

Once the bear is completely sedated, and its eyes are covered, biologists move it out of its cage to an open area to evaluate its health. The bear's girth, length and footpads are each measured. Blood and hair samples are taken to help identify what the bear is eating and to evaluate genetics. This bear was from the Northern Continental Divide Ecosystem (NCDE) population of grizzly bears.

Biologists estimated that this particular male grizzly bear was a subadult, likely about 2 or 3 years old, by examining his teeth. The NCDE grizzly bear population is believed to support more than 1,000 grizzly bears, likely the biggest population in the lower 48 states.



Weighing a male grizzly bear as part of its health check-up before relocation.

### A Heavy Lift

The bear's weight is recorded next (this one was 246 pounds), and it takes quite a few hands to lift it. Adult male grizzly bears can stand up to 7 feet tall and weigh 300 to 600 pounds. (Females are smaller, generally weighing 200 to 400 pounds.)

The grizzly bear is also fitted with a GPS collar so biologists can track its future movements. This will provide important information about the bear's behavior, its home range and the type of habitat the bear uses.

Hair samples collected from grizzly bears can also provide biologists with insights into genetics and may provide limited information about a bear's reproductive success if hair samples are collected from offspring in the future.

### Back to the Wild

All necessary health and biological data are collected in about an hour. At this point, the bear begins to stir. It's time to return it safely to its temporary trailer, where it recovers and awaits release back into the wild.

This young male was released the next morning in a more bear-appropriate part of Montana: a remote portion of Kootenai National Forest, where he can continue foraging in the wild, far from Whitefish.

## Bear and Human Safety

The conservation success story of grizzly bear recovery in portions of the American West means that increasing grizzly bear numbers may also result in an increased possibility of human-grizzly bear interactions. Human-caused mortality is the greatest threat to grizzly bears, which today exist in only 2 percent of their original range in the lower 48 states.

Human-caused mortality includes accidental grizzly bear deaths (such as those caused by automobile collisions), management removals, defense-of-life killing and illegal killing of grizzly bears (poaching).

Prevention, education and awareness offer some solutions for reducing human-caused mortality of grizzly bears — it's best to avoid human contact with grizzly bears in the first place.

### Supporting State Wildlife Conservation

WSFR administers grant funding to state wildlife agencies across the United States, including Montana FWP.

These grant funds are applied throughout the nation to a wide variety of wildlife management activities, including projects such as grizzly bear relocations to help recover, restore, and manage native wildlife and their habitats for the continuing benefit of the American people. □

AMANDA HORVATH, Wildlife and Sport Fish Restoration Program, Mountain-Prairie Region

# Birdies and Other Wildlife

*Service grants help turn golf course to revitalized wetlands community.*

By ASHLEY MCCONNELL



(Above) A Western snowy plover at Sands Beach on the UCSB campus. (Below) Blooming lupins and inundated vernal pools, signs of spring in April at the North Campus Open Space.

A former seaside golf course in Santa Barbara, California, is transforming into a functional wetlands community providing recreational opportunities and pristine wildlife habitat in what has become a model for coastal wetland restoration projects nationwide.

“This is the type of project that is the pinnacle of a restoration ecologist’s life,” says Lisa Stratton, director of ecosystem management at the University of California Santa Barbara’s (UCSB) Cheadle Center for Biodiversity & Ecological Restoration.

In the 1960s, a portion of the wetlands community of Devereux Slough was filled in to make way for the Ocean Meadows Golf Course. Now, with the help of grant funding from the Service and multiple state and local partners, that process is being reversed to create 44 acres of permanently protected wetlands within the 100-acre North Campus Open Space. This will provide habitat for wildlife and recreation and education opportunities for students, residents and visitors as part of the UCSB campus. »



PHOTO COURTESY OF UCSB

“There’s no doubt that the most exciting thing about this project was the chance to turn the clock back,” says Carla Frisk, former project coordinator with the Trust for Public Land, which purchased the golf course property and gave it to UCSB for restoration and long-term management in 2013.

Conservation partners broke ground on the project in spring 2017 and opened trails to the public in October 2018. Restoration planning by staff, students and volunteers will continue through 2019, and the site will officially be dedicated next spring. The area will boast more than 100 acres of salt marsh, grasslands, sage scrub, vernal wetlands and walking trails.

“California has lost something like 95 to 96 percent of its coastal wetlands. It’s just almost unheard of that you get a chance to turn even 64 acres back,” Frisk says.

The former golf course created a flooding risk for nearby homes and businesses during heavy rain years. By creating a natural wetland system, the slough area has already demonstrated its capacity to retain rainwater that would otherwise cause flooding in neighboring communities.

By “rearranging” some 350,000 cubic yards of soil (the fill that made up the golf course), the natural function of the slough and upland vernal pool habitats will be restored.

“After just two feet of sea level rise, the system will become almost fully tidal, which will actually create a six-foot adaptation to sea level rise, which is pretty amazing in terms of habitat and benefits to the community,” Stratton says.

Partners anticipate the area will also support the recovery of rare species including the California red-legged frog, Ventura marsh milk-vetch, California least tern, tidewater goby and western snowy plover. Tidewater gobies were re-discovered in the slough in 2004 and



adjacent Coal Oil Point Reserve boasts one of the most productive western snowy plover breeding sites in California. These tiny shorebirds have already been documented courting and nesting on a sandy portion of the site.

The Service’s Endangered Species Recovery Land Acquisition Program granted California and the Trust for Public Land \$500,000 toward acquisition of the property. An additional \$3 million in matching funds from the Service’s National Coastal Wetlands Conservation Grants Program assisted with land acquisition as well as planning, design, and restoration.

“It’s kind of a highlight when you get that call from the agencies saying, ‘we have good news for you. We wanted to let you know that you just got your grant,’” Stratton says. “I’ve had about 10 of those calls, and they’re pretty magical every time they happen.”

During a behind-the-scenes tour of the North Campus Open Space in 2018, the Service honored Stratton and the Cheadle Center for spearheading the groundbreaking restoration initiative.

“Lisa’s determination and willingness to bring people together toward a common vision was instrumental to restore Devereux Slough to a beautiful natural area that will provide habitat for native plants and wildlife—an area that will be shared and enjoyed by the people of this community,” says Steve Henry, field supervisor for the Service in Ventura. “Without UCSB’s persistent and genuine commitment to our shared cause of conservation, projects like this might not come to fruition.”

Federal, state and local agencies broke ground on the UCSB North Campus Open Space restoration project in spring 2017.

Funds from the Endangered Species Recovery Land Acquisition Program are appropriated by Congress to help in the acquisition of land and water resources crucial to the recovery of threatened or endangered species. The National Coastal Wetlands Conservation Grants Program is part of the Service’s Wildlife and Sport Fish Restoration Program, and funds come from boaters and anglers who pay a federal excise tax on their sport fishing equipment and fuel for their boats. Both grant programs are designed to assist states and other agencies in the shared mission to conserve, protect, and enhance fish, wildlife, plants and their habitats for the benefit of the surrounding community.

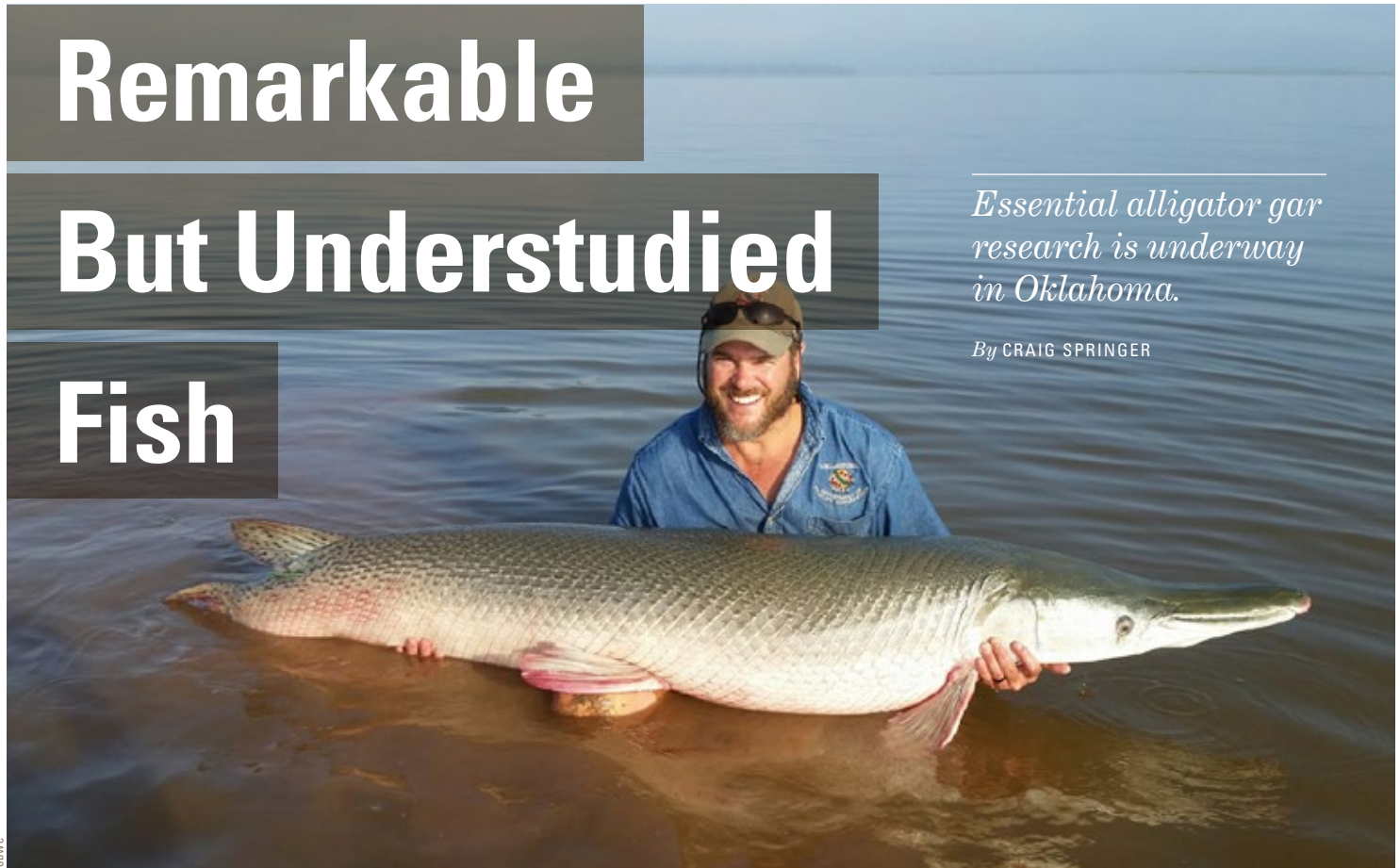
“Restoration of Devereux Slough and incorporating it as a part of the UCSB campus is a conservation wonder and a great opportunity to illustrate how the Service works with the states and their conservation partners to bring wildlife assets back to communities,” says Larry Riley, regional WSFR Chief. “These grants are so exciting because you can see and feel the benefits to wildlife and people. This one, in particular, is one of my favorites. Located on the campus of a major university, this project is habitat, connectivity, community protection, open space, nature classroom and learning laboratory, all in one.” □

