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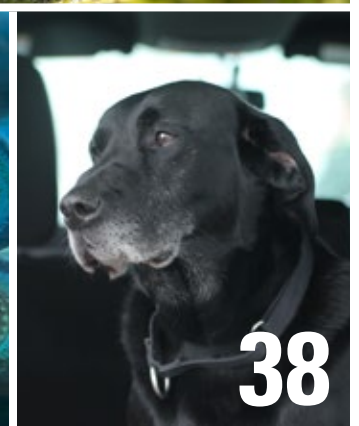
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On the cover:
Great gray owl
in southcentral
Alaska.

(PHOTO BY USFWS)

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Martha Williams,
Director

Even When Not Endangered, Wildlife Still Need Our Help

People know that the Endangered Species Act (ESA) is an incredibly successful conservation tool. We filled the last issue of *Fish & Wildlife News* with stories about some of the successes, and challenges, of the ESA, which just celebrated its 50th anniversary in 2023. (Missed the issue? [Read about the 50th anniversary of the Endangered Species Act.](#))

The Service and the Department of the Interior recently brought together administration leaders, policymakers, stakeholders, and other partners for the Endangered Species Act Symposium: Saving Life on Earth for the Next 50 Years. I was honored to be a part of this event, where we celebrated 50 years of conservation under the ESA and discussed a shared vision for the next 50 years of its implementation. During the Symposium, participants highlighted the importance of the ESA in preventing the extinction of imperiled species, promoting the recovery of wildlife, and conserving the habitats.

The ESA is one tool among many, and a necessary backstop, for addressing the challenging conservation issues we face. Going forward, our focus should be on proactively and collectively doing more so we don't get to a point where we need to use the backstop.

Of all the wildlife on Earth, less than 2,400 species are protected by the ESA. That leaves huge numbers of species that still need help, even if they aren't in danger of extinction.

Help them, we do.

Take birds: We are working hard to address the problems of light pollution and bird collisions. We do this not just for the 90-some birds in the United States protected by the ESA. We do it for the more than 1,000 bird species that call the United States home at least part of the year.

One of the birds, which you can read about later in this issue, is the chimney swift (p. 14). This bird may not be an endangered species, but we consider it one of our birds of conservation concern, which means that it represents one of our highest conservation priorities.

To protect the chimney swift and so many other bird species, we have committed to building all our new structures using bird safe glass and lights, and are surveying our facilities so we can, when possible, retrofit glass and lighting of buildings that present the most risk to birds.

In February, we gathered experts, partners from national and local governments and organizations, developers, architects, and more for a multi-sector summit to address light pollution and bird collisions. I spoke at the beginning of the meeting and was so excited by the energy of everyone attending the summit.

Also in this issue, you can read how we follow the lead of our Indigenous partners in Alaska to conserve the non-endangered caribou that they've lived alongside since time immemorial (p. 20). With their conservation leadership and species knowledge, I am more confident than ever that we shall continue to enjoy the presence of caribou.

We feature a story on wood turtles, a species of concern in the Midwest (p. 18). We are partnering with a surprising partner, the timber industry, to further the conservation of the species.

As a wildlife biologist for a private forest products company told author Gigi Otten, "We want to address endangered and at-risk species, but we also want to keep common species common."

When a species is "common," everyone can agree, it's much easier to conserve them. In many ways the Endangered Species Act is like a hospital emergency room. Anyone who has been to an ER knows that as good a job as they do there, it can often be easier, less costly, and more productive to get treatment from your personal care team before an ER trip is necessary. It is the same with the ESA.

The ESA remains as important today as it was when it was enacted. At the same time, though, we recognize the importance of working with new and existing partners to protect species before they need the emergency room of the ESA. □

Recruitment Films Turn Wildland Fire Crews Into Movie Stars

Every summer, a vast majority of the United States is shrouded in thick wildfire smoke that hangs in the air like a hazy curtain, casting an eerie filter over landscapes and transforming the once-clear skies into a somber palette of muted hues. Thousands of firefighters are dispatched to distant corners of the nation to begin wildfire suppression efforts that last for months. At the peak of fire season, the nation can have as many as 32,000 wildland firefighters on assignment at any given time. The United States has a wildfire problem.

As wildland fire agencies, including the Service, strive to reduce the risk of wildfire to communities, recruitment and retention pose significant challenges.

The concern over recruitment and retention grows every year. Several factors contribute to the complexity of attracting and keeping personnel within wildland fire agencies: the demanding nature of the work, high risk and stress levels, burnout and mental health concerns, and competitive pay. While Congress works to address firefighter pay and mental health issues, our Branch of Fire Management has tackled the recruitment and retention issue by addressing the competitive job market and aging workforce in a unique way.

For the past year, a film crew hired by the Branch of Fire Management has jetted across the country to capture wildland fire footage, habitats, wildlife species, fire personnel, and wildland fire skills for three short



recruitment videos. In November 2022, filmmakers made their first filming stop at Balcones Canyonlands National Wildlife Refuge in Texas. After two days of filming and two large prescribed fires, the Balcones Canyonlands wildland fire crew treated filmmakers to dinner, complete with a recently harvested wild boar slowly cooking on the barbeque.

Next stop for the film crew brought them to Okefenokee National Wildlife Refuge in Georgia/Florida where they were promised footage of fires and the endangered gopher tortoise. Turns out gopher tortoises are a little camera-shy, so the crew focused on the less elusive, but also endangered, red-cockaded woodpecker before capturing other wildlife, amphibious fire vehicles, and a Service helicopter on multiple prescribed fires.

From burning at the best-preserved, precipitation-based freshwater wetland ecosystem in the conterminous United States, the film crew worked their way to Turnbull National Wildlife Refuge

Wildland firefighters at Balcones Canyonlands National Wildlife Refuge in Texas work at a prescribed fire.

(PHOTO BY USFWS)

in Washington. Moose, deer, and sleeping porcupines aside, the film crew captured vastly different fire behavior in the Channeled Scablands ecosystem that predominates the refuge.

Filming was topped off with incredible footage of airboats at Big Branch Marsh National Wildlife Refuge in Louisiana and the fire-dependent, colorful blend of rare orchids, carnivorous plants, and other groundcover that blanket the flat landscape of Mississippi Sandhill Crane National Wildlife Refuge in Mississippi.

Once filming was complete, the Branch of Fire Management strategically released the three recruitment films, each designed to target diverse, younger audiences to help shepherd in the next generation of wildland firefighters:

Recruitment film #1 provides a two-minute intense peek into the excitement of working for our wildland fire program. This film is designed to grab the attention of younger generation thrill seekers looking for intensity in their lives.

Recruitment film #2 offers an in-depth look into how the wildland fire program supports and enhances our overall mission, fire's importance in creating sustainable and healthy ecosystems for plant and wildlife species, and the close-knit culture of our wildland fire program.

Recruitment film #3 explores the upbeat, light, and fun aspect of working for our wildland fire program. This film is designed to appeal to those who may have an interest in wildland fire but also a fear of what type of culture might greet them upon accepting a job in the field.

It is often said recruitment and retention challenges require a multifaceted approach, including implementing strategies to promote a positive and inclusive workplace culture and targeting future recruits that emulate this culture. Collaborative efforts between government agencies, communities, and educational institutions are essential to building a sustainable and resilient wildland firefighting workforce. We hope these recruitment videos help bridge the gap between communities, educational institutions, and the next generation of firefighters. □

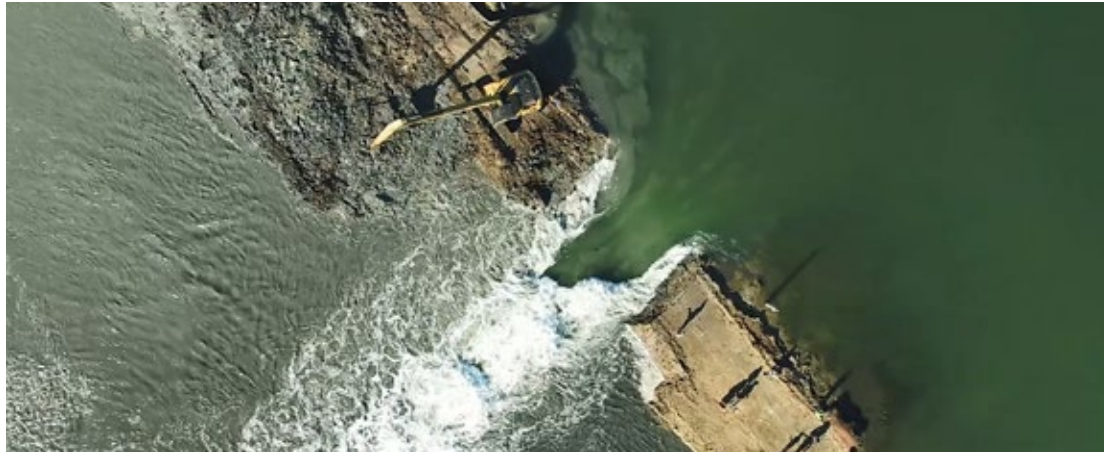
KARI COBB, Branch of Fire Management, Headquarters

Historic Levee Breach Opens 300 San Francisco Bay Acres to Tidal Marsh Restoration

MENLO PARK, Calif. — On Dec. 13, 2023, South Bay Salt Pond Restoration Project partners, including the Service, opened a 300-acre former industrial salt pond to San Francisco Bay with a celebration marking the 20th anniversary of the joint restoration venture. This major milestone event is part of an ambitious 50-year effort to restore 15,000 acres of historic wetlands to tidal marsh and other habitats.

Tidal marsh once ringed the South Bay and cushioned the shore from storms and tides. But over the course of the 20th century, approximately 85% of San Francisco Bay wetlands, over 150,000 acres, were lost to development. Restored tidal marshes help to absorb floodwaters and buffer against sea level rise, support wildlife, and improve water quality by filtering pollutants.

“The restoration of the South Bay Salt Ponds is the most ambitious wetland restoration project on the West Coast,” says California State Coastal Conservancy Executive Officer Amy Hutzel. “It is thanks to the many people who have supported this project over two decades that we are able to breach the Ravenswood R4 pond today, opening hundreds of acres to the tides and currents of San Francisco Bay. The benefits of today’s breach will be felt by the wildlife that make their homes in tidal salt marshes, the adjacent



communities that are now better protected from coastal flooding, and all of us who will get to watch this habitat come to life over the coming months and years.”

Matt Brown, San Francisco Bay National Wildlife Refuge Complex manager, adds: “Partnerships like the South Bay Salt Pond Restoration Project allow us to develop collaborative solutions and bring innovative initiatives into the future. The Don Edwards San Francisco Bay National Wildlife Refuge provides critical habitat to several endangered species, including the California clapper rail, salt marsh harvest mouse, and western snowy plover. The restoration work here is protecting and restoring habitat for each of these species, which is significant not just for us today, but for future generations, too.”

With this breach, the Restoration Project, the largest tidal wetland restoration project on the West

Coast, has opened over 3,300 acres across the South Bay to allow nature to regrow tidal marshes, transforming former industrial salt ponds into a thriving mosaic of wetlands and creating habitat for wildlife. Restoration is working: Since the project began, endangered salt marsh harvest mice and Ridgway’s rails have returned to early restoration sites to live and reproduce. Through the Restoration Project, partners have also enhanced 700 pond acres; built nearly seven miles of recreational trails, a kayak launch, and several viewing and interpretive areas; and opened the shore to public access. A new public trail is expected to open at Ravenswood in 2024.

The South Bay Salt Ponds were acquired in 2003 from Cargill Inc. in a deal brokered by the late Sen. Dianne Feinstein, a longtime champion of the restoration effort. The 15,100-acre property

Ravenswood levee breach near Don Edwards National Wildlife Refuge. (PHOTO COURTESY OF JACK MORRIS)

transfer represents the largest single acquisition in a larger campaign led by multiple partners to restore 40,000 acres of lost tidal wetlands to San Francisco Bay.

The \$13 million restoration effort at Ravenswood included accommodating a key component of the Bayfront Canal and Atherton Channel Flood Protection project, ensuring that the work is beneficial to wildlife and the surrounding communities. □

JACQUELYN D’ALMEIDA, Office of Communications, Pacific Southwest Region

Rappahannock River Valley National Wildlife Refuge's Cat Point Creek Lodge transferred to the Rappahannock Tribe



A steady drum beat rose under the watchful eyes of native bald eagles, friends, and ancestors. For the first time in more than 350 years, the Rappahannock Tribe's drums sounded over their ancestral capital town.

The Rappahannock River Valley is the ancestral homeland of the federally recognized Rappahannock Tribe, the rising and falling river holding deep significance and importance to the Tribe's history and culture. The rich ecosystem is diverse in wildlife and habitats, which the Tribe has been stewarding since time immemorial.

The Rappahannock River Valley National Wildlife Refuge's Cat Point Creek Unit opened to the public in 2023. A two-story, 7,520 square-foot lodge structure stands on the land,

Jerry Fortune, left, and Mark Fortune (Deputy Chief of the Rappahannock Tribe) right perform a drum song.

(PHOTO BY RAPPAHANNOCK TRIBE)

and ownership was formally transferred from the Service to the Tribe in coordination with the Bureau of Indian Affairs. The transfer was celebrated with a ceremony in October 2023.

"Cat Point Creek is the site of the Tribe's ancestral capital town, so being able to share our history and traditional conservation practices with the public at this significant place is especially meaningful for the Tribe in our mission to preserve our culture for future generations," says Rappahannock Tribal Chief, Anne Richardson.

Upon renovations, the lodge will serve as an Indigenous Environmental and Conservation Education Center for use by Tribal citizens and the public, to preserve the river culture and share Indigenous knowledge and stewardship of the land through classes, outdoor activities, and exhibits. The programs will also support the Tribe's longstanding vision to Return to the River, an initiative to engage Tribal youth in leadership skills and traditional cultural knowledge of the river.

Additionally, the center will provide many of the traditional uses the public expects from a national wildlife refuge, like hiking, fishing, birding, and kayaking. A new collaborative vision will offer meaningful programming and comprehensive storytelling of the land from 12,000 years ago to the present for an improved visitor experience.

Transferring ownership of the building to the Tribe is an exciting and innovative example of the Service's commitment to co-stewardship with Tribal Nations.

"Relationships, knowledge-sharing, and co-stewardship with Indigenous peoples are essential to the Service mission," says Service Director Martha Williams. "The transfer of Cat Point Creek Lodge to the Tribe is a prime example of the collaboration between the Service

and Tribes to protect cultural, trust, and treaty resources on Service lands, in support of our shared priority of conserving fish, wildlife, and their habitats."

Over the last two years, the Department has celebrated several significant and innovative co-stewardship arrangements providing Tribes a greater role in the management of federal lands and waters that have cultural and natural resources of significance. In April 2022, Secretary of the Interior Deb Haaland and Director Williams celebrated the Rappahannock Tribe's re-acquisition of 465 acres at Fones Cliffs.

The lodge will also serve as the offices of the Tribe's River Programs and Environmental and Natural Resources departments, working closely with the refuge in a partnership to protect the Tribe's ancestral lands along the river.

As we celebrate the successful transfer of Cat Point Creek Lodge to the Tribe, the Service remains committed to fulfilling our trust responsibility to Tribal Nations and growing our partnerships to best serve wildlife and people. □

LEAH RILEY, Office of Communications, Northeast Region

Making Hiking More Accessible at William L. Finley National Wildlife Refuge

It rains in Oregon. A lot. Especially in the Willamette Valley, the green, beating heart of the state. Accessible year-round trails for those who like to hike can be hard to find. At William L. Finley National Wildlife Refuge, the Woodpecker Loop Trail now offers an opportunity for hikers of all abilities to enjoy nature on their terms—even in the rain.

“This project was a joy to design and build. It provides an improved surface and easier slope for all our visitors and upgraded the accessibility of our most popular trail. It is an ideal addition to our trail system here at Finley,” says Eddy Pausch, deputy project leader for the Willamette Valley National Wildlife Refuge Complex.

This \$357,000 deferred maintenance project, made possible with support from the Great American Outdoors Act, improved access for visitors to the refuge. It replaced deteriorating wood bridges and boardwalks, improved the gravel surfaces, and made the first quarter-mile of the trail accessible in accordance with the Americans with Disabilities Act and Architectural Barriers Act standards.

The improved 1.25-mile loop is a gentle walking trail and allows visitors to experience a variety of habitats. There is also an exceptional view of the valley and Cascade Range at the overlook pavilion a fourth of the way through the loop trail. Throughout the trail, interpretive signs

provide information about the animals and plants you might see.

The project also added an ADA-accessible vault toilet, and the parking area was regraded, making access to the trail easier for folks of all abilities.

The Great American Outdoors Act is part of the America the Beautiful initiative, which is a decade-long campaign to conserve, connect, and restore 30% of the country’s lands and waters by 2030. The effort aims to support locally led and voluntary conservation work across public, private and Tribal lands and waters. This initiative will also create jobs and strengthen the economy’s foundation, tackle the climate and nature crises, and address inequitable access to the outdoors.

The team of employees with expertise in construction and heavy equipment operation from across the country replaced old bridges and walkways with two bridges and three sections of raised walkway, including 370 feet of raised decking, all with a non-slip grating surface to increase trail safety and accessibility—especially in the rain. Improving accessibility despite the rainy weather was a key part of the trail improvements, and seven new culverts redirect rain runoff away from the trail. This improves drainage in the area and will make the trail less muddy. Additionally, parts of the trail were relocated, and a series of switchbacks was added to make the trail less steep.



The educational elements have also been completed—an interpretive kiosk was built, and new signage and bilingual waypoints were installed as a part of the refuge’s Discovery Trail—a bilingual education program for families, schools, and others. These signs, in English and Spanish, guide visitors through the habitats, plants, and wildlife they may encounter throughout the trail.

The refuge’s Homer Campbell Boardwalk Trail and McFadden’s Marsh Observation Blind Trail are also accessible, meaning that for persons with limited mobility, a large part of the trail system is now accessible.

Visiting the 5,325 acres of William L. Finley National Wildlife Refuge is a great way to see what the Willamette Valley once looked like before the growing suburbs,

A Service maintenance action team improves accessibility on the Woodpecker Loop Trail at William L. Finley National Wildlife Refuge in Oregon. (PHOTO BY USFWS)

widespread agriculture, and even settlers—when the Kalapuya people were stewards of the land. A large Roosevelt elk herd can be seen roaming the refuge, alongside migrating waterfowl and other birds, and resident native species such as acorn woodpeckers and the endangered Kincaid’s lupine. □

Service Celebrates a Decade of Connecting People to Nature through Urban Wildlife Refuge Partnerships

BALTIMORE — Service Director Martha Williams joined partners and other leaders Dec. 11, 2023, at Baltimore’s Masonville Cove — our first Urban Wildlife Refuge Partnership site — to celebrate a decade of our Urban Wildlife Conservation Program.

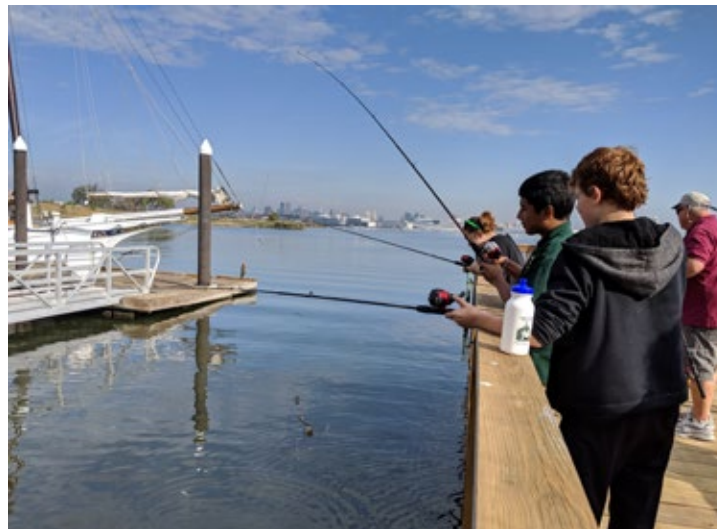
Since 2013, the program has improved lives by expanding access to green space, education, and outdoor recreation for Americans living in and around cities. The program was created to prioritize conservation and recreational access in urban areas, home to more than 80% of Americans.

“Our Urban Wildlife Conservation Program is a response to a 21st-century problem — with the vast majority of Americans living in highly urbanized areas, we need to provide access to the green spaces people need for mental and physical well-being,” Williams said at the event. “Partnerships like the one at Masonville Cove are creating a modern conservation legacy that will ultimately inspire new generations to become stewards of their environment.”

Program members work to clear social and historical barriers and foster connections that advance conservation and strengthen communities. This model includes improving access to green spaces, restoring and connecting wildlife habitat, improving

resiliency to the effects of climate change, and providing community recreation and education.

The Masonville Cove Environmental Education Center campus is nestled within an industrial area on the Middle Branch of the Patapsco River, adjacent to the nearby communities of Brooklyn, Curtis Bay, and Cherry Hill. It’s known



for environmental education programs and world-class outdoor recreational and stewardship experiences.

Since its designation, Masonville Cove Urban Wildlife Refuge Partnership has become a leader in urban conservation, collaborating with community-based organizations, government

agencies, and other institutions to connect residents with nature and wildlife, while enhancing the social and economic vitality of Baltimore communities.

Members include our Chesapeake Bay Field Office and Patuxent Research Refuge, Maryland Department of Transportation Maryland Port Administration, Maryland Environmental Services, the National Aquarium, Living Classrooms Foundation, and a variety of community groups, including Masonville Citizens Advisory Committee, the Greater

Kids fish at the Masonville Cove pier with Baltimore in the background.

(PHOTO BY MARLO ATKINSON/USFWS)

Baybrook Alliance, and Baltimore Green Space.

Masonville Cove is one of 32 Urban Wildlife Refuge Partnerships across the country. □

Fish Helps Save Youth Sports Program

The teams are geared up. The coolers are packed. Parents have their stadium seats and spirit gear. The cheerleaders are pumped for the big game. Families of youth athletes in Springville, Alabama, are ready for the first pitch or kickoff — until it rains.

Each year, approximately 2,000 kids and their families use the athletic fields at the Springville sports complex, except when storms wash out the fields. Flooded conditions delay or cancel games, disappoint the young athletes, and cause a lot of work and expense for the city’s parks and recreation department.

A little fish that darts around on the bottom of creeks eating insects could save the game. The trispot darter helps make everyone a winner, including the fish and Springville’s youth.

“Little Canoe Creek and associated tributaries are home to the trispot darter, a fish that is federally listed as threatened,” says Doug Morrison, manager of Springville’s Big Canoe Creek Nature Preserve, who worked closely with our biologists to confirm the fish’s presence in the waterways on the sports complex. “It is important for their survival to have safe fish passage and clean water.”

Biologists are always thrilled to document the trispot darter, which was once considered nonexistent in Alabama, in Little Canoe Creek. The Left Prong of Little Canoe Creek runs through Springville’s 70-acre youth »

Continued from previous page.

sports complex. Discovery of the trispot darter there was the first recorded occurrence in this part of the watershed.

Unfortunately, the species' urban habitat was in trouble due to a collapsed culvert. The culvert altered the stream's natural flow, limited the fish's passage, and increased flooding on the fields. In addition, the collapsed culvert and deteriorating roadway allowed more sediment to reach the stream, which hurt water quality.

Replacing the culvert would be costly. The city repaired flooded fields several times, so resources were stretched. Once the trispot darter was confirmed, though, we stepped up to bat. We tapped Bipartisan Infrastructure Law money to help replace it.

Bipartisan Infrastructure Law "funding enables the Service to work with local communities and landowners to address barriers to fish passage — and quickly," says Lee Holt, a biologist with our Partners for Fish and Wildlife Program. "Leveraging [that funding] and other monies allows conservationists to take on more projects that benefit federally listed species, their habitats, and the public."

Funding from the law paid for the replacement of the old culvert with a new, environmentally friendly bottomless arch-shaped culvert. The structure restores the Left Prong of Little Canoe Creek to its natural, free-flowing state, enhances fish passage, and improves water quality. It also helps protect athletic fields for soccer, football, softball, and baseball from flooding.



"Important projects like this can get done in a way that can mutually benefit our natural resources, community growth, and future generations," Holt says. "It all starts with individuals like the city's Doug Morrison, Mayor Dave Thomas, and other great partners who are willing to work with the U.S. Fish and Wildlife Service to establish and build great partnerships."

(Top) Work for the trispot darter helps protect athletic fields for soccer, football, softball, and baseball from flooding. (PHOTO BY MONICA THACH)

(Bottom) Bipartisan Infrastructure Law funding paid to replace an old culvert (left) with an environmentally friendly bottomless arch-shaped culvert (right). (PHOTOS BY LEE HOLT/USFWS)

The law's funding freed up money from the city and conservation partners for other projects, including stream bank restorations and sediment controls at the sports complex. Once all projects are complete, walking trails will weave through the complex, and parents will be able to drive safely from field to field, a plus if they have kids playing on separate fields at the same time.

"The Bipartisan Infrastructure Law and the National Fish Passage Program funding were utilized in a way to positively impact our community significantly," says Rick Hopkins, Springville's parks and recreation director. "The city has spent thousands of dollars repairing flood damage. The project is important because the bottomless arch culvert is the first of many steps for environmental education within our community and partnerships with like-minded agencies."

Most of the sports programs are growing 10% to 20% per season. The sports complex includes tennis courts and is the home field for Springville High School. A disc golf facility is in the works.

The partnership with Springville "is huge and could be a model for other communities by showing how the federal government can work alongside a local government, state, or city to remedy issues," says Morrison, who has worked closely with the Service for more than a decade. □

LESLIE HULL-RYDE, Office of Communications, Southeast Region

Missouri Wildlife Refuge Is Home to Blind Fish



Ozark cavefish sense motion given off by organisms in the water to locate food.
(PHOTO BY USFWS)

We help protect a wide variety of plants and animals, including some you may never see. Ozark Cavefish National Wildlife Refuge in Missouri has been protecting sensitive cave habitat since the early 1990s. This 40-acre national wildlife refuge protects Turnback Creek Cave Spring, the outlet of an underground stream designated as critical habitat for the refuge's namesake—the threatened Ozark cavefish.

Federally protected as threatened in 1984, Ozark cavefish are 2¼ inches long, blind, and pinkish-white in color. They live in caves, sinkholes, or underground springs that are untouched by light in the Ozark region of Arkansas, Missouri, and Oklahoma. Because Ozark cavefish live in dark environments, sight is unnecessary, and the fish have

no eyes. They sense motion given off by organisms in the water to locate food like plankton, isopods, amphipods, crayfish, salamander larvae, and even bat guano.

Sometimes called “spring keepers” or “well keepers” and recognized as a sign that water was safe for drinking, Ozark cavefish were commonly found swimming in buckets drawn from wells. Ozark cavefish are still a sign of good water quality.

Turnback Creek Cave consists of Mississippian-aged limestone bedrock. The interconnecting passages are also home to the federally endangered gray bat. These types of caves often have very good water quality, but only if there's no groundwater pollution from things like pesticides, chemical spills, agricultural runoff, and garbage. These contaminants can flow into the groundwater and travel for miles

before finally reaching waters where the cavefish live. These underground pools replenish the groundwater supply where people and terrestrial wildlife get their drinking water. Some threats to the Ozark cavefish include water pollution and declining bat populations. They also are at risk of specimen collection, cave disturbance and destruction, as well as changing water tables.

Together with our neighbors and partners at Paris Springs Conservation Area, we have been able to protect these important habitats across state and federal lands. This state conservation area shares the same mission to protect Turnback Cave and Ozark cavefish populations. Missouri Department of Conservation staff has been invaluable on-site managers, helping to limit disturbance to the protected cave. In addition, they work with nearby landowners to help with conservation efforts.

The cave is closed to the public to help prevent spread of white-nose syndrome, a cold-loving fungus that has caused the deaths of millions of bats across the country. White-nose syndrome has been detected in Missouri and we are working with state and federal agency partners to lessen the spread.

You can make a difference, too! Help protect the Ozark cavefish by avoiding caves, disposing of trash properly, and retaining forested buffers near cave entrances.

Endangered species recovery is complex work, often requiring substantial time and resources. Species today face ongoing threats like habitat loss as well as climate change and wildlife trafficking. We have a continued commitment as a nation to protect imperiled species.

Each of these species is a part of the web of life, each with a unique cultural and biological community, performing services that are essential to our combined well-being. By conserving them, we help protect the benefits that accrue from them—healthy air, land, and water—on which we depend. □

TINA SHAW, Office of Communications, Midwest Region

Salt Marsh Creation, Oyster Reef Restoration to Compensate for Contamination in South Carolina

About 150 years ago, a discovery along the banks of South Carolina's Ashley River drastically changed the area's environment and economy. Though the economic benefits of the discovery have long passed, the environmental changes remain today.

Discovery of phosphate rock outcroppings in South Carolina in the 1860s began a revolution in agricultural fertilizer use, transitioning from fertilizers made from manure, guano, and ground-up bone to commercially produced phosphate fertilizers. Shortly thereafter, South Carolina became the world's chief processor of phosphate rock. The industry employed thousands.

By 1925, however, production in South Carolina began a slow decline as higher quality phosphate rock had been discovered near Tampa, Florida. But the environmental legacy of this industry would persist. Contaminants including heavy metals, which do not degrade naturally, were transported from production sites through surface and groundwater, affecting the growth, reproduction, and survival of an array of organisms ranging from microorganisms to shellfish, fish, and wildlife.