ASHLEY MCCONNELL, External Affairs,  
Pacific Southwest Region

# Remarkable But Understudied Fish

*Essential alligator gar research is underway in Oklahoma.*

*By CRAIG SPRINGER*



Richard Snow, fisheries research biologist with the Oklahoma Department of Wildlife Conservation, hoists an alligator gar in Lake Texoma.

Lake Texoma lies over the Texas-Oklahoma state line. This boundary water is enormous. Denison Dam backs up the Red and Washita rivers for miles. The swollen arms of several tributary streams form massive lake coves that shoulder into the main water body. Consequently, there is much open water and ample shoreline for anglers seeking to catch black bass, crappie, sunfish, blue catfish and white bass.

The striped bass fishery is of good repute. There is something to say for the alligator gar fishery as well—in April a bowfisher harvested a nearly 7-foot, 170-pound alligator gar in Lake Texoma.

But alligator gar are understudied.

For anyone with even a perfunctory knowledge of alligator gar, this may seem counter-intuitive—that not a great deal is known about one of the largest freshwater fishes in North America.

Consider this. Alligator gar reach an enormous 13 feet long and fatten to a plump 300 pounds. It's a long-lived leviathan with some of the oldest individuals swimming this very moment, having hatched when Apollo 10 navigated around the moon in May 1969.

These giant fish have a growing, almost cult-like following of anglers, and for good reason. Hook one and hang on. An 8-foot alligator gar can take you for a ride. You will see a tail dance in a glistening spray of water akin to a silvery »

tarpon over turquoise flats in nearshore saltwater — except alligator gar potentially have more heft. Get a gator gar to the boat, and with a parting flick of its round tail fin, its sinuous form slips into the murk to be caught again.

Or will it?

That's a question that Oklahoma Department of Wildlife Conservation (ODWC) research biologist Richard Snow seeks to answer.

"Virtually any information we glean from ongoing research is new information," says Snow from his Norman, Oklahoma, office. Snow is seven years into research into the alligator gar's life history and has most recently is working to learn more on a how the fish fairs after being caught and released. The answer to this question is central to sport fishery management and has applicability well beyond the bounds of the Oklahoma state line.

The Service's Wildlife and Sport Fish Restoration Program (WSFR) funds Snow's research and essential conservation work such as his.

Snow, an Oklahoma native, has had a years-long personal and professional interest in the fish. He has long enjoyed fishing for alligator gar. He earned a graduate degree at Oklahoma State University in natural resource ecology and management.

Snow says he also earned something else in graduate school. "I have a greater respect for the species — they're a primitive fish, a swimming fossil that survive from long ago," Snow says. "They are a remarkable fish — heavily armored on the outside like a tank because their insides are sensitive."

As an ODWC research biologist, Snow has waded deeper into questions associated with catch-and-release mortality, food preference studies and growth rates.



RICHARD SNOW/ODWC

Snow set up a hooking study with hefty captive alligator gar held in large ponds at Tishomingo National Fish Hatchery. He catches alligator gar just as anglers do at Lake Texoma and elsewhere, fishing with carp or buffalo fish heads. In the experiments, Snow allows a gar to run with bait, brings it ashore and examines it for noticeable internal injuries such as bleeding or air loss from the vent. The controlled environment allows him to monitor the well-being of the fish over a long period to detect effects of hooking that would not otherwise be noted in wild fish. The work is ongoing and results yet to be determined.

Along about May of the year, mature alligator gar move into shallow weedy coves of Lake Texoma and broadcast their eggs that adhere to vegetation. That act is replicated in tanks at the national fish hatchery, where he and hatchery staff monitor the young gar.

"Alligator gar have explosive growth in their first year of life," says Snow. "In the span of only nine days, they go from egg to a larva with a sucker-disc on its head, and then to a predator. They pack on weight and by the end of the first growing season they're a foot and half long."

Alligator gar eat other fish. In examining stomach contents of adult gar, Snow determined that sport fish species make up very little of the diet. Their common foods include common carp, river

carpsucker, buffalo fish, gizzard shad and white bass.

Be not afraid—unless you are a common carp or river carpsucker. Alligator gar mostly eat fish that aren't a food or sport fish. The two rows of teeth are unique to this species.

carpsucker, buffalo fish, gizzard shad and white bass.

"These predators typically ambush their prey, but they also actively forage or scavenge their food," he says. "In the heat of the summer when oxygen is low, they gulp air into a highly vascularized swim bladder to 'breathe.' Bowfishers and anglers take advantage of these habits to locate alligator gar."

Snow says the ongoing research will help his agency steer alligator gar fisheries toward sustainability.

Cliff Schleusner, Chief of the WSFR Program in the Southwest Region, agrees. "These Holocene hold-overs have been understudied and the angler-funded work underway by the Oklahoma Department of Wildlife Conservation adds to a woefully scant body of knowledge," Schleusner says. "Alligator gar, an apex predator, provide an ecological balance that regulate the populations of other fish species — not to mention an angling experience unequalled." □

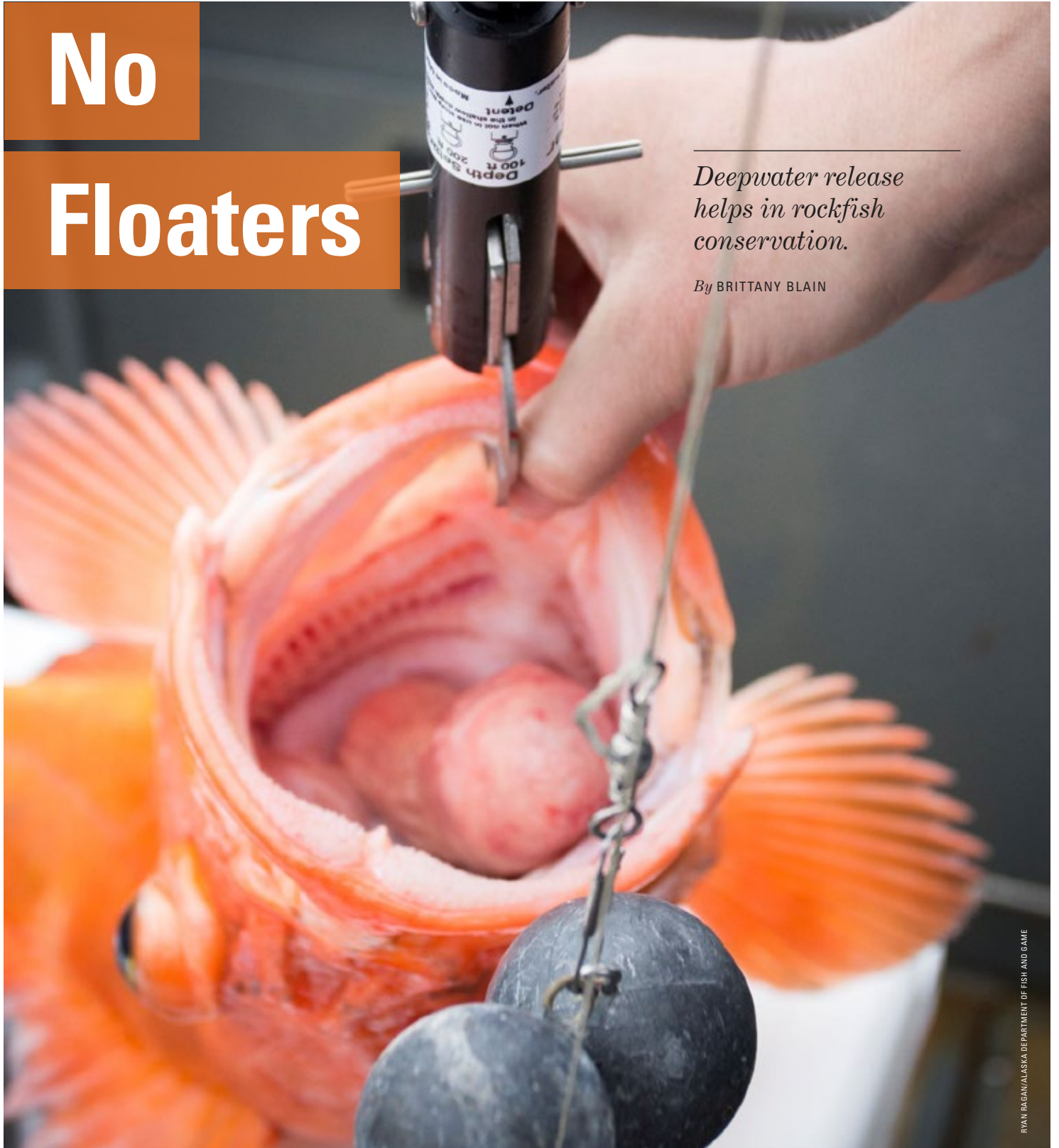
CRAIG SPRINGER, External Affairs, Southwest Region