In 2019, ExxonMobil, one of the companies that had operated fertilizer production facilities in South Carolina, reached a cooperative settlement with the federal government and South

Carolina (collectively the Natural Resource Trustees) requiring the company to pay \$6.3 million to fund the restoration of natural resources and the services they provide that were injured by production-related contamination. This settlement also reimbursed the government and state for costs to quantify those injuries. In August 2023, the Trustees finalized a restoration plan that includes creation of a salt marsh and restoration of an oyster reef, which would compensate the public for natural resource injuries addressed by the settlement. The estimated cost of the proposed restoration is \$5.5 million.

The Edisto Island Salt Marsh Creation Project will provide approximately 17 acres of salt marsh on property owned and managed by the Charleston County Parks and Recreation Commission. The project will restore historic tidal hydrology and salt marsh functions in an impounded freshwater wetland area. It will also create habitat that naturally supports a variety of flora and fauna species, including federally managed and protected migratory birds. The Port Royal Oyster Creation Project will create 3.2 acres of oyster reef habitat at two sites in the Harbor River, near Port Royal. Loose oyster shell material will be deposited on the river bottom, which will then serve as substrate (cultch) where free-swimming oyster larvae



can attach and grow. In South Carolina, oyster reefs are so important they are identified as critical habitats of concern in both the State Conservation Plan and the Department of Natural Resources Comprehensive Wildlife Conservation Strategy.

Phosphate mining in South Carolina left a legacy of contamination and injury to the aquatic environments around the production facilities. Now, with the help of our fellow Trustees—South Carolina and NOAA— we're working to replace that legacy with one of restored water quality, wetlands, habitat, and wildlife. □

Creation of a salt marsh in Edisto Island, South Carolina, may help the federally threatened eastern black rail.

(PHOTO BY ERIC BAUER/USFWS)



MORE INFO

Final Restoration Plan/ Environmental Assessment ExxonMobil Former Fertilizer Sites, Charleston and Port Royal, South Carolina. [Read the plan.](#)

Biobanking: A Wildlife Recovery Insurance Policy

Deep in the wilds of the American Southwest, the secretive and endangered New Mexico meadow jumping mouse continues, against all odds, to eke out a living adjacent to the rare and dwindling rivers and streams of this high-altitude, arid region. One dark night, a tiny mouse smells something delicious coming from inside an open metal box. Very cautiously and with much hesitation, the mouse proceeds inside to retrieve the meal. Suddenly, a metal plate beneath its feet falls, triggering a spring-loaded mechanism, and the sixth side of the box falls into place. The mouse is trapped inside.

The following morning one of our biologists conducting a survey opens the cage. They check the mouse's overall health, take measurements, and collect a tissue sample: a miniscule biopsy punch from the mouse's ear. They observe the tiny creature for some time to make sure it's stable after the trapping and sampling, then release it back to its wild meadow mouse life.

While taking blood and tissue samples for lab analysis is routine work during imperiled species surveys, this tissue could be a premium on a state-of-the-art life insurance policy. It will be shipped off to a genetics lab and a -256-degree Fahrenheit freeze for its long-term preservation, or biobanking. How this tissue may eventually be used is unknown.

"We're trying to bring 21st century solutions to 21st century conservation challenges," says Seth Willey, a wildlife biologist and Deputy Assistant Regional Director of Ecological Services for our Southwest Region. He and his team have been spearheading our biobanking program. "Here in the Southwest, our wildlife diversity took literally millions of years to develop, and despite our best efforts, we're continuing to lose some of that genetic diversity every year. With biobanking, we're trying to use modern tools to preserve America's genetic diversity—our natural heritage—for future generations."

Preserving endangered species tissue isn't new. For plants, seed banks make them easier to bring back after a long period of absence. The preservation of fish genetics for long periods has been around for a lifetime, as their reproductive cells are amenable to freezing. But for mammals, a more nuanced approach is being employed. Recent, cutting-edge techniques by genetics researchers such as biodiversity nonprofit Revive and Restore have ushered science fiction into scientific reality and may be a key factor in assuring resilience and recovery for one endangered mammal.

"Decades ago, someone had the forethought to preserve the genetics of endangered black-footed ferrets. Today, that ferret's entire recovery population comes from seven founders," says Brian Small, a wildlife biologist who's the Biobanking Project



Service biologists are banking DNA cells of several species, including the New Mexico meadow jumping mouse. (PHOTO BY GREG WRIGHT)

lead for our Southwest Region. "Although 18 ferrets were brought into captivity from the last wild population, only seven are genetic founders of today's population.

"Amazingly, in 1988, two individuals that were not able to pass their genes to today's ferrets were cryogenically preserved in the San Diego Frozen Zoo as frozen cell cultures. Then decades later in 2020, a partnership including the Service, Revive and Restore, ViaGen Pets & Equine, and the San Diego Zoo Wildlife Alliance successfully cloned an eighth potential founder they named Elizabeth

Ann. If we can add those new genetics to the recovery population, it could have a strong response to increasing the species diversity and resiliency."

In that circumstance, recovering a single individual represents a 14% potential increase to the gene diversity of North America's only native ferret. Things aren't quite yet so dire for the Southwest Region's six pilot biobanking species: the New Mexico meadow jumping mouse, New Mexico's Peñasco least chipmunk, the Texas kangaroo rat, Mexican wolf, and Arizona's Sonoran pronghorn and Mount Graham red squirrel. »

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However, for most of them, their situation is trending downward, which is why it's so important to bank their genetics now.

"Biobanking is an insurance policy essentially. It's not going to help us recover the jumping mouse tomorrow, but it's something we can start to work on now," says one of our fish and wildlife biologists Mark Brennan, the species lead for the New Mexico meadow jumping mouse. "Saving the genetic material we have now could help recovery in the future. For example, if we lose a population or one goes through a bottleneck, saving cell cultures now could possibly allow us to bring back that population's unique traits."

And while the possibilities are endless for what the future holds, biologists offer a word of caution to those who would like to declare victory when biobanking a species.

"What we don't want is for people to get complacent and think that we can just put the tissue sample in the freezer and no longer worry about protecting its habitat or continuing current recovery efforts," Brennan says. "Biobanking isn't a panacea. It doesn't fix everything. It's just another tool in the recovery toolbox." □

AL BARRUS, Office of Communications, Southwest Region



A major breakthrough in biobanking came with the 2020 cloning of a black-footed ferret that had died decades prior. (PHOTO BY RYAN HAGERTY/USFWS)

Freshwater Filter Feeding Saginaw Bay Sees Recovery in Michigan

We have seen a dramatic transformation over the past decade at Shiawassee National Wildlife Refuge, thanks to funding from the Great Lakes Restoration Initiative. Habitat restorations have reconnected rivers that were cut off from diked floodplains for more than 100 years.

Eric Dunton, a refuge biologist for the past 13 years, has been an integral part of that transformation and works with partners to restore the marsh and floodplain areas. The refuge is the site of a 1,000-acre wetland restoration project, which aims to provide high-quality habitat for wildlife and cleaner water.

"We have worked hard to prove this is a coastal system," says Dunton. "Despite being 20 miles inland, the Shiawassee Flats are directly connected to Saginaw Bay and the southern end of Lake Huron."

A Freshwater Coastal System

Michigan's lower peninsula is famously mitten-shaped, thanks to Saginaw Bay. Twenty miles south of the bay lies the refuge's 10,000-acre grassland and wetland complex. That complex is part of a larger area called the Shiawassee Flats, which act like a giant funnel where the Cass, Tittabawassee, Shiawassee and Flint rivers all converge in this low-lying area.

The flats include the national wildlife refuge, state game refuge, and surrounding wetland complexes. They serve as an

important migratory stopover for tens of thousands of waterbirds. Fish, amphibians, and other wildlife also rely on the habitat for breeding grounds, and the area is well known as a recreational paradise for bird watchers, anglers, and hunters.

During normal years, 15% of the inland freshwater in the Lower Peninsula flows through the refuge. The flats act as a filter for the water, gleaning out excess nutrients and pollutants before the water flows into the Saginaw River and out to the Saginaw Bay.

"During certain times of the year," says Dunton, "the wind pushes water inland towards the refuge instead of the more typical outflow to the bay. Because the bay and the flats share so much water, there's no doubt they share fish populations. The question is to what degree they share fish resources."

Dunton has been working with partners to assist in surveys to better understand the fisheries population of the Saginaw River.

Our agency, the U.S. Geological Survey, and the University of Michigan School of Natural Resources and Environment have partnered to determine how many fish are in the river and are moving into the refuge. Using sonar detection, the partners have been able to see how many fish are passing through the system. This allows scientists to better understand how aquatic species use the coastal marsh, which is critical to understanding the next steps in the refuge restoration. »



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A Wise Investment

Dunton is continuing to work with partners to restore the marsh and floodplain areas within the refuge. Ducks Unlimited received \$1.5 million for the first Great Lakes Restoration Initiative project on Maankiki Marsh, which broke ground in 2016. That first project began at Shiawassee National Wildlife Refuge and since then, more than \$3.8 billion in Great Lakes Restoration Initiative projects have been awarded throughout the Great Lakes region.

Over the last eight years, partners collaborating to restore Shiawassee Flats have seen habitat improvement for water quality benefits and birds, fish, and other wildlife. Although Saginaw Bay has seen some algal blooms in recent years, natural resources managers know the restoration is working.

“The blooms would be much worse and more frequent without the refuge’s filtration,” says Dunton. He cites research data from University of Michigan graduate students that showed that water had fewer nutrients after flowing through the refuge.

Dunton says there is plenty of work to continue and the magnitude of this effort takes continued dedication, patience, and constant reassessment. On-the-ground conservation is often time-intensive, expensive, and requires extensive collaboration between local communities, state and federal agencies, private landowners, and other partners.

Despite the heavy lift, the impact of these projects is an invaluable investment that ensures benefits, even those far beyond the original intentions.

A great egret visits Shiawassee National Wildlife Refuge in Michigan.

(PHOTO BY JIM HUGGINS/USFWS)

In the case of the refuge, reviving the wetlands helped avoid catastrophic damage in 2020 when a dam on the Tittabawassee River failed, giving way to flood waters that rushed toward Saginaw Bay. The refuge was under almost 10 feet of water during the unexpected flood. However, refuge managers and local officials were able to avoid the displacement of thousands of residents in low-lying areas of Bay City, thanks to the flood protection provided by the wetlands □

ASHLEY J. PETERS, Office of Communications, Midwest Region

PROTECTING AT-RISK SPECIES

A New Red Knot Subspecies? Working with Partners to Protect a Bird of Conservation Concern

Washington Department of Fish and Wildlife natural resource scientist Joe Buchanan started his career studying northern spotted owls. When Buchanan began researching red knots in 2006, he realized that we don’t know much about red knot migratory patterns along the Pacific Flyway.

“Joe deserves so much credit for how much we’ve learned about red knots in the Pacific Northwest,” Service wildlife biologist Vanessa Loverti says. “Without Joe’s interests and contributions, we would know very little about the importance of these sites. He really pulled us together and led the way.”

While different species of red knots live all over the world, the red knot subspecies in the Pacific Northwest is *Calidris canutus roselaari*. Its cousin, the *Calidris canutus rufa*, is a subspecies of red knot that lives in the Midwest and East Coast of the United States and is protected as threatened under the Endangered Species Act. Although the *roselaari* is not protected under the ESA, it is considered a bird of conservation concern and has been proposed for protection in the past.

In 2009, Buchanan, the Service, the U.S. Geological Survey, and others started researching the birds’ habitat and behavior. Buchanan liked to go out on »



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an airboat during low tide on the wide, expansive mudflats in Willapa Bay and Grays Harbor where the red knots like to rest and eat.

“We’d go out in the boat, and the operator would just kill the motor so we could drift in close and count birds,” Buchanan says. “I quickly realized that the airboat would be a game changer because it would take us to places that we couldn’t reach from shore, and it could skim across the mudflats in places where it wouldn’t be practical for us to walk.”

The researchers began gathering every year at Grays Harbor and Willapa Bay to tag and track red knots. With the help of bird ecologist and population geneticist Jesse Conklin, they made a

startling discovery: Analyses of the birds’ genetics showed that there could be two species of *Calidris canutus roselaari*. One group of red knots that stops at Grays Harbor likes to head to Wrangel Island off the northern coast of Russia to breed. The other ends their migration in Alaska. With not much known about the red knot’s overall population size—and by some estimates, declining—the possibility of two genetically distinct groups raises exciting research and management possibilities.

“Estimates from 2010 show that there are about 21,000 [Pacific Flyway red knots],” Buchanan says. “In comparison, the population of western sandpipers is in the millions. So that’s really tiny. And now we’re thinking about multiple genetically distinct populations migrating through Washington and going to either Alaska or Russia. Knowing how

Red knots (*roselaari*) stand in shallow water at Bottle Beach State Park, Washington. (PHOTO BY THOMAS ROWLEY)

small these subpopulations are has really important ramifications for conservation, including which habitats are most important to protect. But it’s dependent on our ability to establish a baseline on the size of those genetically distinct population segments.”

Based on the knowledge of this genetic difference, researchers can look at whether the populations are coming through Washington at different times, or how they’re sorting themselves out on wintering grounds. Are they mixing or staying separate? Are there any sites that are more important than others? In other words, do these genetic variations translate into different management practices?

“I think we need to figure out what we can about the ecology of these two groups and just how different they are,” Conklin says. “Like if they are ecologically identical except for these two breeding areas, then it’s not very useful or important to name a new subspecies. But let’s say we find that most of the birds from one place in Mexico breed in Alaska, and most of the birds from another breed on Wrangel Island, then you would have a case for ecologically important units that could be addressed through conservation.”

In other words, scoping out genetic differences is only one piece of the subspecies puzzle. If from a management perspective we can treat the birds as one group, then naming a separate subspecies is less important. However, if the birds are behaving in a way that suggests we need to manage them differently, then declaring a separate species could be vital.

“Everything we learn about red knots in the Pacific Flyway is going to help us understand bird behavior on a more global scale,” Loverti says. “Every time we do a study like this, we get to understand a little more about bird habitat, migration patterns, and genetics. I fully expect that we’ll be able to use the results of this work to further conservation of both red knots and birds in general.” □

LEV LEVY, Office of Communications, Pacific Region

PROTECTING AT-RISK SPECIES

On the Wing with Chimney Swifts

If you think about a bird and the Service, your mind may go to the bald eagle, not just the symbol of our country but one of the greatest Endangered Species Act success stories of all time. But we work equally as hard to keep over a thousand bird populations healthy, even if they aren't protected by the ESA. Birds like the chimney swift.