No

Floater

*Deepwater release helps in rockfish conservation.*

*By* BRITTANY BLAIN



RYAN BAGAN/ALASKA DEPARTMENT OF FISH AND GAME



Prince William Sound in Southcentral Alaska is known for its beautiful scenery and productive marine waters; home to numerous fish species including halibut, salmon, lingcod and rockfish. There are more than 30 species of rockfish found in Alaska.

**R**ockfish are popular with saltwater anglers — they are relatively easy to catch and make for great table fare. It's not uncommon for boats to return to port with each angler on board having caught a daily bag limit of rockfish successfully.

But there is a problem.

Most rockfish are caught in deeper water, and when reeled to the surface, they show signs of barotrauma, seen as their balloon-like stomach protruding from their mouth and bulging eyes. Barotrauma is caused by changes in pressure as the fish is brought from the depths to the surface.

People look at these fish when they come out of the water and often assume they are as good as dead. In fact, they are still very much alive and can survive if certain release practices are used.

If released at the surface, a rockfish suffering barotrauma will float. It may attempt to swim back down, but the gasses inside the body are such that the fish often cannot swim back down on its own. Think of it as if the rockfish were wearing a life vest. If left on the surface, the rockfish can become easy prey for birds, marine mammals or other fish.

Biologists with the Alaska Department of Fish and Game (ADFG) have been conducting studies on the effects of barotrauma on rockfish and survivability of rockfish using deepwater release methods. Many deepwater-release methods exist, from commercial devices to a simple weighted milk crate and rope.

The ADFG studies, funded through the assistance of the Wildlife and Sport Fish Restoration Program (WSFR), have led to some noteworthy findings. One found that survival of yelloweye rockfish released at depth was far higher (98 percent) than that of fish released at the surface (22 percent). Last year, while revisiting a site studied from 2008 to 2010, researchers recaptured a released fish that had grown more than five inches in eight years. At this point, it is the longest known survival of a rockfish released using a deepwater-release mechanism in Alaska.

After many years of collecting data in part thanks to WSFR funds, results continue to maintain that deepwater release of rockfish is a necessary conservation method to ensure healthy populations of rockfish in Alaska's saltwaters. In fact, the Alaska Board of Fisheries generated a proposal at the 2017 Prince William Sound meeting to require mandatory use of these devices by all anglers in Prince William Sound. This was carried further this spring, and the use of deepwater release will now be required statewide in Alaska in January 2020 for all rockfish species. Alaska follows Oregon in requiring the use of deepwater release to get rockfish back down to depth and keep them around for the future generations of rockfish and anglers.

Deepwater release saves rockfish. □

BRITTANY BLAIN, Alaska Department of Fish and Game



## The Alaska Freshwater Fish Inventory Program

Alaska's abundant, remote and predominantly pristine freshwater fish habitats are largely unexplored and undocumented. The Alaska Department of Fish and Game's Alaska Freshwater Fish Inventory program, with funding support from the Service's Wildlife and Sport Fish Restoration Program, annually designs and conducts studies to change that and provide information needed for management of the habitats that support Alaska's freshwater fish.

An important type of fish in the state is anadromous fish, such as salmon, which hatch in freshwater, then migrate to ocean for the majority of their lives, and ultimately return to the same freshwater body to spawn. Due to the vastness of Alaska's streams and rivers (which total approximately 750,000 miles in length), and more than 3 million lakes, only a fraction of the actual anadromous fish freshwater habitats have been documented, likely less than half. An even smaller percentage of resident fish habitats have been documented.

Inventorying more freshwater systems will provide better knowledge of fish distribution and habitats important to sustaining wild fish populations.

JAMES BALES, Alaska Department of Fish and Game

(Previous page) Yelloweye rockfish suffering from barotrauma, seen as their balloon-like stomach protruding from their mouth and bulging eyes.



# Finding a Home in Conservation

By COLLEEN SCULLEY



COLLEEN SCULLEY

It was a warm summer day in 2002 as I drove north on I-91 crisscrossing the Connecticut River, the fields and mountains unfolding along both sides of the highway. I was arriving on the heels of becoming engaged to the love of my life. We'd left the West Coast in search of a future together, grounded in our shared passion for conservation—seeking a quieter and simpler (and hopefully less expensive) life than we left in California. My partner, Chris, was beginning a graduate program in conservation biology in New Hampshire and I needed a job—quickly! I was rethinking my career after three years as an endangered

Colleen and her children, William and Lizzy, enjoy a New England summer day.

species biologist in California. I had experienced the responsibility of drafting listing determinations and recovery plans, and slogged away protecting listed species through Section 7 consultations and Habitat Conservation Plans. I was feeling uncertain whether the Service was the right place for me. But, we needed income to support our new life, so I had applied for a host of positions, both with the Service and with state agencies and nongovernmental organizations.

I arrived in Hadley, Massachusetts, to meet with the Wildlife and Sport Fish Restoration Program (WSFR) at the Service's Northeast Regional Office. I had applied for a job there administering grants to states to conserve at-risk species on private lands. During the drive, I was crash-studying about this program that I knew next to nothing about, doubting it was the place for me. I recalled learning about WSFR while at a class for new employees—wasn't that the program that's all about hunting and fishing?

During the meeting, I could feel myself gaining interest. As an endangered species biologist, I had found real inspiration when working with partners and trying to find ways to achieve proactive conservation. I learned that WSFR was focused on partnerships, working collaboratively with states, and that the program was about more than just hunting and fishing. But what I most remember about that meeting was the warm welcome I received and the no-nonsense, team-oriented people I met.

Not long after, I received a call offering me the position, I accepted and began what would become a 17-year (and counting) journey through a program that inspires me to this day. As a WSFR biologist, I work in an 85-year partnership between state fish and wildlife agencies and the Service that conserves wildlife and wild places, so everyone can enjoy them. WSFR delivers more than \$230 million in grants annually in the Northeast Region alone (more than \$1 billion nationwide) to conserve fish, wildlife, lands and waters, and provide people with opportunities to get outside and connect with nature. The legacy of this effort in the Northeast can be seen in the 500,000 acres of land conserved, 3.2 million acres managed and open for public access, 1,600 boat access sites, and recovery efforts for thousands of such species as the piping plover, New England cottontail, Delmarva fox squirrel and striped bass.



Since arriving in 2002, I've watched the mission of WSFR expand to now administering 11 grant programs in the Northeast. These grant programs allow us to contribute to and support innovative work such as landscape conservation through the Highlands Conservation Act Program and initiatives combating the bat-killing white-nose syndrome. The program supports maintaining clean water by providing pump-out stations for boaters and encourages Native American tribes to conserve natural resources and wildlife critical to their culture and sustenance. WSFR has supported states in their innovative use of State Wildlife Grant funds to implement State Wildlife Action Plans at a regional scale, pooling funds and resources to work across state boundaries to protect thousands of imperiled species here in the Northeast.

I've learned through my work in WSFR the difference between a partnership in name only and a Partnership fueled by real cooperation and advancement of mutual interests. Each day, I watch in awe as the talented WSFR team of biologists, fiscal experts and communicators in the Northeast provides oversight, checks and balances, and technical assistance to states, tribes and other grantees to help safeguard federal grant funds and communicate accomplishments. They do this with integrity and honesty, serve in both a regulatory and supportive role, and foster the goodwill of grantees. As I get closer to the third decade of my career, the Service and states in the Northeast are increasingly fostering mutual interests. I see the Service stepping up efforts to recruit and retain more people to hunt and fish, and states leading the way in conserving at-risk species to preclude the need to list them in the future.