The chimney swift is a neotropical migratory bird protected by the Migratory Bird Treaty Act. Thus, harassing, injuring, or killing swifts, their eggs, and their nests are illegal. Chimney swifts arrive in the United States in March or April to breed and roost and then depart in August or September for South America's upper Amazon basin of Peru, Ecuador, Chile, and Brazil, where they like to spend the winter.

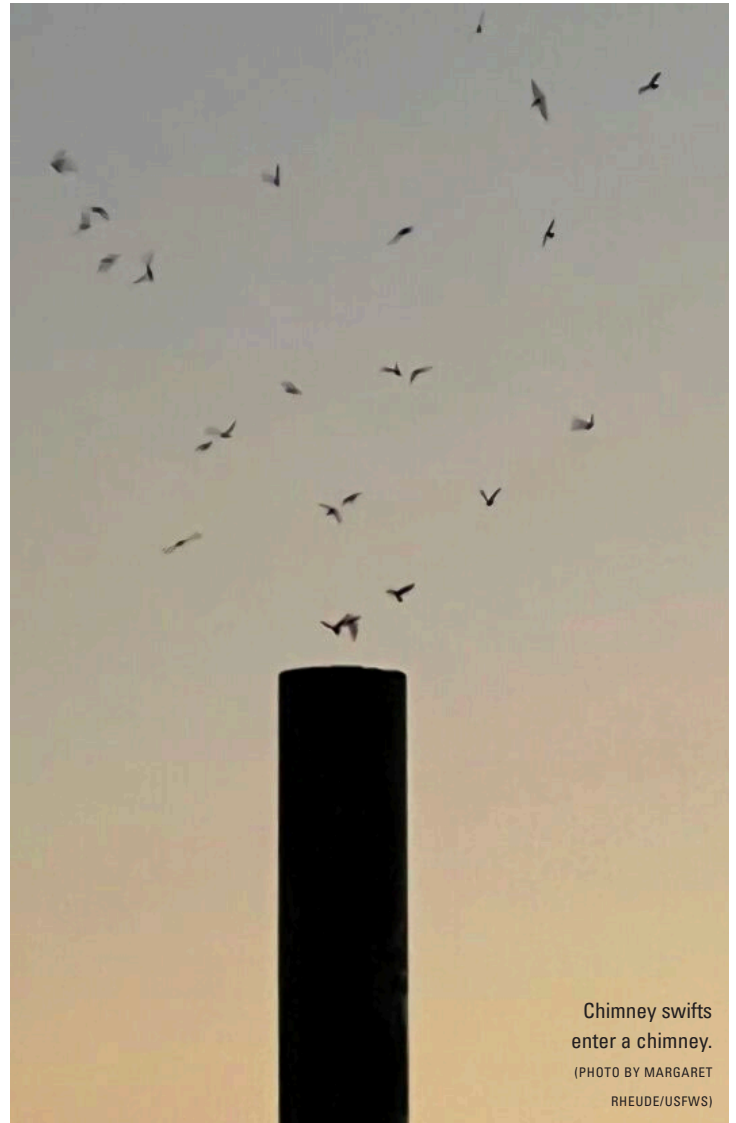
Before European settlement in the United States, chimney swifts used large hollow trees and tree cavities in old growth forests, but most of this habitat has been lost to development. As urban areas expanded, swifts began using masonry chimneys and similar human-made structures in and around towns and cities. Although chimney swifts initially adapted well to human

settlement, their population has been in serious decline over the last several decades.

Chimney swifts are in a group of birds called aerial insectivores, along with swallows, flycatchers, and other species of swift, which catch insects while flying in the air. These species are experiencing severe population declines due to loss of their insect prey populations (because of habitat loss and chemical pesticide use), habitat loss and degradation, collisions with buildings, climate change, and severe weather events. Chimneys suitable for swifts have not been built since before the 1960s, leaving many in need of repair. Moreover, many existing swift-occupied chimneys are being capped, renovated, or demolished as part of urban renewal projects.

The chimney swift was once a common bird but is now one of our Birds of Conservation Concern, a Road to Recovery Tipping Point Species, a State of the Birds Tipping Point Species, and a Species of Greatest Conservation Need in 22 states.

Besides protecting them with the Migratory Bird Treaty Act, we are also working to conserve chimney swifts, and other birds, by coordinating several initiatives to reduce bird impacts from buildings.



Chimney swifts enter a chimney.
(PHOTO BY MARGARET RHEUDE/USFWS)

Every year up to 1 billion birds die from collisions with buildings and glass in the United States, and most of those fatalities happen at homes and buildings shorter than four stories tall. Even glass walkways and bus stop shelters cause bird collisions.

Birds don't see glass as a barrier and don't avoid it. They collide with glass when they see natural reflections (clouds, sky, or trees) in the glass, when they see plants through windows, and when they are attracted to landscaping or interior lights. »

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Many birds that seem fine following window collisions can later die from internal injuries.

Fortunately, your small efforts can make a BIG difference. You can make your building safer for swifts and other birds. Some bird safety measures even reduce your energy costs and look great.

We are also supporting efforts to protect our night skies for birds.

Throughout the year, nighttime lighting can affect birds by illuminating their habitats. This can cause birds to avoid habitats essential for their survival and can alter the relationships between predators and prey, all because these areas have too much light.

Lighting can attract large numbers of night-migrating birds from as far as five kilometers away. Birds can become entrapped in these areas of bright lights, circling endlessly, depleting energy stores needed for migration and even colliding with buildings and infrastructure.

Like building collisions, though, simple and easy actions we can all take throughout the year will help keep the night skies dark.

Turning off lights at night or limiting lighting so that it is most beneficial for people will make our night sky more naturally dark, helping to create a more natural environment for people and birds.


Conservation can also be awe-inspiring. We partner with groups that hold Swift Nights Out or Swift Sits, which capture



(Top) Chimney swifts hang on in the inside of an artificial nest box. (PHOTO BY SUNNY KELLNER/SHARON AUDUBON CENTER)



(Above) Staff at the Sharon Audubon Center's Wildlife Rehabilitation Clinic care for chimney swifts. (PHOTO BY SUNNY KELLNER/SHARON AUDUBON CENTER)

 **LEARN MORE**

[Chimney swifts, including more conservation actions, what kind of chimneys are good for swifts and how far they can fly in a year.](#)

[Helping stop birds from hitting glass.](#)

[Protecting our night skies for birds.](#)

a stunning display before fall migration of hundreds of chimney swifts entering and then re-entering their roosts at dusk. At these events people not only enjoy watching the spectacle of so many birds flying together but also count the number of birds entering the roosts to help monitor their populations.

Chimney swifts may not have the cachet of the bald eagle, but our world would be infinitely poorer without them. Even if you don't have a chimney, we can all take simple actions to help them by making sure that they have plenty of food — flying insects — to eat and feed their young. You can plant native species that are beneficial for native insects, avoid pesticides as much as you can, protect and restore habitat, and even set out potted plants to help feed insects. Take pride in the important contribution you are making to chimney swift conservation! □

PROTECTING AT-RISK SPECIES



State and federal biologists, private landowners, Tribes, foresters, hunters, conservation organizations, and others have worked to halt population declines of the New England cottontail. (PHOTO BY HELEN MANNING)



Some think of the Endangered Species Act as a hospital emergency room, keeping an imperiled species from going extinct. And it is remarkably successful, credited with saving 99% of the species it protects.

But not everyone needs to go the emergency room. Sometimes a trip to your local doctor staves off what would become a dangerous problem requiring a trip to the ER.

Read about some of our work, with partners, of course, to help species stay out of the Endangered Species Act's emergency room. »

A collaborative project with staff at Altus Air Force Base in Oklahoma aims to help biologists understand why the Texas horned lizard is declining and gather data on their range and abundance in the area. (PHOTO BY WADE GURLEY/USFWS)

[TURTLES & TIMBER]



A wood turtle spends much of its time on land, earning it the nickname 'tortoise' (land-dwelling) rather than 'turtle' (water-dwelling). (PHOTO BY

JESSICA PIISPANEN/USFWS)

Foresters branch out in the name of conservation.

By GIGI OTTEN

When a forester fells a tree and yells, “Timber!” would you believe they’re also thinking, “Wood turtle!”? In the working forests of Michigan, they are!

Wood Turtle Profile

Meet the wood turtle, a scrappy reptile that settles into chilly waters for brumation—the scientific term for hibernation in reptiles—during Midwestern winters. In the summer, this little guy spends his days in the forest searching for berries and a good place to sunbathe. Wood turtles can live for 80 years, but don’t be fooled, they know how to party. They keep their feet loose by doing the worm stomp: a dance done to imitate rainfall and draw worms out of their burrows.

Found in woods and waters from Maine to Minnesota, this semi-aquatic turtle, like so many species, has experienced habitat loss and degradation. Every day, they encounter dangerous road crossings, polluted waters, nest predation, and capture by poachers. While we know wood turtle populations in the Northeastern states are declining, health of populations in the Midwest are less understood. Luckily, Trish Brockman, a current graduate student in the Department of Fisheries and Wildlife at Michigan State University, is on it.

In 2020, Brockman was recruited by the Wildlife Conservation Initiative to research the way wood turtles use forests with timber harvest, called working landscapes. The initiative is a formal partnership among the Service, National Alliance of Forest Owners, and National Council for Air and Stream Improvement, Incorporated to conserve species on private working forests.

The Old Souls of the Forest

First, Brockman needed to find out how her subjects used the forest. Like paparazzi for the local turtles, she followed as they foraged for berries and frequented the best sunbathing logs. While learning

about their use of the land, she gained an appreciation for their individuality. Brockman began to see these turtles as “old souls” with routines, personalities, and preferences. They have great memories. She says, “They know the forest like the back of their... well, shells, I guess.”

Harvest Timber, Not Turtles

As Brockman examined the relationship between wood turtles and working forests, she found that the two can coexist. “Forest management isn’t just about chopping down trees,” says Brockman. “It’s about creating a healthy forest that works for wildlife, economic factors, and people.”

Henning Stabins, a wildlife biologist for a private forest products company, agrees wholeheartedly. “It’s all about being proactive,” he says, “We want to address endangered and at-risk species, but we also want to keep common species common.” Stabins says it can be tricky to care for species of conservation concern, such as wood turtles. Species particularly at risk are protected by the Endangered Species Act and are given special considerations. With 29 years of experience, Stabins has found it’s easier to conduct research and conserve species, like the wood turtle, before the ESA is needed.

Brockman Shares the Knowledge

Brockman expanded her work to host “Wood Turtle 101” workshops with foresters wanting to learn more. “You can write all the scientific papers you want,” Brockman explains, “but if you can’t communicate to the folks who are doing the work, you can’t be effective.”

Foresters who attended the workshop found creative ways to help the turtles. They rescheduled harvest to avoid logging during active turtle season and are thinking of ways to construct and maintain



Few young turtles reach adulthood, meaning it can take a long time for turtle populations to recover from losses. (PHOTO BY COLIN OSBORN/USFWS)

sites to improve nesting success. With the wood turtle’s home range being a near perfect reflection of the privately managed forests that cover more than 60% of Michigan, their support is making a big difference.

Friends Across Sectors

Brockman is still receiving pictures and locations of wood turtles from enthusiastic foresters. She is amazed by their level of engagement, and it gives her hope for the wood turtle’s future. With support from our agency and the initiative, these two unlikely groups have found friends across sectors. □

GIGI OTTEN, Office of Communications,
Midwest Region

INDIGENOUS LEADERSHIP ON CARIBOU

Caribou in Selawik National Wildlife
Refuge. (PHOTO BY LISA HUPP/USFWS)

**In the Northwest Arctic, local
knowledge and collaboration
carry climate-impacted
caribou forward.**

By CHRISTIAN THORSBERG



The tuttu flowed down the foothills of the Waring Mountains as if they were part of the land itself—the caribou stampeding southward across undulating hills and tundra wetlands, over dry brown grasses and white patches of lichen, their course approaching the soon-to-freeze Selawik River.

When the caribou emerged on the near side of its banks, they left behind the boundary of the Arctic Circle and continued through a new one—Selawik National Wildlife Refuge—drawn farther south to their overwintering range.

Witnessing the Western Arctic Caribou Herd’s fall migration through Selawik—part of the longest land migration on Earth—and springtime return north, has remained “one of my greatest memories,” says Brittany Sweeney, an outreach specialist with the refuge.

Cyrus Harris also cherishes his memories of caribou migrations, especially those from when he was young. Born in 1957 in Sisualik—an Iñupiaq village found 12 miles from Kotzebue, across Kotzebue Sound—he remembers the cooling air of late August and September coinciding with the gathering of dog teams and the revving of then-new-fangled snow machine engines.

The Western Arctic Herd, responding to the temperature drop, left their calving grounds and moved southward like clockwork each Labor Day weekend, “traveling right through our backyard,” he recalls.

Harris was around 10 years old when he set out on foot to experience his first harvest, traveling toward the foothills a few miles northeast of Sisualik, where Iñupiaq communities had gathered caribou for countless autumns before.

“Sometimes I would take a boat and go and hunt on the Kobuk River,” Harris says. “And of course, Onion Portage would be the place to go. It was where the main herds continuously crossed, and we took what we needed.”

Paatitaaq, or Onion Portage, an important site in this traditional land, is where Harris followed in the footsteps of countless others before him. Thousands of years of archaeological evidence of caribou hunting has been recorded at the site, a place where, since time immemorial, young harvesters have learned from those with more experience. “Living in Sisualik,” Harris says, “we’re all one.”

Paatitaaq is also where biologists, including those with the Service, would trek for decades to complete collaring projects and other caribou studies, Sweeney says. In need of stability amid the variables for which they were testing, >>

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scientists could always count on the herd's reliable river crossing.

But those vibrant memories and stable journeys are beginning to fade with the passage of time. The migrations Sweeney and Harris treasure haven't occurred with nearly the same regularity or timing for the past decade, and the herd's numbers are dwindling.

This double whammy is attributable to a changing climate in the tundra, says Alex Whiting, the Native Village of Kotzebue's environmental program director.

As of July 2023, the Western Arctic Caribou Herd was numbered at 152,000, down from 188,000 in 2021 and 500,000 in 2003.

This smaller herd has restricted its range and isn't migrating as far south. Instead, the caribou are stopping and overwintering in Selawik Refuge itself, if they even come down that far. Many animals are opting instead to winter in the mountains, keeping north of the Kobuk River and refuge lands. "It's denying people [in Kotzebue] almost any fall-time opportunity to harvest," Whiting says.

Paatitaaq today is often quiet in the fall, empty of caribou, hunting parties, and scientists alike. The cultural, environmental, and economic losses such change has caused is profound.

"[Our land] is being disturbed," Harris says. "We're dealing with climate change, just as everywhere else on Earth. But it hits us harder."

More Change Than We're Used To

The impacts of warming on Selawik Refuge are significant. Research shows that the effects of climate change in the Arctic—and on the Western Arctic Herd,



one of the largest caribou herds on Earth and Alaska's biggest—are twice as impactful compared to the rest of the world.