While I was not raised in a family or community where hunting and fishing were prevalent, through my work in WSFR, I've become increasingly



DELAWARE DNREC

aware of the roles hunters, anglers, boaters, recreational shooters and the manufacturers behind these sports all play in supporting conservation and public access. I see the importance of the more than \$200 million that these revenue streams provide annually for both state fish and wildlife and agencies to achieve our missions here in the Northeast. While I've always known the value of people connecting with nature, I now tend to look at hunters, anglers, birders, hikers, kayakers and boaters as more alike than different.

As the WSFR program and its mission has grown, so has my family. My daughter, Lizzy, is now 11, and son William is 8. Chris and I have put down some deep roots in New England—settling on 100-

Colleen on a project site-visit with state partners.

acres of wetlands, woodlands and fields. In March, as we were outside boiling off the last of the maple syrup, we welcomed the woodcock displaying over our heads and the deafening spring peepers calling from the pond. I feel profound gratitude each day for the meaningful work I do with the WSFR Program, how I've grown as a professional and a person, and the life that has been afforded me. □

*Colleen is the Chief of the WSFR Program in the Northeast Region.*



# wings of hope: a restoration connection

*Conservation projects  
improve beaches for Great  
Lakes piping plovers.*

By DAWN MARSH

Waugoshance Point extends west, like a finger pointing into northern Lake Michigan. More than 200 miles from any major city, it is a blustery and quiet place. Yet, there, with no humans present to witness, the beginnings of an amazing journey are taking shape.

(Above) Researchers prepare to band a piping plover chick. Almost 98 percent of Great Lakes piping plovers are banded. Each combination of colored bands creates a unique ID, like a social security number, that will stay with the bird throughout its life. (Left) LR:X,R can be recognized by her distinctive jewelry, the color-coded bands that have been attached to her legs.

**T**he piping plover is a small, sandy-colored bird that weighs about as much as a golf ball. Every year a subpopulation of piping plovers returns to the shores of the Great Lakes to lay their eggs. Each newly hatched chick is precious, members of one of the most endangered animal populations in the United States. Conservation work by a wide variety of federal, tribal, state and private partners has already paid huge dividends, helping a nearly extinct population (12 breeding pairs in 1990), rise to 68 pairs in 2018



USFWS

Some of that work took place at Waugoshance Point, located within Michigan's Wilderness State Park. Waugoshance was once a Great Lakes piping plover stronghold, having served as one of the last nesting locations when the population was at its low point. However, even as the population began to rebound in the 1990s and 2000s, the habitat on Waugoshance was deteriorating.

It became a place where no piping plovers wanted to nest. Following extended periods of low lake levels, the beaches became crowded with vegetation. In 2013 and 2014, working with partners at the Michigan Department of Natural Resources and U.S. Geological Survey, the Service's Coastal Program improved the beach habitat by grading the slope and removing vegetation. Staff return each year to monitor and maintain the resulting sandy, sparsely vegetated habitat. Their efforts were rewarded when in 2016 Waugoshance Point successfully attracted nesting plovers; there were three nests in 2018.

Plover chicks are tiny, like little puffs of cotton on toothpick legs. In the summer, researchers from the University of Minnesota carefully put colored leg bands on Waugoshance Point's newly hatched chicks. These bands will provide critical information on each bird throughout its life. One of the chicks hatched there, a female, will eventually be known by the band combination of LR:X,R.

Great Lakes piping plovers migrate to the southeastern United States every July or August, where they stay until April or early May. Piping plovers face numerous threats throughout their range, especially habitat loss from development and human presence. Fortunately, numerous protected areas along the Georgia coast have limited development. One of these, Cumberland Island National Seashore, is where LR:X,R decided to spend her winters away from the Great Lakes region. She found herself in good company—at least 18 other plovers from the Great Lakes population winter on the island or on nearby beaches.

After surviving the hurricane season on Cumberland Island, LR:X,R found her way back north to the Great Lakes. When LR:X,R arrived at Wisconsin's Cat Island chain, she didn't know about the hard work the Service and its partners had put into re-creating breeding habitat for a variety of bird species there. She also didn't realize that the local community was invested in her survival (nearby Titledown Brewing Company crafted a beer named the "Piping Plover Reserve" and designed commemorative pint glasses to raise awareness and funds for the project).

The Cat Island Chain Restoration Project will continue over the next 20 to 30 years, and one goal is to boost Great Lakes piping plover population numbers. With ingenuity and community support, the project has already doubled the number of breeding sites in Wisconsin. Last year, there was at least one active piping plover nest in the study area, and the female was none other than LR:X,R. This spring, LR:X,R was sighted at Cat Island once again, continuing her "restoration connection" journey.

Although only two North American shorebird species, the piping plover and red knot, are protected as threatened under the Endangered Species Act, almost all shorebird species are of conservation concern due to the ongoing threat of habitat loss. The conservation success story of LR:X,R and Great Lakes piping plovers like her is possible due to dedicated volunteers, partner organizations, tribes, universities and agencies that come together to restore key habitats and to conduct research and monitoring of this endangered shorebird.

The story is still far from over. Much work remains as new and old threats continue to put pressure on the birds and the population is still only about halfway to the 150-pair recovery goal needed to leave the List of Endangered and Threatened Wildlife. □

DAWN MARSH, Ecological Services Program, Midwest Region



## How You Can Help LR:X,R and Other Shorebirds

While trips to the beach can be relaxing for humans, recreational activities (e.g., walking, running, biking, fishing, kiteboarding, birdwatching or photography) may disturb shorebirds. We can "share the shore" by taking a few important steps:

- Leave no trace: Do not litter or feed wildlife.
- Give shorebirds plenty of space: 300 feet is ideal! If birds run or fly away from you, then you are too close.
- Leash dogs when shorebirds are present. Birds see dogs as predators, and when dogs chase birds, it can result in stress, injury or even death. Please leash your dog anytime you see flocks of birds on the beach, and never allow dogs to chase birds.
- Avoid flying kites near posted nesting areas. Shorebirds often mistake kites for predatory birds, causing them to stop feeding.
- Respect closures for wildlife. Do not enter areas that have been roped off for nesting or resting birds, and obey all posted signs during the nesting season. If areas of the beach are closed to dogs, please respect the closure and take your furry companion to another section of beach. That includes your wheels, too—do not drive or ride beyond the high tide line.
- Share the knowledge! Help others to appreciate shorebirds. If you see others disturbing shorebirds, please politely let them know how their actions may be negatively affecting the wildlife. It is likely that they are unaware of the consequences of their actions. If you suspect someone is intentionally harassing or harming wildlife, please contact the local Service office.



# hearing monarchs

*Inspiring conservation  
after listening to the  
delicate sound of butterfly  
wings in Mexico.*

By MARA KOENIG

Imagine hiking up a dusty trail to elevations of 10,000 feet, each step moving closer to what appears to be orange and black confetti covering the trees. Approaching closer through the dense forest, you suddenly realize the confetti is actually thousands of monarch butterflies in roosting clusters resting until they once again begin their migration north.

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Visitors hike in the Monarch Butterfly Biosphere Reserve.

The annual migration of the monarchs' eastern population involves four or five generations of the butterfly, beginning in spring in Mexico, continuing through summer in the United States and Canada, and ending in fall back in Mexico. Monarchs spend time in many areas in North America, but they overwinter in Mexico in a few small sites, totaling about 15 acres in 2018-2019.

The Service is working to ensure that monarch butterflies and this magnificent migration phenomenon continue to exist. The number of monarchs has decreased significantly over the last 20 years, but there is a massive effort underway to provide habitat for monarch butterflies, imperiled bees and other pollinators.

Lori Nordstrom, the Assistant Regional Director of Ecological Services for the Service's Midwest Region, has an integral role in monarch conservation, and she fulfilled a lifetime dream this year—visiting the monarch butterfly wintering grounds in central Mexico. "It is a highlight of my life," says Nordstrom.

An avid traveler, she has hiked to Mount Everest, gone on multiple African safaris and seen Bruce Springsteen live in Scotland and on Broadway. "Monarchs top all of that!"

Inspired by predictions of the monarch population being high for the 2018–2019 overwintering count, Nordstrom used vacation time and reserved a spot on a guided trip led by the University of Florida Natural History Museum. Meeting her tour in Mexico City started with a surprise; other monarch conservationists were on the trip, including staff from Monarch Watch. They departed the following day to Angangueo, a colonial town once filled with mining activity. Angangueo is nestled in a ravine that rambles between forested mountains, where millions of monarchs winter within the Monarch Butterfly Biosphere Reserve.

Nordstrom visited both the Sierra Chincua and El Rosario monarch butterfly

sanctuaries in the reserve. There a local guide leads you on the 45 minute to one-hour hike or horseback ride into the mountains. This incredible journey wanders through forests filled with long-needled pines and Oyamel firs until you reach the butterfly colonies.

Local guides are also stationed along the paths through the reserve to provide information and ensure people are able to immerse themselves in the experience. Guides stress the importance of respecting the observation limits to allow all visitors to enjoy this breathtaking natural event. Visitors may not eat, smoke, throw trash or make noise.

"El Rosario supported the biggest population this winter, so we started to see monarchs flying as we drove up in elevation to the base of the reserve," says Nordstrom. "As we hiked higher into the forest, there were thousands of monarchs flying, and we could see huge clumps of monarchs on the branches of the oyamel trees."

"I got teary with joy and awe at this magical wonder."

The dense shade and cool temperatures at this high elevation permit monarchs to survive the winter with scarce resources. There are few nectar sources in the forest, so monarchs sip water from small streams trickling down the mountain to metabolize their stored fats to fuel their spring migration north. The sun's energy, basking the monarchs in warmth, entices them to lift off the trees and take to the air.

"There were so many that I could hear them!" Nordstrom says, describing the sound of them flying as a gentle rain on dry leaves in a forest. There were millions of monarchs. Some trees would be covered with clumps of monarchs while nearby trees barely had any monarchs in them, leading Nordstrom to understand better why estimating the size of the monarch population is so difficult and why it is measured by the size of the area covered rather than numbers of butterflies. >>

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Lori Nordstrom, the Assistant Regional Director of Ecological Services for the Service's Midwest Region, visited El Rosario monarch butterfly sanctuary in Mexico.



PHOTO COURTESY OF LORI NORDSTROM/USFWS



LOUI NORDSTROM/USFWS

The 2018–2019 overwintering count confirmed the predictions — monarchs occupied about 15 acres of forest, a 144 percent increase in overwintering population from last winter. Monarch numbers have not been this high since 2006–2007, according to Mexico’s National Commission for Protected Natural Areas. Monarch populations, like other insects, are characterized by annual population booms and monarchs are very sensitive to weather such as storms.

During Nordstrom’s visit to El Rosario, she was joined by many people from the local community coming to appreciate “their” monarchs, including elementary school groups, families escorting their

Monarch butterflies fill the sky.

grandparents and college students. Nordstrom and her group showed the school kids and other visitors on the trail how to cup their hands around their ears to better amplify the sound of the monarch wings, as is done when listening to bats. What a field trip to instill the next generation of conservationists for the reserve!

Nordstrom’s tour group also visited an *ejido*, an area of communal land used for sustainable agriculture supported by Alternare, A.C. Alternare is a Mexican organization that educates and trains rural



communities and supports *ejidos* that inhabit the reserve region. The Service’s International Affairs Program supports Alternare, and in 2018, the Service and the Organization of American States honored Alternare as the 2018 Conservation Champion for its 20 years of work to conserve migratory phenomenon of the monarch butterfly.

“Our work may be known to Americans, now I see the results of our actions,” Nordstrom says.

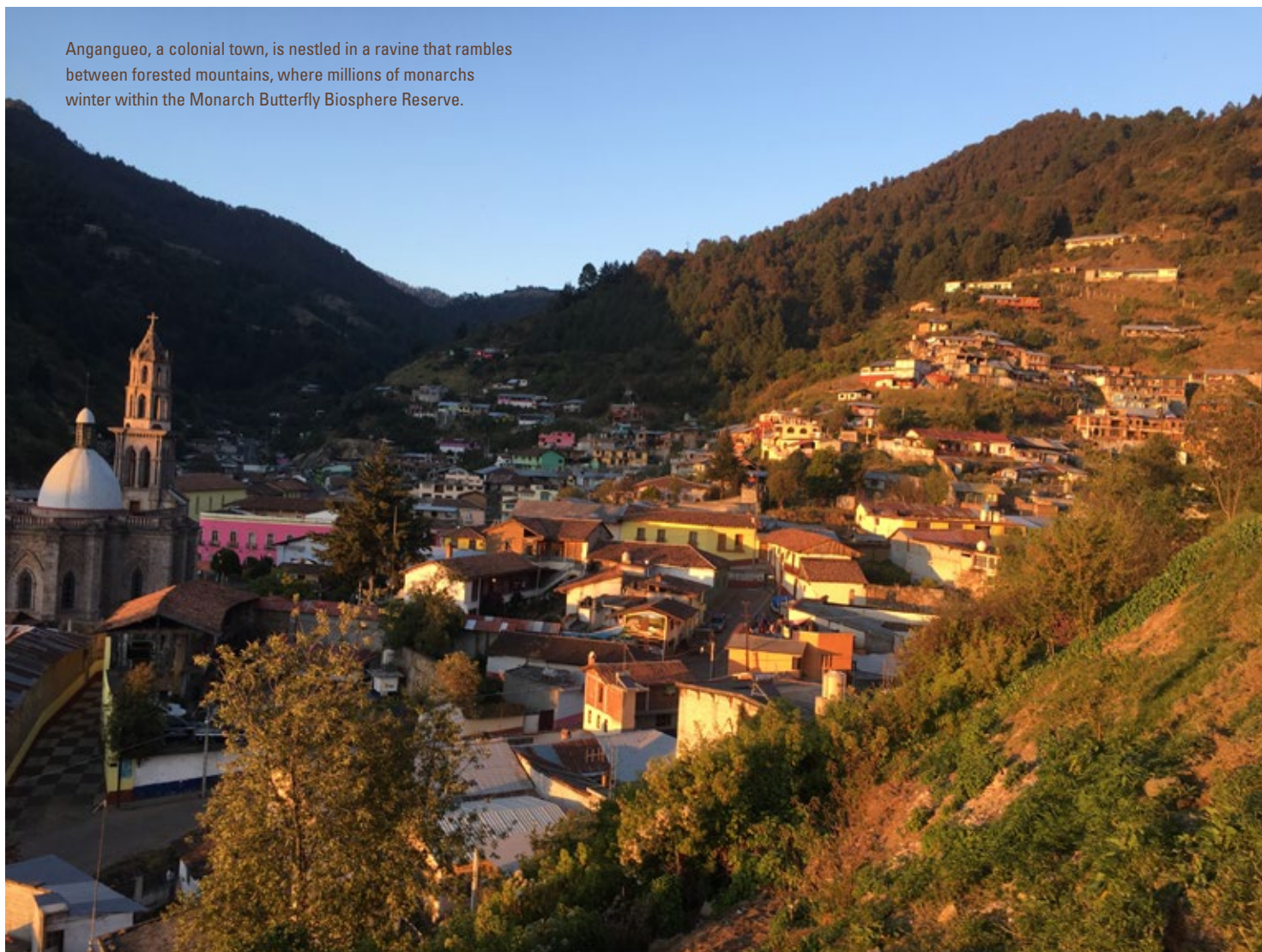
Nordstrom was proud to see the Service’s logo displayed on the wall recognizing Alternare’s many partners, and seeing that recognition deepened her understanding of the relevance of our conservation efforts and support on an international scale.

Back in the office, Nordstrom’s singular experience has helped to better inform her work on monarch butterfly conservation. On a personal note, she is interested in how to help the ecotourism industry be even more sustainable for the communities within the reserve. The Monarch Butterfly Biosphere Reserve comprises 140,000 acres of forest between the state of Michoacán and the state of Mexico and is recognized by UNESCO as a World Heritage Site. The monarch tourist season is December through March. □

MARA KOENIG, External Affairs, Midwest Region



Angangueo, a colonial town, is nestled in a ravine that rambles between forested mountains, where millions of monarchs winter within the Monarch Butterfly Biosphere Reserve.



LORI NORDBLUM/USEFWS



LORI NORDBLUM/USEFWS

## Helping Monarchs

No matter who you are or where you live, you can get involved today to help monarchs. Start by planting milkweed and nectar plants that are native to your area. Use organic yard products to minimize your impacts on monarchs, their food-plants and other pollinators. Become a citizen scientist and monitor monarchs in your area. Educate others about pollinators, conservation and how they can help.

Monarch butterfly artwork is found throughout this region of central Mexico, including this stone and concrete art on a road.

## MUSEUM OBJECTS COME TO LIFE

This is a series of curiosities of the Service's history from both the U.S. Fish and Wildlife Service Museum and Archives as well as the Service's National Fish and Aquatic Conservation Archives.

As the first and only curator of the museum, Jeanne M. Harold says the history surrounding the archives give them life. Jeanne retired in November but provided articles to keep Curator's Corner going. This issue, we also welcome submissions from April Gregory, curator of the National Fish and Aquatic Conservation Archives.