"At the same time that herd numbers are down, and their range is smaller, we see the weather not getting as cold in the fall," Sweeney says. "We're seeing changes in the tundra habitat."

One of the most drastic changes is the delayed arrival of autumn and winter. Caribou begin their migration when the weather starts to get cold. But freezing temperatures are being experienced 30 to 45 days later each year on average, both Harris and Whiting say. And once cool weather does set in, in October and November, it isn't reliably persisting—sudden thawing, and rain on snow events, are becoming more common.

Caribou antlers on a home in Kotzebue in April 2008.

(PHOTO BY USFWS)

As a result of these changes, caribou are beginning their migration much later in the year, and limiting or changing their movements. Traversing frozen rain, as opposed to snow—for which their hooves are adapted—is sometimes impossible.

"The caribou are coming in a whole lot later," Harris says. "We're not seeing any animals, except maybe a few stragglers here and there, for even the whole month of September."

At Selawik Refuge, change is abundant. "We're seeing increased erosion and changes in vegetation cover, which will affect [caribou's] preferred winter foods, forage, and how they move across the landscape," Sweeney says. >>



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As recently as 2010, the southward-moving Western Arctic Herd crossed the Kobuk River reliably in late August. But in 2020, the first caribou didn't reach the river's southern side until Nov. 2—more than a two-month delay in migration in the span of just 10 years.

Meat and Money Matters

These late migrations, caused by a changing climate, directly affect both dinner plates and wallets.

In mid- to late October, altered hormones cause bulls' bodies to undergo chemical changes that make their meat foul-smelling. Because this rut meat is largely unpalatable, subsistence harvesters since time immemorial have been sure

to complete their hunting early in the season, when the meat is fresh.

But when migrations are delayed, caribou often aren't accessible to hunters until bulls are already in rut, timing communities out of larger, preferred animals.

"About 70% of the wild food that people [in and around Kotzebue] eat comes out of Kotzebue Sound, but the other 30% is mainly caribou," Whiting says. "Caribou is one of the two most important big game species to the Native Village of Kotzebue. They're irreplaceable."

So much so, that hunters have been forced to find alternative methods to stock their freezers, including making unfamiliar journeys north to hunt in August and September. But these are treacherous

Lichen, a favorite food of caribou.

(PHOTO BY TINA SHAW/USFWS)

and expensive trips, the price of gasoline alone costing hundreds of dollars.

Since 1993, Harris has organized and operated the Maniilaq Association's Hunter Support Program, which "provides supplemental fish and game to elders aged 60 or over," according to its website, and allocates money to Tribes for hunters to purchase "gasoline, motor oil, and ammunition" needed for harvests, Harris says.

When he founded the program 30 years ago, the program's mission was purely a "meals on wheels" for access to Native >>



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foods — problems with bull rut were few and far between. “Back then, the caribou crossed the Kobuk River when the bull [meat] was still good,” Harris says.

But in the decades since, harvest expenses and challenges have only increased. Referencing the program’s records, Harris says that gas prices near Kotzebue and the Kobuk Delta have fluctuated between \$7 and \$14 per gallon over the past three years. “And that’s not counting the price of ammunition,” he says. “I feel for the villagers.”

With shrinking hunting windows, the harvesting experience is also changing. What used to be a “mellow” couple of weeks in September filled with important coming-of-age and teaching moments, Whiting says — gathering supplies, gassing-up boats, driving upriver, camping out, and waiting for caribou to come around — has become more rushed and haphazard as filling freezers is no longer a sure thing.

“As hunting opportunities and probabilities decrease, it becomes more frantic,” Whiting says. “It creates a sense of urgency when these animals come in, and it’s a less deliberate process. Either you get these animals, or you get nothing.”

A raised platform with caribou pelts and meat, March 1974, in the village of Selawik. (PHOTO BY USFWS)

The losses are both physical and spiritual.

“Traditional, wild foods are important for people and communities on many levels,” Sweeney says. “It’s the nutrition, the healthy exercise you get by going out in the land and harvesting. There’s the satisfaction from participating with your family, sharing meat with Elders, learning about local ways of life. When caribou aren’t present, it impacts people deeply.” »

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Partnerships and Local Knowledge Lead the Way

In western Alaska, shrub tundra and rocky crags kiss, rivers meander for miles beneath mountains, and permafrost sustains abundant wetlands.

Across these ecosystems, human-made boundaries exist — stretches managed by a multitude of partners including the U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, Alaska, and Native Corporations.

The caribou themselves recognize none yet move across all, complicating recovery, conservation, and research efforts. “That means we need to have multi-agency partnerships,” Sweeney says. “Which is what we do.”

Harris helps lead the way, sharing his deep knowledge of caribou and place as



a co-chair of the Western Arctic Caribou Herd Working Group. Local people, mainly subsistence users from within the wide range of this herd, and others come together during the group’s meetings to share knowledge and craft management plans for the herd and lands.

The Alaska Department of Fish and Game, for example, completes annual population surveys of the herd with aerial photos and ongoing radio tracking to measure other key metrics.

Meeting outcomes often influence actions taken at Selawik Refuge, where a unique geography adds urgency to anthropogenic research. Stretching across the border of where continuous permafrost becomes discontinuous, the effects of thawing in the refuge will continue to be substantial for people and caribou alike.

Another focus of Selawik Refuge, Sweeney says, is facilitating subsistence hunting on refuge lands. To do so in a responsible and safe way, outreach, engagement, and uplifting communications with local Alaska Native communities is a top priority.

Often, this means focusing on and prioritizing Indigenous Knowledge.

When Harris was a young boy at Sisualik, he was taught an important lesson in patience: “The Elders always advised us to allow the first group of caribou to pass by without disturbing them,” he says.

Permitting the leading caribou safe passage ensures that the hundreds or thousands more that follow them would continue their migration. It is an act of reciprocity — helping to keep caribou populations stable is important for the herd, and it allows the village continued access to all the food they need. “That practice has worked well for us for centuries,” he says.

But in 2017, Elders in the community of Kiana noticed a new trend, likely exacerbated by a lack of hunting opportunities. Many boats were congregating on the Kobuk River, taking caribou as they crossed, creating congestion, conflict, and what Whiting calls a “free for all” situation.

In response, the Kiana Elders Council crafted a caribou hunting guidance document reminding people of the Tribe’s hunting ethics, which are based on traditional values and knowledge. The message encouraged people to wait and harvest caribou after the herd leaders had already crossed the river and set the path for others to follow. Following the Elders’ lead, this message was shared widely across the region by Harris, Whiting, Sweeney, and agency partners.

The next year, the three again worked together again, this time with the Native Village of Kotzebue to share similar guidance on the Tribe’s winter hunting ethics, including treating the herd with respect, avoiding the harvesting of pregnant cows, and not wasting any meat.

These efforts weren’t implemented with only the present in mind. They are teachings that extend both far into the past, and beyond into the distant future.

“One of the most heartbreaking things,” Sweeney says, “is that none of these experiences, sights, smells, or tastes are reliable anymore. But stewardship is ongoing. There’s lots of engagement from local people and partners in wanting to ensure that this herd is around in perpetuity, for future generations as much as it is important today.” □

CHRISTIAN THORSBERG, Office of Communications, Alaska Region

As of July 2023, the Western Arctic Caribou Herd was numbered at 152,000, down from 500,000 in 2003.

(PHOTO BY KENT MILLER/NPS)



HOME ON THE ARTILLERY RANGE

Fort Indiantown Gap contains one of the largest expanses of native warm-season grasslands in the Northeast United States. (PHOTO BY PENNSYLVANIA DEPARTMENT OF MILITARY AND VETERANS AFFAIRS)

One of the busiest National Guard Training Centers in the U.S. is the only place where the eastern regal fritillary butterfly is still found. It's not a coincidence.

By BRIDGET MACDONALD

On a raw morning in early May, a dozen biologists from the Service and National Guard Training Center Fort Indiantown Gap piled out of pickups under gunmetal-gray skies and walked gingerly onto an artillery range. Tiptoeing amid spent ammunition shells and bunches of thigh-high straw-colored grass, they scanned the ground for something small, delicate, and bright: spring's first violet blossoms.

Violets are an important part of a well-balanced diet for the regal fritillary, a rare butterfly the Service is considering protecting under the Endangered Species Act. Just as infants need milk or formula, the butterfly's caterpillars need these ground-hugging flowering plants to grow. To complete their complex lifecycles, fritillaries also need nectar sources that sustain adults and native grasslands with tall vegetation that provide shelter for all life stages.

While the western subspecies of the regal fritillary is still found in native grasslands that meet these needs in 14 states in the Great Plains and portions of the Midwest, the eastern subspecies is found only at Fort Indiantown Gap. The National Guard Training Center in central Pennsylvania is the last place in the eastern United States that still provides this habitat sweet spot.

It's not a coincidence.

New Recruits

Spring is the start of military training season at the fort. Over the next few months, tens of thousands of soldiers cycle through the installation to practice tactical maneuvering of mechanized infantry, air-to-ground bombing and strafing, and the use of individual and crew-served weapons.

It's also when the fort's smallest recruits show up. As the weather warms, larvae half the size of a grain of rice begin to stir in the grasses, waking from their winter dormancy to eat violets, grow, and pupate.

In June and July, they emerge from chrysalises and mate, relying on nectar sources for sustenance. In late summer and early fall, the female butterflies lay eggs.

When the eggs hatch, the first stage larvae—called first instar—eat their own egg cases, their only meal before overwintering on the range until spring, when the busy season starts again.

This rare butterfly persists on the site's artillery ranges not in spite of the mortar fire and rumbling tanks but because of them. Protected from development for decades and disturbed regularly by military training activities, the installation's 17,000 acres—slightly larger than Manhattan—provide a mosaic of high-quality habitats, including one of the largest expanses of native warm-season grasslands in the northeastern United States.

“If the military wasn't present here, these biodiverse native ecosystems would not exist,” says Erika McKinney, a wildlife biologist with Fort Indiantown Gap.

Neither would the eastern regal fritillary. Their habitat requires periodic disturbance, at the right time and intensity, to keep the butterfly going strong.

Common Ground

Unlike the soldiers who share their habitat, adult eastern regal fritillaries aren't well camouflaged. These large, showy butterflies have bright orange forewings with black spots and dark hindwings that feature black bars, fine white markings, and two rows of large spots at the base. >>

Adult eastern regal fritillaries are large, showy butterflies, with bright orange forewings with black spots. (PHOTO BY MADISON FERNER/PENNSYLVANIA DEPARTMENT OF MILITARY AND VETERANS AFFAIRS)



spotlight: protecting at-risk species

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But the soldiers and butterflies do share common ground, literally.

“They both need ranges,” McKinney says. Soldiers need wide open spaces to train, and fritillaries need ranges to roam. “They are nomads in their ecosystem.”

The soldiers’ training activities improve the butterflies’ habitat by creating regular disturbances—think controlled fiery explosions—that sustain grassland habitats by both keeping woody vegetation from encroaching and providing the right conditions for native nectar plants to flourish. Violets in particular thrive in disturbed soils.

For a long time, the eastern regal fritillary was able to hang on at the installation solely because of military training activities. Then in 1992, the National Guard began actively managing the species’ habitat through prescribed burns, mowing, seeding, and transplanting to further optimize the landscape for a species that seemed to be disappearing everywhere else.

“They had the foresight to realize the fort might be the only place left for this species,” says Pam Shellenberger, a biologist with our Pennsylvania Field Office. “They launched this incredible effort and now do deliberate management in five research areas on the fort for the fritillary.”

The habitat has responded. Surveys show violet density increases fourfold after an area has been trampled by tanks. After a prescribed burn, the increase is eightfold. Regular prescribed burns ensure the violets keep coming. >>



(Above) A spent shell in an artillery range at Fort Indiantown Gap where eastern regal fritillaries roam. (PHOTO BY BRIDGET MACDONALD/USFWS)



(Left) Just as infants need milk or formula, the eastern regal fritillary’s caterpillars need to eat violets to grow. (PHOTO BY PENNSYLVANIA DEPARTMENT OF MILITARY AND VETERANS AFFAIRS)



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Always Ready, Always There

In tandem with its boots-on-the-ground efforts to conserve the eastern regal fritillary, Fort Indiantown Gap is collaborating with the Service and other partners to propagate butterflies in captivity and reintroduce them to new suitable sites.

Our Science Applications Program in February 2024 helped the installation codify its intentions to conserve the species through a Candidate Conservation Agreement. The formal-but-voluntary commitment will be appended to the installation's Integrated Natural Resource

Management Plan, which identifies key natural resources and actions needed to manage them.

“The agreement outlines the beneficial management practices the fort has been doing to help the eastern regal fritillary,” Shellenberger says.

If the species is protected under the ESA, the agreement will help streamline the consultation process between the Department of Defense and the Service required under the act to provide coverage for incidental loss of some individuals resulting from activities that benefit the species.

The goal is to avoid disrupting decades of conservation progress that the eastern regal fritillary can't afford to lose.

Biologists from Fort Indiantown Gap and the Service visit the range on a raw spring day. (PHOTO BY BRIDGET MACDONALD/USFWS)

“If not for management conducted by the military, this species would already have blinked out,” Shellenberger says.

True to their motto, the National Guard plans to be “Always Ready, Always There” for the eastern regal fritillary at Fort Indiantown Gap. □

BRIDGET MACDONALD, Office of Communications, Northeast Region



BIG LITTLE CHALLENGE

Work to restore the Long Valley speckled dace to suitable habitats is in its early stages. (PHOTO BY ROSA COX/CDFW)

**Conserving small desert fish
is no small feat**

By NATHAN HURNER

To understand the plight of small fish living in a remote desert, one can first look to the story of Phil Pister, a former district fishery biologist with the California Department of Fish and Wildlife, who in 1964 made history in the world of small desert fish.

In the Owens Valley of California, Pister and other researchers stumbled upon a clear pool that contained a startling rediscovery, the Owens pupfish; a now federally endangered species of small desert fish that had been presumed extinct since the 1940s.

Five years after this notable rediscovery, to save the only known Owens pupfish population from a drying pond, Pister carried two buckets full of the fish across hazardous terrain to a safe location. For a few moments, Pister was responsible for the existence of an entire species. Those moments have continued to inspire recovery efforts for other small desert fish to this day. The Long Valley speckled dace is one such fish.

“And we’re really just talking about this fish that exists in one small basin and has been isolated from other populations for a significant amount of time,” says Rosa Cox, a fish biologist with the California Department of Fish and Wildlife.

Seven hundred and sixty thousand years ago, Long Valley formed near the north end of the Owens Valley as a result of an enormous eruption. The original volcano collapsed in on itself, creating one of the largest calderas in the world. Continued geological movement separated Long Valley from Owens Valley, resulting in an isolated speckled dace population in the local waterways. The resulting isolated speckled dace habitat in Long Valley represents one of the few unique pockets of water found in this arid habitat.