### DIY at Hatcheries



This image is from the 1975 Alchesay-Williams Creek National Fish Hatchery Annual Report. It illustrates the ingenious work of the hatchery staff using materials they had on hand to

improve feeding fish from a Cushman Truckster. They modified the hopper and engine to fit the frame of the Cushman flatbed and designed the chute to spread fish food into ponds. National fish hatcheries have been around since 1871, so we have numerous photos that document the creativity and adroitness of hatchery staff building their own tools or rigging equipment before the modern era of mass-produced fish culture supplies. The fact that the staff of Alchesay-Williams Creek chose to include it in their annual report suggests that they were quite proud of their invention. (April Gregory)

### Fish in a Pail



The Fearnow pail revolutionized the transportation of live fish when it was introduced by E.C. Fearnow in 1922. Milk cans had been used previously for moving fish, and the lighter Fearnows could carry twice as many fish as milk cans and took up half the space. The simple design of a recessed lid with holes in it aerated the water in the pail and served as an ice-holder that cooled the water. Fearnow pails were used by national fish hatcheries nationwide. The name of a hatchery and a unique identification number were stamped or painted on the side of pails, as seen on this pail from Natchitoches National Fish Hatchery in Louisiana. Hatcheries would load Fearnow pails brimming full of live fish onto fish rail cars and once the fish were stocked from the rail cars, the empty Fearnow pails were returned to their respective hatcheries to start the process all over again. (April Gregory)

### Blue Goose Flyer Extraordinaire

This desk was used at the Lake Ilo National Wildlife Refuge in west-central North Dakota. An Executive Order by President Franklin D. Roosevelt established the refuge in 1939 as a breeding ground for migratory birds and other wildlife. This desk is typical of the period, factory-made in simple fashion of oak boards. What is extraordinary, however, is that a blue goose symbol, which had been designed by Jay N. "Ding" Darling, was stenciled on the front drop leaf of the desk, forever marking the desk as a Service family member! We have such a great family, don't we? (Jeanne M. Harold)



### Be Careful What You Display Curios In

Visitors often admire a lovely black lacquered display or curio cabinet in our museum storage area. Service agents confiscated it at the Port of Baltimore several decades ago. They seized it because it contains mother-of-pearl inlay decorations that were manufactured with endangered mussel shells. Importation of materials from endangered species into the United States is, of course, illegal without the proper permit. Display cabinets of this sort have been popular in American parlors for the last century, often used to exhibit eclectic souvenirs from worldly travels. You must be careful about what you display or what you display things in, though. Be sure not to break the law, or you could lose your furniture! (Jeanne M. Harold)



# Giving Back: A Thank You to John Gavitt

by ROBIN WEST

I first met John Gavitt in the 1990s when we both worked at the Service's Regional Office in Anchorage, Alaska.



John Gavitt and staff of North River Retreat, West Virginia.

John was the Special Agent in Charge for the Office of Law Enforcement and I was the Migratory Bird Coordinator. The challenges we shared in developing enforcement policies for closed season take of migratory birds by Alaska natives created a strong bond and a long friendship — John demonstrated characteristics we all should aspire to: honesty, intense care for all people and all of God's creation, a strong work ethic and a willingness to go the extra distance to get the job done. He demonstrated these attributes throughout his career where he conducted undercover anti-poaching investigations and accepted a lengthy assignment overseas as part of the CITES Secretariat before moving to Alaska.

Upon retirement in 2000 John continued to give back with his work with the San Francisco-based nonprofit WildAid, helping train others to stem growing international poaching operations. During this time, John, with the help of wife Arlene, created the 437-acre North River Retreat in Hampshire County, West Virginia. John provided outdoor experiences designed for families: hiking, hunting, fishing, camping, sporting clay shooting, bird watching and GPS training. While doing this, he also managed the property to enhance habitat value for rare birds. John did this always at a financial loss, but did so out of his love for nature and his concern that future generations would not be able to experience the joys of outdoors experiences that he did as a youth.

While the realities of life have forced John to recently close North Country Retreat, he made sure that his giving back didn't stop with that decision. John put a conservation easement on his property, as part of the Cacapon and Lost Rivers Land Trust. Such efforts help ensure that John's 437-acres, along with approximately 50 other conservation easements in the area's trust, will continue to give back to future generations. Thank you, John!

ROBIN WEST/ CHAIRPERSON/FWS ASSOCIATION OF RETIRED EMPLOYEES

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## transitions

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### Headquarters



**Dr. Benjamin N. Tuggle**, Assistant Director for Science Applications, retired on March 29 after a distinguished 40-year career.

He joined the Service in 1979 working in wildlife disease biology at the National Health Research Center in Madison, Wisconsin. From there, he went on to hold key leadership positions throughout the nation, including experience as the Chicago Field Office supervisor and special assistant to the Director in the agency's Washington, DC, headquarters office. From 2005–2017, he served as the Regional Director for the Southwest Region before his assignment to Science Applications.

During his time as Southwest Regional Director, Dr. Tuggle addressed some of the nation's most complex and controversial issues in natural resources management including conservation issues along the U.S./Mexico border, wolf-livestock interdiction for the Mexican gray wolf, wind energy development, cooperative conservation on public and private lands, and middle Rio Grande water issues. He also oversaw establishment of three national wildlife refuges—including the

first urban national wildlife refuge in the Southwest—to provide species habitat and outdoor recreation access.

In reflecting on why he got into conservation as a career, Dr. Tuggle says, "Stewardship of land and all living things, along with hard work, were very strong values for my grandparents and they did their best to instill those values in me. I didn't realize it at the time, but through those experiences and their teachings, they were establishing my conservation foundation. Years later, those values and lessons would resurface when I decided to pursue my undergraduate, master's and doctorate degrees in biological sciences. I've never regretted that choice, and I still love every facet of being in the outdoors." □



After more than 40 years with the Service, the last four as Deputy Director or Acting

Director, **Jim Kurth** retired in June.

His first Service job was at Mississippi Sandhill Crane National Wildlife Refuge. He later served as manager at Arctic National Wildlife Refuge in Alaska and Deputy Chief and Chief of the National Wildlife Refuge System.

His career combined with his passion for history translated into an encyclopedic knowledge of the many conservation heroes

whose stories and faces line the walls of the Service's National Conservation and Training Center. And he honors their legacy by sharing their stories. More than one Service member recalled Kurth's strength as a storyteller in comments on a blog about his departure ([bit.ly/31fYezu](http://bit.ly/31fYezu)).

In 2015, Kurth was awarded the Distinguished Presidential Rank Award by the Department, the highest award for members of the SES and given to those recognized for sustained extraordinary accomplishment. Last year, the National Wildlife Refuge Association presented him with its highest award, the Theodore Roosevelt Lifetime Achievement Award, for devoting his life to the protection and conservation of our nation's wildlife and wild places, and for serving as a mentor and role model for new generations of conservationists throughout America.

His Service family will truly miss him. □

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### Southeast Region



**Jeff Fleming** began serving as the Deputy Regional Director for the Southwest Region in

April. Jeff's career with the Service spans a little more than 15 years, most recently serving as the Assistant Regional Director for External Affairs in the Southeast Region. He also served as Acting Deputy Regional Director while their Regional

Director position was vacant. Jeff brings diverse experiences to his new position. He worked in Headquarters as the Service's Public Affairs Chief, spent nearly a dozen years on Capitol Hill handling conservation policy and had a short stint on the nonprofit conservation community.

Jeff brings an enthusiasm and passion for people and our mission. He is a problem solver, a creative thinker and an approachable leader. He is excited about the opportunity to be part of the leadership team in the Southwest Region and contribute to the conservation work being accomplished there for the Service. □

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### Southwest Region



**Dr. Steve Reagan** is the new Deputy Regional Chief for Refuges in the Southwest Region.

Steve started his career with the Service in 2000 and has worked at eight refuges in the Southeast Region. For the last seven years, he was the project leader for the Sam D. Hamilton Noxubee National Wildlife Refuge Complex, with refuges in both Alabama and Mississippi. Before that, Steve was a deputy refuge supervisor within the Southeast Region helping supervise 42 national wildlife refuges. Steve has previously served as refuge operations specialist at Mandalay National Wildlife Refuge, acting refuge manager

of Bayou Teche National Wildlife Refuge, supervisory biologist for the Southwest Louisiana National Wildlife Refuge » Complex and deputy project leader at White River National Wildlife Refuge. Steve has worked and lived throughout these United States including Massachusetts, New York, Tennessee, North Carolina, Idaho, California, Wyoming, Louisiana, Arkansas, Georgia and Mississippi. Before the Service, Steve worked for the Wyoming Game and Fish Department, U.S. Forest Service and National Park Service. Born in Massachusetts, Steve has a bachelor of science degree from the University of Massachusetts, a master of science degree from the University of Tennessee and a doctorate from Louisiana State University. He is a certified wildlife biologist with The Wildlife Society. □



**Kraig Ruebush** has been selected as the manager of Willow Beach National Fish

Hatchery, located in Willow Beach, Arizona. He brings nearly two decades of experience and knowledge in fish culture, conservation and hatchery operations.

Kraig is a native of Macomb, Illinois, where he grew up on a hog farm, often a shadow

to his dad who introduced him to the outdoors and fishing. After high school, Ruebush signed on with the U.S. Army. As a soldier, he learned to operate heavy machinery, a skill he carried into civilian life, excavating roads and ponds, waterlines and golf courses.

His love of the outdoors led to a career shift: a bachelor of science in fisheries from the University of Arkansas-Pine Bluff and eventual work as a fish biologist.

“Kraig brings an impressive suite of experience to Willow Beach, and I’m pleased to have him on board,” says Stewart Jacks, Assistant Regional Director of Fish and Aquatic Conservation. “He’s worked with a multitude of cold-water and warm-water species over the last two decades—experience right in line with our endeavors at his new station.”

“I feel fortunate to have been able to travel all over the country working with so many interesting people throughout my varied career,” Kraig says, “My family and I look forward to our new chapter in life at Willow Beach.”