These isolated pockets call to mind another area significant and well known to the history of the life sciences.

“Think of them as similar to the Galapagos Islands,” Cox says, “they’re islands of water within a very dry system”

Rather than working on the Galapagos’s small desert islands, in Long Valley, biologists are working with small water systems across a large desert landscape. These modest rivers and springs exist in a dry expanse and lie in the rain shadow of the more dramatic Sierra Nevada range. Instead of the sails and compasses used by exploratory researchers to study the Galapagos, biologists use four-wheel drive

and GPS to identify unique species hiding in the limited desert oases.

“Why do we care what a species is and how it’s delineated?” Cox says. “We really, truly care because species are the unit at which we manage ... with formal recognition will come ... additional ability and resources for conservation and management.”

Extended isolation in Long Valley resulted in a genetically unique population, distinctly different from its nearby neighbor, the Owens speckled dace. We received a petition to protect the Long Valley speckled dace under the Endangered Species Act in 2020 and published a 90-day finding that the petition presented substantial information indicating that the petitioned action may be warranted. As part of the next steps >>



Long Valley. (PHOTO BY ROSA COX/CDFW)

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in the review process, we will develop a Species Status Assessment to get a clear picture of the biology of the species, what extent it exists on the landscape, and threats to its survival.

Understanding more about the species can help generate greater collaboration between agencies and help find avenues for species recovery efforts.

“The restoration process really does involve just collaborating with agencies, collaborating with partners,” Cox says. “[The] U.S. Fish and Wildlife Service has been really critical in helping try to restore habitat and find alternative habitats.”

An example of this collaboration for recovery of small desert fish can be seen in a project for the Owens pupfish. The California Department performed an intensive habitat restoration project in 2020 and collaborated with the Service and landowners to introduce the Owens pupfish to the restored water system. This project established an important new population for the imperiled fish species.

While the pupfish has seen some success, the work to restore the Long Valley speckled dace to suitable habitats is in its early stages. Like Pister’s last-ditch effort for Owens pupfish in the 1960s, Steve Parmenter, a former biologist with the department, likely saved the Long Valley speckled dace by moving some individuals to a private pond in the mid-2000s, says Cox. When the last remaining wild population crashed for unknown reasons, it was this small population on private land that became the source for recovery translocations.

In 2022, as part of a planned conservation action in coordination with the Service and the respective landowner, department staff



moved over 400 Long Valley speckled dace to a nearby small stream to establish a new, isolated, population there. These projects and the continued collaboration of multiple partners provide hope for small desert fish in the fight for their existence.

“The main thing that people can do to contribute to conserving native desert fish in general, it’s just simply not releasing pet fish into waters,” Cox says.

The introduction of non-native species has historically been one of the great challenges to conserving small desert fish. The public can play a part in reducing the harm done to the fish and the habitat where they live by not introducing pet fish, frogs, or turtles into wild ponds and water systems. >>

Understanding more about the species can help generate greater collaboration between agencies and help find avenues for species recovery efforts. (PHOTO BY ROSA COX/CDFW)



MORE INFO

This story is based on excerpts from our award-winning Fish of the Week! podcast. Kaylan Hager, a fish and wildlife biologist with the Service in Reno, Nevada, and Rosa Cox, a fish biologist with the California Department of Fish and Wildlife in Bishop, California, sat down with the hosts to talk about Long Valley speckled dace and other small desert fishes living at the base of the Eastern Sierra. [Listen to the podcast](#) on the dace or [read the transcript](#).

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In addition to preventing the spread of invasive species in our native waters, spreading appreciation for the uniqueness of these desert fish can go a long way as well.

“They evolved to fill these niches that another species didn’t. So, they’re very unique and very rare,” Cox says. “And they’re there for a reason. And they could be a keystone indicator for that

ecosystem ... increasing local awareness of all our endemic species in general, could create a group of people who are excited about advocacy.”

There is a long road ahead filled with recovery, management, and further scientific discovery, but that road has been made walkable by former and current passionate biologists and dedicated volunteers. □

NATHAN HURNER, Office of Communications,
Pacific Southwest Region



Restoring Salt Marshes for People and Wildlife

Salt marshes exist where land and sea meet. Daily tides refresh the landscape with ocean waters and support wildlife and plants adapted to these dynamic conditions.

Many birds, including the at-risk American oystercatcher and species protected by the Endangered Species Act, rely on these areas. Beyond birds, salt marshes are home to many high priority species, from West Indian manatees to loggerhead sea turtles to Atlantic sturgeon. Salt marshes are also home to wildlife species that people and businesses rely upon. They serve as critical nurseries for healthy populations of commercially valuable fish and shellfish.

They also absorb storm surge like a sponge, protecting nearby property and natural areas during severe weather—saving billions of dollars in infrastructure. Salt marshes are an ally against climate change, too. They not only buffer coastal communities but also store a tremendous amount of carbon in their soils.



(Left) Because American oystercatchers survive almost exclusively on shellfish, they live only in a narrow ecological zone of salt marshes and barrier beaches.

(PHOTO BY PAMELA DENMON/USFWS) (Right) With support from the Delaware Watershed Conservation Fund, the American Littoral Society is leading a project to restore Thompsons Beach, along New Jersey’s Delaware Bayshore. (PHOTO BY SHANE GODSHALL/AMERICAN LITTORAL SOCIETY)

Sadly, centuries of human alterations have greatly reduced the extent and function of salt marshes. And now, rising seas are creeping up on them.

Recognizing the enormous value of salt marshes, the Department of the Interior and the Service, with funding support from the Bipartisan Infrastructure Law, launched the Salt Marsh Keystone Initiative in January 2024. Partnering with others, we are leveraging resources and expertise to help make informed, efficient use of funds to restore this valuable habitat, creating a more resilient coastline to address climate change. □

Excerpted from [“Keystone Initiative Centers on Salt Marsh Conservation”](#)

DEMYSTIFYING THE PACIFIC LAMPREY



**Myths and truths about the
misunderstood species.**

By LENA CHANG

After spawning, males and females die, and their bodies provide valuable marine-derived nutrients for other aquatic residents. (PHOTO BY USFWS)



Pacific lamprey are misunderstood by many as ugly, scary, dangerous, and mostly worthless. But in reality, they play an important role in the ecosystem and hold deep cultural significance for Native American Tribes. Pacific lamprey are a native and anadromous species — starting their lives in fresh water, heading to the ocean, and returning to fresh water. Pacific lamprey have declined in abundance and distribution throughout their range in the United States, which is Alaska to Southern California. They, like salmon, face challenges from climate change, passage barriers, habitat destruction, and non-native species.

Although Pacific lamprey are not protected under the Endangered Species Act, we conserve them through longstanding partnerships with Tribes, federal and state agencies, and nongovernmental organizations. We established the Pacific Lamprey Conservation Initiative; its goal: to collaboratively conserve and restore Pacific lamprey and their habitats.

Pacific lamprey expert and deputy project leader Christina Wang from our Columbia River Fish and Wildlife Conservation Office is here to shed some light about what's really going on behind all of those teeth.

1. Pacific lamprey are “vampire fish.”

MYTH! — Like a good parasite, they don't often kill their host.

Pacific lamprey are often described as vampire fish because of their feeding strategy. They are parasitic on other fish and marine mammals. Lampreys use their suction mouth to attach to their host and suck out blood and body fluids until they are full. Then they drop off, and the hosts swim on their way.

Not only are they not killers, Pacific lamprey are an important part of the food web ... as prey. Pacific lamprey have at least 40 documented predators — juvenile lampreys are eaten by fish and birds, and adults are eaten by fish, birds,

and a variety of marine and terrestrial mammals. Pacific lamprey are actually preferred by predators over salmon because they are higher in fat and calories.

2. Pacific lamprey are dangerous.

MYTH! — They are far offshore and deep, looking for more tasty prey than you.

Pacific lamprey are not dangerous! Because of their parasitic lifestyle, people often think they will be the lamprey's next host. I challenge you to find a Pacific lamprey while you are swimming in the Pacific Ocean. When they return to fresh-water to spawn, they are not eating anymore. So, the stream behind your house is safe for wading and swimming!

3. Pacific lamprey are an invasive species.

MYTH! — Pacific lamprey are native and have co-evolved with their host species for millennia. They belong here!

Sea lamprey and Pacific lamprey are two different species. Sea lamprey are native to the Atlantic Ocean and rivers and tributaries on the East Coast, but they are invasive to the Great Lakes. Pacific lamprey are native to the Pacific Ocean and rivers and tributaries on the West Coast. Many people seem to know about the sea lamprey invasion in the Great Lakes and confuse them with native Pacific lamprey, assuming they are also a nuisance species. >>



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4. Pacific lamprey are culturally significant.

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TRUE!— Pacific lamprey are incredibly important to Native American Tribes.

Native American Tribes have harvested Pacific lamprey since time immemorial. Pacific lamprey are used by Tribes for subsistence, at ceremonial tables and for medicine. The Tribes typically prepare them by smoking, drying, or grilling. They are considered a first food, a traditional native food with a tie to Tribal identity and ceremony. Tribal people talk about Pacific lamprey being a part of their family and Elders who must be respected. Families

(Above) Pacific lamprey have been caught at depths ranging from 300 to 2,600 feet, and as far off the West Coast as 62 miles. (PHOTO BY DAVID HERASIMTSCHUK/FRESHWATERS ILLUSTRATED) (Left) Juvenile Pacific lamprey reared at Abernathy Fish Technology Center in southwest Washington use their suction mouths to cling to the corner of a holding tank. (PHOTO BY AMANDA SHEEHY/USFWS

teach their children about the importance of Pacific lamprey and how to harvest and prepare them, and this information is passed from generation to generation. Tribes feel they have a responsibility to care for lamprey since they have been on the Earth for so long, and the Service has a Tribal trust responsibility to help conserve Pacific lamprey. >>



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5. Pacific lamprey have no jaws and many teeth. And they can climb with their mouths!

TRUE!— Pacific lamprey belong to an ancient group of fish that developed before jaws did!

Pacific lamprey make the most of their jawless anatomy and use their suction mouth to eat, swim along the river bottom, climb, and spawn. Surrounding that wonderful and useful mouth are rows and rows of teeth. They use them for attachment to their hosts and are replaced as they wear down, just like shark teeth.

Pacific lamprey also have a very unique skill that other lamprey don't have — they can climb vertical surfaces using their suction mouth. They can climb natural barriers such as waterfalls, which allows them to move upstream to good spawning habitat. The Service and partners in Pacific lamprey conservation are using this special ability to inform the creation of passage structures that help lamprey climb up and over passage barriers. All they need is a little trickle of water and up they go!

6. Pacific lamprey bites are shaped like smiley faces.

See right. Enough said. □

LENA CHANG, Office of Communications,
Pacific Region

(Top) Pacific lamprey harvest for the Confederated Tribes of Warm Springs at Willamette Falls, Oregon.
(Right) A Pacific lamprey bite mark on a salmon.


(PHOTO BY DAVID LEAL/USFWS)



SNIFFING 🐾 OUT 🐾 TROUBLE

**Wildlife inspector canines
make a difference for plants
and animals.**

Dogs are remarkable animals. Humans have taught them numerous ways to help those in need, and now they are assisting the Service in combatting illegal wildlife trade. These scent detector dogs help our wildlife inspectors find items hidden in shipments. Read about two of our wildlife inspector canines:

A black dog, likely a Labrador Retriever, is shown in profile, sniffing a cardboard box. The dog is wearing a black collar with a metal ring. The background is a warehouse or storage area with yellow plastic wrap and cardboard boxes.

Dock was trained to use his snout to point to a package he detected wildlife in. If he was on a conveyor belt, Dock scratched the box to alert his handler where the wildlife was detected.

(PHOTO BY CHRISTIAN THORSBERG/USFWS)

Dock's Honorable Career as a Wildlife Inspector Canine

By KRIS PACHECO and CHRISTIAN THORSBERG



Imagine: You're on duty as a federal wildlife inspector, responsible for enforcing laws and regulations surrounding the importation and exportation of wildlife through U.S. ports. You walk through facilities covering acres of land with mountains of boxes and packages in constant movement, sorted to be placed in different aircraft with destinations worldwide. Every day thousands of packages are moving in and out of the Ted Stevens International Airport in Anchorage, Alaska. The task seems nearly impossible. Luckily for you and the handful of federal wildlife inspectors stationed there, you had a secret weapon: the wet nose of a black Labrador named Dock.

Dock retired his federal service with our Office of Law Enforcement as a wildlife inspector canine on October 19, 2023. He had over seven years of honorable service and was one of the longest serving dogs from his class in Georgia.

Dock spent his career in Alaska. (PHOTO BY CHRISTIAN THORSBERG/USFWS)

Our wildlife inspector canines come from the Department of Agriculture's National Detector Dog Training Center (in Newnan, Georgia). The center works closely with animal shelters, rescue groups, and private owners to select dogs that are 1 to 3 years old and have the intelligence and drive to work. Through this training course, dogs are trained to detect specific items hidden in boxes, vehicles, and other locations. The dogs selected for the Service are trained to detect the scents of species commonly trafficked in the illegal wildlife trade. After they learn the scent of some high-ticket items that are critical to protect, the dogs are trained on scents they are likely to encounter in their particular region.

They also must pass the American Kennel Club Canine Good Citizen Test, ensuring they have good manners and behavior around unfamiliar places, noises, people, and other dogs.

Born in 2014, Dock was brought to a Paulding County Animal Shelter in Georgia. "He was surrendered because he was a busy, active dog that didn't fit the lifestyle of the owner," says Katie Shipman, the adoption and rescue coordinator at Paulding County Animal Control. "It was very clear Dock was bored and causing mischief at home. He needed a job, so when the owner came to surrender [him], I immediately thought of the [training center]. He had great food drive, was very confident, and I knew he would make a great canine officer."

Dock worked his tail off and successfully passed the course. In 2016, Dock came to Alaska with his handler, Wildlife Inspector Chad Hornbaker. Since then, Dock worked full time with Hornbaker at U.S. ports of entry in Alaska. Most of his time was spent at the Ted Stevens International Airport, but multiple times per year he traveled to the Alcan Port of Entry on the Alaska-Canada border, working alongside U.S. Customs and Border Protection to detect wildlife and injurious invasive species, such as zebra and quagga mussels, on watercraft.

Every day was slightly different for Dock, who lives with Hornbaker. Flight times of parcels moving in and out of Anchorage, flight times of international passenger flights, and sorting times at parcel hubs were all factors that could change Dock's day. Usually, his shift started with a stroll through the airport to the wildlife inspector's office. Dock was met with greetings and smiles from all the staff that had come to know and love him over the years. As Hornbaker walked through the terminal, heads popped over desks or around doorways to check if Dock was with him and provide some morning greetings and pets. In the office, impromptu training sessions sniffing out snacks and popcorn, hidden >>



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by Wildlife Inspectors Tillman Graham and Brian Ohlen, were a regular occurrence.

“I’m just the guy at the end of the leash,” Wildlife Inspector Hornbaker says.

Dock spent the majority of his workdays using his nose to detect wildlife items within parcels. He was walked through sorting facilities and inspected hundreds of packages each day. Wildlife inspectors work through large quantities of shipments and identify packages that require inspection. With sometimes short turnarounds on the tarmac, Dock was accustomed to boarding planes and running through parcel containers for a quick check without delaying flights.

When a package is found to contain wildlife items, wildlife inspectors will determine if that item requires permits or is lawfully allowed to be shipped. These items often have the required permits and can continue to the shipment’s

(Above) Dock and his handler inspect a boat for invasive species. (PHOTO BY KATRINA LIEBICH/USFWS)

(Below) Dock and his handler inspect a package containing whale baleen he detected during a training exercise at a parcel hub. (PHOTO BY KATRINA LIEBICH/USFWS)



destination. Other times, wildlife inspectors work with the senders of the parcel to gather information and obtain the proper paperwork for the shipment. Then there are times when the item requires seizing and is not allowed to continue to its destination. These items are often illegally acquired wildlife violating federal wildlife laws such as the Endangered Species Act, Lacey Act, Marine Mammal Protection Act, and the Indian Arts and Crafts Act. Dock’s work also helped wildlife inspectors enforce violations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Dock had quite the track record with finds that sometimes even surprised his handler and other wildlife inspectors in the Alaska Region. To name a few, Dock found python skin on designer shoes, gold-plated crocodile skin shoes, poison dart frogs, endangered cactus, packages full of shark fins, ginseng root from Shenandoah National Park, walrus and elephant ivory, elephant skin, and even a package containing 17 turtles (15 of which were alive and saved).

In retirement, Dock has been adopted by his longtime handler and friend Hornbaker, who has now taken a senior position in Alaska, no longer handling wildlife inspector canines.

Across the country, we employ a hand full of wildlife inspector canines. They serve as force multipliers and huge assets to the Office of Law Enforcement as parcel hubs continue to grow. For stations to employ a wildlife inspector canine, a wildlife inspector must be available to attend a training course as well as provide a long-term commitment to the role as a wildlife inspector canine handler. These take time and resources outside the bounds of a normal wildlife inspector. The job, as many handlers such as Hornbaker would agree, is worth the work. Dock is not only a retired wildlife inspector canine, but he is part of the family. □

KRIS PACHECO and CHRISTIAN THORSBERG,
Office of Communications, Alaska Region

Second-Chance Dog Gives Other Species a Second Chance | *By* JOHN HEIL

Whether at seaports, the border, airports, or warehouses, Ray Hernandez and his canine Braxton are protecting human health and safety against the exploitation of illegal wildlife and endangered species. “We’re often the last line of defense for endangered species,” says Hernandez, a wildlife inspector and handler for our Office of Law Enforcement in Southern California. “It would take me a year by myself to go through a warehouse [to find illegal endangered species being smuggled], but with Braxton we can complete the process in 15-30 minutes.

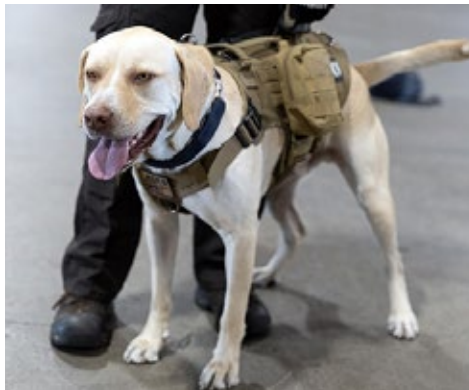
“With one sniff, he can tell me if there is something of interest in a parcel. He simplifies everything—makes my job so much easier.”

Coming from an animal shelter program, Braxton’s “second chance” involves using his trained nose to find illegal wildlife including endangered species being imported into or exported out of the country in Southern California.

He’s probably the most athletic of the dogs I’ve had,” says Hernandez, who had two other wildlife inspector canines before Braxton. “He’s relentless in trying to show me he’s found something, even willing to go to the second level of shelves on top of a crate to pinpoint an item and pick it up in his mouth.”

Hernandez is fond of all three of his canines. Lockett, now retired, was his first, a short and stubby English lab with an “amazing nose.” His second was Colt, who has also retired, and now Braxton. All three dogs live with Hernandez and his family and “get along perfectly.”

“I think the bond between the dog and their handler is so important,” says Hernandez. “Having the dog live with you makes the working relationship that much stronger. They have a routine—knowing



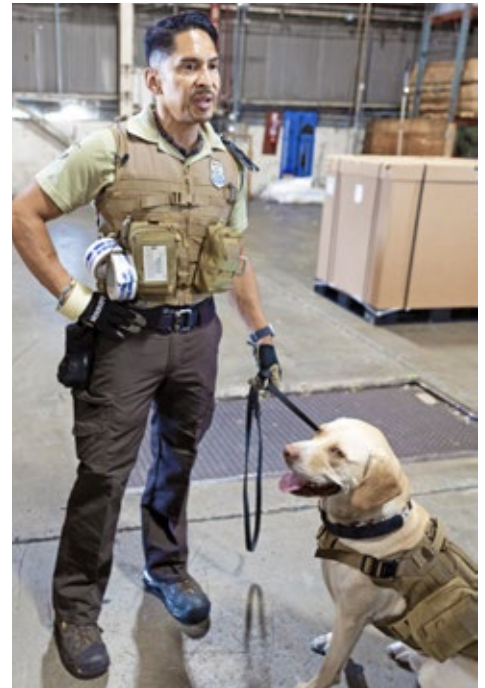
Braxton, a wildlife inspector canine for the Office of Law Enforcement, with Wildlife Inspector Canine Handler Ray Hernandez at a warehouse in Southern California in November 2023. (PHOTO BY REBECCA FABBRI/USFWS)

when to play at home and relax with the family and when to be serious at work. Some think Braxton is intimidating, but he’s just the sweetest—wouldn’t hurt a fly. Will curl up with you like a cat.”

At work it is all business as Braxton and Hernandez play a key role in ensuring illegal wildlife are not imported or exported. Additionally, health and safety are paramount. When Braxton finds parts of animal such as a “hacked-off leg or the charcoaled rodent,” as are typical of the job, Hernandez says, they ensure they turned over for testing for disease.

It isn’t always endangered species either, as Hernandez has found mitten crabs in shipments. They’re an invasive species that could wreak havoc in waterways within the United States.

One particular success story Hernandez is most proud of is when he and Braxton intercepted 100-plus native box turtles in multiple mail shipments over a year, destined for Hong Kong. They were able to successfully transfer the turtles to a conservancy, which through genetic research was able to return them to their original environment in the Midwest.



“That’s over 100 turtles being taken out of the gene pool,” Hernandez says. “They were nursed back to health and given a second chance.”

That second chance is what Hernandez takes the most pride in. That Braxton, once a stray dog who was given a “second chance” can then in turn give other species a “second chance.” □

JOHN HEIL, Office of Communications, Pacific Southwest Region



MORE INFO

Canines within the National Detection Dog Training program that end their federal service and those that cannot be adopted by their handlers are found good homes to which they retire. For more information on the National Detector Dog Training Center and to learn how you can adopt a dog that has retired from service or did not meet the rigorous training requirements but would make wonderful pets visit [National Detector Dog Training Center](#). In some instances, you don’t need to live close to the Center to adopt.



ENDANGERED TO EMPOWERED

**The oxbow restoration
and the Topeka shiner's
journey in Iowa.**

By MAKEDA NURRADIN

In the heart of America's Midwest, a quiet revolution in conservation is taking root. As the United States celebrates the 50th anniversary of the Endangered Species Act, the prairies and waterways of America's heartland have been quietly weaving an uplifting tale of partnership, resilience, and ecological triumph. Kraig McPeck, supervisor for our Illinois-Iowa Ecological Services Field Office, says, "As we celebrate half a century of the Endangered Species Act, the story of the oxbow restoration and the Topeka shiner is a reminder of what we can accomplish together." »

(Above) Jenna Haag, one of our biological science technician, stands in an oxbow, showcasing the tangible results of restoration efforts, a Topeka shiner. (PHOTO BY JEREMY ROBERTS/IOWA SOYBEAN ASSOCIATION)

Continued from previous page.

We're part of a remarkable partnership creating ripples of change throughout the Midwest. This coalition of state agencies, agricultural associations, and passionate farmers has come together with one purpose: to restore and safeguard Iowa's precious oxbow habitats and, in doing so, protect the stability of oxbow ecosystems. Our Partners for Fish and Wildlife Program acts as the glue binding the coalition together.

The Partners program collaborates with private landowners and local communities, providing resources to restore wildlife habitats, offering technical and financial assistance for conservation projects. This program is built on voluntary partnerships and is supported by various organizations, including the Iowa Department of Agriculture and Land Stewardship, Practical Farmers of Iowa, Iowa Soybean Association, and the Iowa Department of Natural Resources. Each organization contributes expertise, ranging from agricultural practices to biodiversity knowledge, enriching the conservation efforts. Funding sources are diverse, including the Regional Conservation Partnership Program from the U.S. Department of Agriculture Natural Resources Conservation Service and the Water Quality Initiative from the Iowa Department of Agriculture and Land Stewardship.

What's an Oxbow?

Oxbows, U-shaped remnants of river meanders, are vital for ecosystem health, acting as biodiversity hotspots, playing key roles in water filtration and flood control, and serving as important habitat. Central to these habitats is the endangered Topeka shiner, a small, native freshwater fish considered an indicator species. That means its presence or absence are used to assess the overall health of an ecosystem and they provide valuable insights into environmental impacts affecting aquatic systems in its range.



An oxbow is formed when a winding curve of a river becomes isolated due to erosion of river banks and the creation of a new river channel during high water flow. But sediment builds up in oxbows. Oxbows dry out. They disappear altogether when plants cover them. The degradation of these special places, as seen in places like West Buttrick Creek in Iowa's Raccoon River watershed, not only diminishes water quality but also threatens the survival of the Topeka shiner and other aquatic species. Restoring oxbows is crucial not just for this species but for maintaining the health of freshwater systems.

(Top) Digging starts on an early oxbow restoration in Iowa. The first oxbow restoration agreement was with the Iowa Natural Heritage Foundation. (PHOTO BY JOE MCGOVERN/IOWA NATURAL HERITAGE FOUNDATION)

(Bottom) Oxbows act as biodiversity hotspots, play key roles in water filtration and flood control, and serve as important habitat. (PHOTO BY JOE MCGOVERN/ IOWA NATURAL HERITAGE FOUNDATION)

The revival story of the Topeka shiner highlights the critical role of partnerships, innovation, and the sustained dedication of local communities. This tale is a reminder that progress in conservation is achievable when communities, farmers, and agencies come together with a shared vision. >>



Service staff and partners conduct a survey and population assessment of the Topeka shiner. (PHOTO BY REBEKAH JONES/IOWA AGRICULTURE WATER ALLIANCE)

Continued from previous page.

That conservation goes beyond preservation, aiming to create a legacy that future generations can admire and continue. This journey with the Topeka shiner is not just about safeguarding a species but about passing down a lasting and proud heritage in environmental stewardship.

Landowner Partnerships: The Cornerstone of Conservation

Without the commitment of landowners, the restoration of oxbow wetlands would remain a distant dream. Kathy Law and her husband, Dave Law, Iowa farmers who participated in oxbow restoration on their land, stress the significance of these partnerships, emphasizing: “Landowner involvement is paramount. Their commitment to preserving natural habitats has been the linchpin of this endeavor.”

For farmers, the benefits of participating in oxbow restoration extend beyond ecological preservation. Brandon Iddings, of the Iowa Soybean Association, notes, “Not only have these wetland restorations become a haven for endangered species, but they’ve also proved beneficial for crop yields.”

In the heart of Iowa, where family farms dot the landscape and generations have tilled the same land, Kathy Law speaks with reverence about the soil underfoot. “Our land is not merely an income source,” she begins, echoing the sentiments of countless Iowa farmers. “It’s our heritage. For many, these lands have been passed down through generations. It’s not just about profit, it’s our lifestyle, our very way of life.”

Her commitment to the land is evident. But she also highlights a mutual relationship between conservation efforts and farming benefits. “When we participated

in the oxbow restorations, the soil they removed was of such high quality that it was spread over one of our fields,” she recalls. “This seemingly small act resulted in our corn yielding over 20 bushels more per acre. The only reason for this boost we can pinpoint is the improved quality of our soil from that deposited dirt.”

For Law and many like her, conservation isn’t just about protecting nature—it’s about enhancing productivity and ensuring their land’s legacy continues. “There are tangible economic benefits alongside the invaluable environmental advantages,” Law emphasizes. “It’s not just about doing the right thing for nature but also ensuring our land remains prosperous for generations to come.”

Joe McGovern, president of the Iowa Natural Heritage Foundation, emphasizes the ease for farmers: “Through collaborations, farmers can participate in these restoration efforts without the burden of added costs.” >>



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Darrick Weissenfluh, of our Partners for Fish and Wildlife Program in Iowa, comments on the enhanced water quality, observing that, “The filtering capacity of these restored oxbows has significantly reduced sediment and nutrient runoff, leading to cleaner water for everyone.” Weissenfluh adds: “Oxbow restorations have contributed hundreds of thousands of dollars to local economies, supporting many local contractors and businesses. And the great thing is, the oxbows we restore continue to deliver benefits to all Iowans for decades by providing habitat for fish and wildlife and by improving water quality.”

Combined works can amplify the reach and effect of oxbow restoration. Racoon River Watershed Project, alongside the Iowa Natural Heritage Foundation, leveraged grants to design wetlands that maximized nitrate removal. “We recognized the transport of nitrate as a challenge and

took tangible steps to address it,” Iddings of the soybean association says.

What’s Next: Hope for the Topeka Shiner

The restoration of oxbow habitats has been crucial for the Topeka shiner, with the Service playing a significant role in bringing all the characters of this story together. When asked about their experiences working with partners on Topeka shiner conservation, staff shares different perspectives along the same narrative—the future for this little fish depends on collaborative conservation. Drew Diallessandro, our Iowa private lands coordinator, says, “This isn’t just a win for the Topeka shiner but a testament to what collaborative conservation can achieve.”

Aleshia Kenney, one of our wildlife biologists, worked in oxbow restoration in the Midwest for 15 years, says, “It’s potential shift from endangered to threatened is a bright spot in our conservation journey.” Downlisting from endangered to threat-

Kathy Law and Dave Law stand in front of the restored oxbow on their land. (PHOTO BY DARRICK WEISSENFLOH/USFWS)

ened would mean the shiner was one step closer to recovery and was no longer in danger of extinction.