Willow Beach Hatchery is one of 70 such facilities found across the United States. Kraig and his co-workers raise rainbow trout and endangered razorback sucker, a rare fish species found only in the Colorado River and its large tributaries. The hatchery is open to the public and visitors are encouraged to stop by. □

## honors

### Pacific Region



**Dr. Beth Flint** has been honored by the Pacific Seabird Group with a lifetime achievement award.

This prestigious award recognizes a seabird researcher, educator conservationist who has made significant, long-term contributions to sea-bird science, conservation and education in the Pacific Ocean or the world. Beth, a supervisory wildlife biologist with the Marine National Monuments of the Pacific, was honored not only for her significant contributions to the knowledge of seabirds but also for her outstanding career as a role model and mentor to seabird biologists throughout the Pacific Rim.

Beth began her career with the Service in 1980, when she became one of the first volunteers to work at the newly acquired Tern Island in French Frigate Shoals. It was there that she first experienced the joys of working in a seabird colony. “I found an egg that was pipped. And you understand how the reproductive cycle of birds work and that eggs hatch. But actually finding this somewhat inanimate object that the chick had poked a little hole in the egg and was cheeping was thrilling. It was like ‘ahhh. It’s life, it’s really life.’ I still remember that moment of holding a hatching egg in my hand. It was lovely.”

Over the years, Beth has worked with seabird colonies across the Pacific, including Johnston Island, Jarvis Island, Midway Atoll and Nihoa. “My favorite island is always the last one I’ve visited,” she says, “but my favorite long-term project is organizing and encouraging the annual albatross census on Midway because it allows so many people to enjoy the thrill of being in a seabird colony.” □



**Jackie Ferrier**, project leader at Willapa National Wildlife Refuge Complex in

Washington, is the first woman honored as the Paul Kroegel National Wildlife Refuge System Refuge Manager of the Year. Presented by the National Wildlife Refuge Association, the award recognizes outstanding accomplishment by a refuge manager in the protection and management of national wildlife refuges.

Jackie calls it “the experience and the honor of a lifetime. There’s no other way to say it. There are so many talented people doing incredible work on refuges. I am so honored to have been selected.”

During her nearly eight years as complex leader, Jackie oversaw the restoration of 700 acres of tidal estuary in Willapa Bay, which provides important habitat for chum salmon and migratory waterbirds. The estuary is part »

of an area designated as a site of international importance for shorebirds by the Western Hemisphere Shorebird Reserve Network.

She also spearheaded sand dune restoration to protect native animals including plovers, larks and endangered Columbian white-tailed deer. To better connect the community with the refuge, she teamed last year with the Friends of Willapa Refuge to launch *Wings Over Willapa*, an annual birding, nature and art festival.

One success for Jackie was the Columbian white-tailed deer restoration on Julia Butler Hansen Refuge for the Columbian White-tailed Deer. "We were in jeopardy of a dike breach, and we had to pull together a team to move deer. We had to make some tough decisions, but look at how successful that has become. We were able to downlist the deer three years later. That was state agencies, Native American tribes, Ridgefield National Wildlife Refuge, our Ecological Services office and the Regional Office all working together like a well-oiled machine."

The Willapa Refuge complex is made up of three refuges: Willapa National Wildlife Refuge, Julia Butler Hansen Refuge for the Columbian White-Tailed Deer, and Lewis and Clark National Wildlife Refuge.

Also honored by the Refuge Association were:

■ **Friends of Tennessee National Wildlife Refuge**, named the Friends Group of the Year. The Friends of Tennessee Refuge devoted more than 12,000 volunteer hours to education and outreach. The group's work brought more than 3,600 school-children to visit the refuge on 60 field trips.

■ **Eric S. Johnson**, a forester at the Central Arkansas National Wildlife Refuge Complex, named Employee of the Year. He has worked to manage and restore more than 90,000 acres of forest in the Lower Mississippi Alluvial Valley for migratory birds. His Spatial Habitat Management Plan, the Refuge System's first, covers all six refuges in the Arkansas complex: Bald Knob, Big Lake, Cache River, Holla Bend, Logan Cave and Wapanocca National Wildlife Refuges.

■ **Harold Fairfield II**, a volunteer at Ash Meadows National Wildlife Refuge in Nevada, named Volunteer of the Year. He has chalked up more than 7,000 volunteer hours. One of his accomplishments was designing an improved fish trap that reduced stress and mortality on the refuge's endangered fishes.

■ **Allen Williams**, a landscaping/wildlife habitat specialist for a Texas school district, named Advocate of the Year. He has helped Santa Ana National Wildlife Refuge in Texas engage hundreds of teachers and thousands of students in environmental education. □

## Northeast Region



**Dr. Brett Towler**, a hydraulic engineer, has received the Sam D. Hamilton Award for Trans-

formational Conservation Science.

For many years, much of fish-passage science emerged from work with Pacific salmon on the West Coast, even though research was taking place in other parts of the country. Working in the Northeast, Brett found this frustrating.

"We have many other anadromous fish in our rivers that face unique challenges, like American shad and eel." Although research was taking place to understand these challenges, there were fewer mechanisms for transferring this technology to practitioners in the field.

In response, Brett dedicated himself to increasing the rigor and accessibility of fish-passage engineering science through » publications, education and training. In 2010, he developed a partnership with the University of Massachusetts Amherst's Master of Science in Civil and Environmental Engineering program to improve the ecological literacy of the next generation of fish-passage engineers through specialized courses and research opportunities. Recognizing the need for collaboration to advance fish-passage science, he wrote a memorandum of understanding

to synthesize research priorities for UMass, the U.S. Geological Survey and the Service, resulting in stronger relationships and better conservation outcomes. In 2016, he produced the first Service manual on anadromous fish passage for the East Coast, providing standardized design guidelines that are now being used by states, consultants and other federal agencies.

"Considering the enormity of our conservation challenges, we need the best and most creative minds working toward innovative solutions," says Will Duncan, Species and Habitat Conservation Branch Chief for the Northeast Region. "Brett embodies the creative and innovative spirit of our agency, and his scientific capabilities have produced broad-ranging benefits," he says, explaining, "He has repeatedly shown that we can achieve great conservation outcomes while also serving the needs of private industry and citizens." □



**Michael Horne**, project leader for the Lenape National Wildlife Refuge Complex—encompassing refuge lands in New Jersey, New York and Pennsylvania—has received the national Land Legacy Award from the Service's Division of Realty for significant contributions to land protection, amounting to 2,422 acres and counting.

“Mike has a way of making land-protection projects happen,” says Mark Maghini, Chief of Realty for the Northeast Region. “He’s got a great network of partners, and he is able to leverage those partnerships to help us to stretch our land-protection dollars further,” he says. In the past two years, 95 percent of the land acquisitions in Mike’s jurisdiction have been the result of donations or bargain sales.

But Mike’s land-protection portfolio is more than the sum of its parts.

“He really has a vision for the possibilities that lands represent,” Maghini says, noting Mike’s forward-thinking acquisition of a former golf course adjacent to Cherry Valley National Wildlife Refuge.

Within just a few months of the Cherry Valley deal closing, Mike had spearheaded initiatives to restore natural flow to a creek on the property, transform the fairways into habitat by planting warm-season grass species, and repurpose the golf cart paths to create ADA-accessible trails.

For Mike, that vision for the land is a direct reflection of the partnership that makes it happen. “We don’t draw lines in terms of agencies and organizations,” he says. “We are all part of one big team, and we work together to figure out how to make things work.”

As such, he considers the Land Legacy Award to be an affirmation of that team’s shared accomplishments. “That’s not my award,” he says. “It recognizes everything we have gotten done on the ground by working together.”

One of three awards established as part of the National Realty Awards Program in 2001, the Land Legacy Award recognizes Service employees or volunteers outside of the Division of Realty for significant contributions to the Service’s land-protection mission. □



**Dr. William “Bill” Ardren**, a senior fish biologist, has received the Rachel Carson

Award for Exemplary Scientific Accomplishment.

More than just contributions to a body of scientific knowledge, the award recognizes meaningful results in the face of real conservation challenges.

That challenge has been restoring a population of landlocked Atlantic salmon to the Lake Champlain Basin in Vermont, New York and Quebec after more than a century’s absence. Salmon disappeared in the mid-1800s as a result of overfishing, agricultural runoff, development and construction of dams in rivers that prevented them from swimming upstream to spawn.

“Bill recognized that there are multiple conservation problems that make up the overarching challenge of restoring salmon in Lake Champlain, and he has brought together a broad network of conservation and academic partners to understand and help address them,” says Andrew Milliken, project leader for the Lake Champlain Fish and Wildlife Conservation Office.

Those problems have been both complex and confounding, including a debilitating Vitamin B deficiency caused by an invasive forage fish, low returns of hatchery-raised fish to spawning grounds and dams standing in the way of those that do attempt to migrate.

Bill responded with a series of large-scale experiments in the hatchery, field and lab that leveraged the capacity of staff and partners to change the population trajectory for Atlantic salmon in Lake Champlain through research, observation and calibration—also known as adaptive management. For example, Bill was able to identify specific chemical odorants that salmon cue in on to home to spawning grounds in the wild and to figure out the life history stage critical for those cues. In response, he recommended changing the water source in the hatcheries from well water to brook water at a certain time of year to expose young salmon to these natural chemical cues, which has led to returns to rivers three to five times previous rates.