This sentiment is echoed by Kathy Law, who sees the increasing participation of landowners in oxbow restoration as a sign of growing grassroots conservation efforts. The success story of the Topeka shiner and oxbow restoration, showcasing community and organizational collaboration, offers hope and a model for future endeavors.

“Every plot of land rejuvenated, every oxbow restored, brings us closer to a future where our natural habitats thrive,” Iddings says. □

MAKEDA NURRADIN, Office of Communications, Midwest Region

MUSEUM
OBJECTS
COME TO
LIFE

In this series we highlight the "Treasures of the Service" from the museum collections of the U.S. Fish & Wildlife Service Museum and Archives, the Service's National Fish and Aquatic Conservation Archives, the National Wildlife Property Repository, and the collection at DeSoto National Wildlife Refuge, containing over 250,000 artifacts excavated from the 1865 wreck of the Steamboat Bertrand.

Conserving History



Some of the most fragile items recovered from the steamboat Bertrand, housed at DeSoto National Wildlife Refuge in Iowa and Nebraska, are 12 rubberized raincoats, also called slickers.

The first rubber raincoats were invented by a Scottish chemist, Charles Macintosh. In 1823, Macintosh developed a method of "painting" sticky, dissolved India rubber onto wool cloth, then applied a second layer of wool on top of the first to create a waterproof material. Unfortunately, the oils in the wool caused the rubber cement to dissolve, and the material became very stiff in cold weather and tacky in hot weather.

In 1839, Charles Goodyear accidentally discovered a way to stabilize rubber while working at the Eagle India Rubber Company in Massachusetts. The process, in which rubber and sulfur were combined and heated, was known as "vulcanization," which allowed the rubber to remain flexible in the cold and solid in heat, making it more practical for use in clothing. The Bertrand raincoats were made in 1864, by pressing warm rubber onto a strong fabric, using the Goodyear patent.

Over several decades in storage at DeSoto, because of oxidization and "off-gassing" of sulfur and nitrogen from the slickers themselves, most of the raincoats were becoming brittle and starting to crack. To address this issue, in early 2020, all 12 slickers were sent to the Gerald R. Ford Conservation Center in Omaha. There, each coat was gently cleaned, given new interior supports, and placed in a specially made tray, which helps trap the pollutants off-gassed by the slickers. Oxygen absorbing material was placed in each tray to bring oxygen levels inside as close to zero as possible. Each tray was sealed in a special film to keep out oxygen. Before they were completely sealed, each tray was flushed with nitrogen gas to reduce the oxygen in the container. By this means it is hoped to slow further deterioration. The slickers were then returned to DeSoto, where museum staff regularly monitors them to ensure the oxygen levels stay at the appropriate level. (BILL

CANTINE, MUSEUM SPECIALIST/ACTING CURATOR, DESOTO NATIONAL WILDLIFE REFUGE)



Precious Cargo for the High Mountains

This pair of large plastic boxes, called panniers, fit over the back of a horse or mule. They were retired from use at our Colorado Fish and Wildlife Conservation Office, which assists in conservation and restoration projects in the Mountain-Prairie Region. These panniers transported fish, including the endangered greenback cutthroat trout, in remote areas of Rocky Mountain National Park inaccessible to vehicles. The fish were placed inside the boxes and supplied with oxygen from a small cylinder through holes in the top. The tank walls insulated the boxes to keep the fish cool on their ride up the mountain. Considered extinct by the 1930s, a few small populations of greenback cutthroat trout were rediscovered in in the 1950s-1970s. Efforts by the Service and partners have helped downlist the species to threatened and recovery work continues. (MIRANDA ZWINGELBERG, MUSEUM

TECHNICIAN, NATIONAL FISH & AQUATIC CONSERVATION ARCHIVES)

transitions

Midwest Region



Will Meeks is the new Regional Director for the agency's Midwest Region,

overseeing the day-to-day operations and strategic direction of the region, which covers Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

"Throughout his career, Will has demonstrated great skill in working with communities to manage complex natural resource issues that require collaboration and consensus building," says Service Director Martha Williams. "He will be an important asset to the Service's national leadership team as we address a wide variety of future challenges in the Midwest and across the country."

Meeks spent his childhood in northern Ohio, the son of a natural resource manager. "Growing up on the shores of Lake Erie crafted my conservation legacy," he says. "I used to take a small boat out to the backwaters and learn about wildlife. I was blessed with that opportunity, and I'm proud to lead the Midwest Region in sharing opportunities for everyone to connect with nature."

Meeks has more than 28 years of experience with the Service and was most recently Assistant Regional Director for the National Wildlife Refuge System in the Southeast Region since 2022.

Meeks' career with the Service started in 1995 at Sand Lake National Wildlife Refuge in South Dakota, and since then his work has spanned multiple states, regions, and Headquarters. This includes serving as deputy division chief of wildlife resources and conservation planning in Washington, DC, before leading the Habitat and Population Evaluation Team in the Mountain-Prairie Region. Meeks went on to work as Assistant Regional Director for the National Wildlife Refuge System in the Mountain Prairie Region for more than seven years. His next move was to the Southeast Region where he worked as the refuge manager for Savannah Coastal Refuge Complex.

"I've seen the Service meet and overcome challenges that at times seemed insurmountable," says Meeks. "We've approached those challenges with scientific excellence, a sense of teamwork, and a spirit of cooperation with partners. Let's keep that great tradition as we face our next challenges and find the many opportunities they hold." □

Headquarters



Dave Miko has been chosen as the Service's Assistant Director for the Fish and

Aquatic Conservation Program. In this role, he will lead efforts to conserve aquatic species and habitats, control aquatic invasive species, enhance recreational use of aquatic resources, and fulfill our Tribal trust responsibilities as they relate to aquatic resources.

Miko is a dedicated leader with 30 years of experience working with federal, state, industry, Tribal, and non-governmental organizations. He joined the Service in 2014 as a Headquarters division chief, leading our work on aquatic invasive species, aquatic habitat and species conservation, hatchery operations, and our Aquatic Animal Drug Approval Partnership. He became the program's deputy in 2022 and soon after was named acting Assistant Director.

Before joining the Service, Miko worked for the Pennsylvania Fish and Boat Commission where he directed Pennsylvania's work to conserve fisheries while optimizing opportunities for the angling public. He started his career in the field as a fisheries technician in Pennsylvania.

Miko attended Pennsylvania State University where he earned his Bachelor of Science in wildlife and fisheries management, as well as Texas Tech University where he earned a Master of

Science in fisheries management. In his spare time, he enjoys fishing with wife Devin and their Newfoundland pups, remodeling their home in northern Virginia, and visiting America's incredible public lands. □



After over 30 years of service with the agency, **Karen Anderson** retired in January 2024 from

the Branch of Recovery and Conservation Planning in the Headquarters Ecological Services Program. She holds degrees in wildlife science, with a master's from Virginia Tech and a bachelor's from Purdue University.

In her role, she worked on policy and regulations for conservation agreements under the Endangered Species Act. She was also one of two Ecological Services representatives, assisting in the transition to ePermits to ensure the new system met staff and user needs. Prior to Ecological Services, she worked in International Affairs as a permit biologist and later as a policy specialist. One of her efforts with International Affairs included developing a policy on giant panda imports.

Outside of work, Anderson is active in her community. She is a master naturalist, a watershed steward, and the volunteer coordinator for the Patuxent River Corridor Barn Owl project. A master gardener for over 10 years, Anderson has a »

Continued from previous page.

strong interest in native plants, pollinators, and the Bay-wise program.

In retirement, Anderson plans to continue to volunteer on multiple projects. She also enjoys birding, wine tasting, reading mysteries, gardening, and traveling to see birds and other wildlife. Her bucket list travel destinations include Mongolia (snow leopards and Pallas cats), Panama (great birding including harpy eagles), New Zealand, and Mexico (to see overwintering monarch butterflies).

We wish you the best, Karen! □

honors

Headquarters



Refuges Chief **Cynthia Martinez** received the 2023 Ira Gabrielson Award, bestowed annually by our Advanced Leadership Development Program (ADLP).

The award, named after the first Director of the Service (then the Bureau of Biological Survey), recognizes a current Service employee who best exemplifies the leadership qualities demonstrated by Dr. Gabrielson,

including vision and determination, commitment and integrity, and leadership.

A fifth-generation New Mexican, Martinez (seen between ALDP Cohort 19 graduates Lydia Collins and Marilyn Bisenieks) is the first woman and Hispanic to lead the National Wildlife Refuge System, which encompasses over 850 million acres across more than 570 refuges and marine national monuments.

In addition to embodying each of the criterion associated with the award, Martinez is a true champion of the people who work for the Refuge System, no matter the position they hold. She is committed to building future leaders across the Service through formal and informal means. □

in memoriam

Mountain-Prairie Region



Longtime Service employee **Wes Orr**, who retired in 2000 and is a member of both

the Northwest Fish Culture Hall of Fame and National Fish Culture Hall of Fame, died in October 2023.

Born in 1940 in South Dakota, Mr. Orr first worked for the Service in high school at the former McNenny National Fish Hatchery in South Dakota. He

then went on to work at national fish hatcheries across the country, but it was his success at Ennis National Fish Hatchery in Montana that established and ensured his conservation legacy.

"In 1973, the Ennis Hatchery produced 13 million eyed rainbow trout eggs," Mr. Orr writes in his own obituary, "and thanks to good employees (who I never thanked enough), the hatchery was producing 40 million eggs when I retired in 2000."

The National Fish Culture Hall of Fame says in its 2013 induction recognition, "During his tenure, he was responsible for shipping a staggering 438,780,605 eggs and 1,331,152 pounds of fish from six different strains of rainbow trout to over 30 different states and countries."

In a 2009 issue of *Eddies*, the Service's former magazine on fisheries conservation, John Bryan writes, "If you've caught a rainbow trout in the last few decades, there's a good chance it was courtesy of the work of Wesley Orr."

Mr. Orr grew up, he writes, in "probably the best time in the history of our country to grow up. Our family was into fishing, camping, hunting, sports, outdoor activities, and friends."

He took to fishing.

Bryan's *Eddies* profile says, "He cast his first fly when he was 5 and began tying flies at 12."

After college at Colorado State University, he worked for the Service for 38 years and served many years in the Army National Guard.

Mr. Orr was "among the elite of coldwater fisheries professionals," Bryan's article quotes a retired national fish hatchery employee. "I learned immediately from Wes that fish culture is not a nine-to-five job; it's a lifestyle. You have to work with fish according to their schedules: 4:00 A.M., all night, whenever. Wes has a strong professional ethic and treats people with respect. And he has always made certain to have time to focus on his family and keep that his priority."

His association with the Service continued until his death. He wrote the essay on rainbow trout in Service employee Craig Springer's book *America's Bountiful Waters: 150 Years of Fisheries Conservation and the U.S. Fish & Wildlife Service, a commemoration of our work with fish*.

Springer adds to the story: "I selected a photo from the NCTC archives to go with his story and by golly it was a photo of his dad! His dad was a local plumber who was working at Spearfish NFH the day a USFWS photographer was on station during the mid-1950s.... I had no idea it was Wes's father; the image was not labeled as such. We were both stunned!" □

Melissa Gonzalez Always Listening for Conservation Solutions



Melissa Gonzalez, audiovisual productions specialist at our National Conservation Training Center, was born in Connecticut and raised in Quebradillas, Puerto Rico. As a proud puertorriqueña, with Puerto Rican parents, she was raised among a blend of beliefs and traditions from Africa, Spain, and the native Taíno people. In her family, and many others on the island, knowing is passed down generation to generation.

Communication has always been important to Gonzalez, especially when nature speaks. “If you pay attention,” she explains, “you will see what is working ... and what is not.”

As a child, Gonzalez often walked with her father through the rain forest in Puerto Rico. During

Melissa Gonzalez shows a child a monarch butterfly.

(PHOTO BY BRETT BILLINGS/USFWS)

their time together, he shared his knowledge of the forest, knowledge that was passed down through generations and gained from personal observation and experience. He knew the forest, the animals, and the environment. However, her father’s passion and knowledge was often not heard, or overlooked by scientists and researchers studying the island’s wildlife. That didn’t stop him from looking to the future.

Gonzalez says her father “always had hope that perhaps a next generation, with some kind of graduate education, would be able to communicate with scientists in charge of conservation.”

Communication failures like the one between the scientific community and local knowledge holders, like her father, sparked her interest in the communications field. She wanted to have a seat at the table, so she pursued an education in strategic communications, at the University of Puerto Rico in Arecibo and a master’s degree specialized in advertising from the University of the Sacred Heart in San Juan, Puerto Rico. Gonzalez hoped to help people make informed decisions and to do good things.

While representation within the Service is changing, Gonzalez is often “the only ___” in the room—the only Latina, person of color, person who is bilingual or multicultural, and often the only person with a multidisciplinary communications background. Her cultural background and life experiences have molded the way she sees and understands the world, giving her a perspective that is seen as unique within the conservation field and that can be challenging for many to understand and relate to.

“I never thought I could have a job or make a living out of a career where I get to apply the power of marketing communications to protect nature.”

There are many differences between Gonzalez’s life in West Virginia and growing up in Puerto Rico. Her family’s home, like many others on the island, did not have air-conditioning, so their windows were always open—she could feel the breeze

and hear the natural world. Now, she lives in a world where climate-controlled buildings are common, and the connection to nature is harder to achieve.

Maintaining that connection isn’t as simple as opening her windows anymore. For Gonzalez, connecting with nature these days is a more active pursuit by going for walks, hiking, gardening, bird feeding and watching, fishing, or kayaking. While there are many similarities in the rural upbringing found in West Virginia and Puerto Rico, the contrast between growing up in Puerto Rico and living in West Virginia is sharp. For Gonzalez, it is easy to see in the food of course, but also in daily commodities found around that are scarce in Puerto Rico. Her multicultural background has shaped the person she is today, but also helps her understand the perspectives of people in different socioeconomic statuses.

In her current role as an audiovisual productions specialist, Gonzalez contributes to conservation efforts by ensuring that all perspectives are heard and included.

Gonzalez works to produce and share content that is relatable and inclusive, and helps people make informed conservation decisions. She strives to understand the people she works with and for. “I focus on listening to their questions and opinions about nature,” Gonzalez says, “because the solution to our most complex challenges is probably in one of those perspectives that have not been historically included in the mainstream conservation methods.” □

Fish & Wildlife News

Division of Marketing
Communications
U.S. Fish and Wildlife Service
5275 Leesburg Pike
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parting shot



Fishing Pro

Osprey are very well adapted to catch fish. They can bend their outer toe backward to help hold slippery fish and have sharp spicules on the bottom of their toes to help hold the fish. Osprey can also close their nostrils when plunging into the water to catch their prey.

(PHOTO BY LANE WINTERMUTE/USFWS)

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