The results of these and other conservation solutions is highlighted by the first documented natural reproduction of salmon in more than 150 years in two tributaries to Lake Champlain—the Winooski River in Vermont in 2016 and the Boquet River in New York in 2017.

“This award acknowledges the culmination of efforts by partners working to advance the science and help address limiting factors for salmon in Lake Champlain—many of which also appear in other systems,” Bill says. He has drawn on the connections and experience developed helping to start the Conservation Genetics Lab at the Abernathy Fish Technology Center in Washington state to tap into expertise from across the global salmon community to understand better what is happening in Lake Champlain. □

## Headquarters



The Office of Law Enforcement’s (OLE) **Jim Gale**, who retired from the Service in December,

was honored as the federal recipient of the National Fish and Wildlife Foundation’s (NFWF) 2019 Guy Bradley Award. At the time of his retirement, he served as OLE’s Acting Deputy Assistant Director and was the Special Agent in Charge of the Special Operations Division.

“Effective conservation of wildlife depends in large part on the leadership and professionalism of wildlife law enforcement officers such as SAC Jim Gale,” NFWF Executive Director and CEO Jeff Trandahl says. “Jim’s tireless efforts to develop increasingly advanced enforcement capabilities at the federal level will leave a lasting legacy for conservation in the United States and abroad.”

“We join the National Fish and Wildlife Foundation in applauding Jim’s accomplishments as a leader in wildlife crime investigations,” says OLE’s Assistant Director, Edward Grace. “He has over 33 years of professional excellence, and this award exemplifies his dedication to investigating and combating wildlife crime.”

Jim began his law enforcement career as a county park ranger in 1985. He then joined the Virginia Department of Game and Inland Fisheries as a game warden and became a special agent with the Service in 1992. This background provided a foundation of working collaboratively with local, state and federal partners to investigate wildlife crime, something he carried with him throughout his career.

Jim understood that wildlife crime is a global issue and that it takes a global effort to fight it. Under his leadership, he oversaw the creation of, and led, the Special Operations Division. This highly advanced division is composed of five units that provide training and investigative support to domestic and international wildlife crime officers. Also under his direction was Operation Crash, an award-winning investigation into rhinoceros horn and elephant ivory trafficking. It was because of this operation that transnational organized criminal syndicates were connected directly to wildlife crime.

“I could not be more proud than to be awarded the National Fish and Wildlife Foundation’s highest award for achievements in wildlife law enforcement,” says Gale. “It is such an honor and the ultimate way to end my career.”

In 1905, Guy Bradley was the first wildlife officer killed in the line of duty. In his honor, NFWF annually presents this prestigious award to one state and one federal recipient, “to recognize extraordinary individuals who have made an outstanding lifetime contribution to wildlife law enforcement, wildlife forensics or investigative techniques.” □

## Midwest Region



**Scott Hicks**, field office supervisor for the Michigan Ecological Services Field Office, is the

winner of the Service’s 2018 Science Leadership Award. This award recognizes supervisors who champion the use of science in conservation decision-making and who empower their staff to accomplish scientific work and engage the scientific community. It reflects the Service’s continued dedication to strengthening the agency’s use of science in the conservation of fish, wildlife, plants and their habitats.

“Excellence in science, and its application to natural resource decision-making, has always been a hallmark of the Service,” says acting Midwest Regional Director Charlie Wooley.

“Scott is most deserving of this honor. In leading efforts at our Michigan Ecological Services Office with a talented staff and collaboration with great natural resource partners from the state of Michigan, and beyond, Scott has helped ensure a foundation of sound science in our work. Congratulations!” »

Some highlights of the work recognized by this honor include Scott’s demonstration of science leadership through fostering employee professional growth

and supporting the collaborative efforts of his staff internally, with state partners and across the region to achieve our mission. He encourages his staff to collect data using tools such as bat acoustic detectors and identification software, temperature data loggers, high tech trail cameras, underwater and thermal cameras, and avian geolocators.

“Given science is the foundation of what we do as an agency, this award is very meaningful personally. But even more, I feel an incredible appreciation for the Service staff, researchers and other conservation partners that I’ve been lucky enough to work with,” Scott says.

Scott has also helped to foster important collaboration among members of the Kirtland’s Warbler recovery Program, which has improved understanding of the species’ needs and has been an important aspect of enabling us to propose delisting the Kirtland’s warbler under the Endangered Species Act.

“This award is not one I would have expected or even contemplated, but I’m honored to be the recipient and very proud of the great work done by our team and our collaborators. Be it partners like the Michigan Department of Natural Resources, Smithsonian Migratory Bird Center, U.S. Geological Survey, or local university researchers and students; this award is shared for the great things we can accomplish working together,” he says. □



## in memoriam

### Mountain-Prairie Region



**Arden J. Trandahl**, 86, founding father of D.C. Booth Historic National Fish Hatchery,

died February 10 in Spearfish, South Dakota. A native of Minnesota, Arden grew up working in his family's produce business. He graduated from Wabasso High School in 1950 and received his bachelor's degree in wildlife and conservation with an emphasis on fisheries from South Dakota State University in 1960.

Arden's early fishery assignments took him to Alabama, Minnesota and South Dakota. In 1963, he was named manager of the Service's Senecaville National Fish Hatchery in Ohio. In his 30-year career, he served as Assistant Branch Chief of Hatcheries in the Great Lakes Region and Technology Branch Chief of Hatcheries in Headquarters. Arden's favorite and most notable assignment started in 1978 as Director of Spearfish Fisheries Complex (South Dakota) which was composed of Spearfish National Fish Hatchery, McNenny National Fish Hatchery and the Ranch A Diet Development Center.

In 1983, budget cuts forced the closure of numerous hatcheries nationwide including the Spearfish Fisheries Complex. As a result, the Service deeded McNenny Hatchery to South Dakota — it's now known as the McNenny State Hatchery. Although the Service maintained ownership of Spearfish Hatchery and the Ranch A Diet Development Center, it withdrew funding and staff. With a deep passion and appreciation for the value and potential of the Spearfish facility, Arden took early retirement and dedicated his time and effort to promoting and advocating for the station.

The City of Spearfish Parks Department immediately hired him, and Arden proved to be instrumental in establishing partnerships and agreements that allowed the use Spearfish Hatchery as a draw for tourists while maintaining the historic structures, cultural resources and a trove of fisheries artifacts. The Booth Society was established, and the City Hospitality Tax was passed because of his efforts. Both remain a valuable source of funding for Spearfish Hatchery today.

In 1989 — as a result of Arden's efforts — the Service resumed operations at the Spearfish station. The Service also rehired him to serve as the Director and curator of D.C. Booth Historic National Fish Hatchery and Archive, newly renamed in honor of the station's first superintendent. In this role, he created and promoted a strategic plan for restoration and modernization of the facility. Countless visits

with agency heads and congressional delegations resulted in nearly \$4 million allocated and appropriated to restore, retrofit and upgrade the facility. This included construction of a state-of-the-art collection management facility, administrative offices, concessions building, underwater viewing area and public restrooms.

Today — in addition to raising trout for tribal and military waters — D.C. Booth serves as the official depository for the Service's fisheries program. The National Fish and Aquatic Conservation Archives serve to assemble, preserve and protect fisheries records and artifacts for educational, research and historical purposes. The collection continues to grow and currently consists of an estimated 1.8 million linear feet of archival material and 7,200 objects. Located on the National Register of Historic Places, the site receives more than 160,000 visitors a year. A dedicated staff, assisted by volunteers who donate 14,000 hours annually, conducts fish culture and strives to bring the hatchery experience alive with interpretive programming, museum tours, exhibits and youth education. In 2002, for his contributions in making D.C. Booth what it is today, a bronze statue was commissioned at the hatchery in Spearfish in Arden's likeness.

In 1996, when he called an official end to his career, politicians entered a tribute into the *Congressional Record*. It read: "High praise to a man who has dedicated his life to government service and the management of fish hatchery operations."

Arden is also considered to be a founding father of the Fish Culture movement within the American Fisheries Society organization and as such was the first president of the Fish Culture Section. His efforts firmly re-established aquaculture as a major entity and influence within the society. The National Fish Culture Hall of Fame was also originally a concept of Arden's, and he effectively promoted the idea into reality. Since that time nearly 60 notables have been formally recognized and inducted, including Arden in 1991. Because of his perseverance and patience, the historical importance of fish husbandry in America's development and the contribution of those who pioneered the art of fish culture have been documented and will be remembered.

Arden married Sylvia Wersal on July 26, 1955, and they were blessed with a large family including their nine children 18 grandchildren and 18 great-grandchildren.

In honor of his memory, a memorial has been established by the Trandahl Family to support D.C. Booth Historic Fish Hatchery and Archive: The Trandahl Family, 48 Pearson Drive, Spearfish, South Dakota, 57783. □

# Fish & Wildlife *News*

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## parting shot

### Summer Beauty

Prairie lily is one of the many native wildflowers found in bloom on Upper Souris National Wildlife Refuge in North Dakota in the summer.



JENNIFER JEWETT / USFWS

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