U.S. Fish & Wildlife Service

Restoring the Great Lakes

Success Stories from the 2016 Field Season

The *Great Lakes Restoration Initiative* continues to be an incredible journey.
Watch the video at fws.gov/GLRI

Welcome!

Dear Reader,

We are now seven years into our Great Lakes Restoration Initiative adventure and with that achievement comes the seventh edition of *Restoring the Great Lakes.* Through our 2016 interagency agreement with the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service received more than $44 million to support new and ongoing Great Lakes restoration projects. As always, it is our pleasure to share with you how the funding supported us in our conservation efforts. What we and our partners have accomplished in such a short amount of time is nothing short of miraculous.

What do these miracles look like? There is no better example than the Great Lakes piping plover. A few decades ago the small and charming shorebird hovered on the edge of extinction with only a handful of mating pairs left in the world. Too long neglected, the story of the piping plover resembled the larger story of the Great Lakes. In the absence of coordinated and sustained stewardship actions, we stood to lose a lot. The emergence of the Great Lakes Restoration Initiative in 2010 was a game-changer for us, our partners and the piping plover. In lean budget times it allowed us to fast track needed dollars to the field to protect and restore the majesty of the Great Lakes region for the people, plants and wildlife who call it "home."

Today piping plover populations are on a steady rise. After a 30 year absence, a pair of piping plovers successfully nested on New York's Lake Ontario shoreline in 2015. In 2016, a breeding pair of piping plovers was found nesting in lower Green Bay in Wisconsin, and another in Wilderness State Park in Michigan. Each camouflaged nest sits on a sandy beach restored with Great Lakes Restoration Initiative funding. There is still a lot of work to be done, but these types of successes keep us going.

Whether you live near or far, we invite you out to our national wildlife refuges and national fish hatcheries to learn more about the work that we do and the people who make it happen. Our Great Lakes Restoration Initiative supported projects in the Great Lakes reflect the passion and the hard work of our staff. Come witness it for yourself.

We look forward to seeing you!

Tom Melius
Regional Director, Midwest Region

Wendi Weber
Regional Director, Northeast Region

Great Lakes RESTORATION

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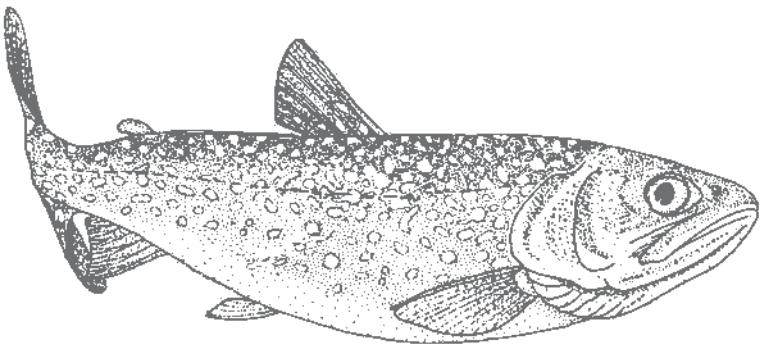


U.S. Fish & Wildlife Service

Great Lakes Restoration Initiative (GLRI)

Bird and bat radar unit. USFWS

Lake trout restoration. USFWS

Fish passage. USFWS

Protecting and restoring bird habitat. USFWS

Why save the Great Lakes?
Comprised of more than 10,000 miles of coastline and 30,000 islands, the Great Lakes provide drinking water, transportation, power and recreational opportunities to the 30 million citizens who call the Great Lakes Basin "home." Fishing, hunting, and wildlife watching in the Great Lakes generate almost $18 billion in annual revenue. As the largest group of fresh water lakes on Earth, the Great Lakes hold 95 percent of the United States' surface fresh water. Unfortunately, years of environmental degradation has left the Great Lakes in need of immediate on-the-ground action to save this precious resource for generations to come.

What is the Great Lakes Restoration Initiative?
The Great Lakes Restoration Initiative (GLRI) is a driver for environmental action in the Great Lakes. Building upon strategic recommendations for how to improve the Great Lakes ecosystem presented in the Great Lakes Regional Collaboration Strategy of 2005, President Obama's FY 2010 budget invested $475 million for GLRI. Funding decreased to $300 million in FY 2011 through FY 2016. GLRI represents a collaborative effort on behalf of the U.S. Environmental Protection Agency and 15 other federal agencies, including U.S. Fish and Wildlife Service, to address the most significant environmental concerns of the Great Lakes.

What is the USFWS's role in the Great Lakes Restoration Initiative?
The Service facilitates the implementation of GLRI Action Plan priority programs, projects and activities to protect, restore, and maintain the Great Lakes ecosystem. Through an interagency agreement with the U.S. Environmental Protection Agency, the Service was allocated approximately $69 million in FY 2010, $37.4 million in FY 2011, $43.6 million in FY 2012, $40.5 million in FY 2013, $49 million in FY 2014, $41 million in FY 2015 and $44.3 million in FY 2016 to work on projects in the following focus areas:

• Toxic Substances and Areas of Concern (AOCs): Years after pollution stops persistent pollutants can remain in the environment, often trapped in sediments below the surface of the water. The areas of the Great Lakes Basin most severely impacted by these pollutants are known as Areas of Concern (AOCs). Service will work to restore and protect aquatic ecosystems in the Great Lakes from the threat of persistent pollutants. In addition, the Service is initiating an effort to address the looming threat of emerging contaminants, such as hand sanitizers, pharmaceuticals, and personal care products, in the Great Lakes.

• Invasive Species: More than 180 non-native species are established in the Great Lakes. The most invasive of these reproduce and spread, ultimately degrading habitat, out-competing native species, and disrupting food webs. Service activities will work to control and eradicate harmful non-native species in the Great Lakes. In FY 2016 $3.8 million in GLRI funding was allocated to the Service to work specifically on Asian carp control and management, with an additional $4.8 million allocated for state projects.

• Habitat and Wildlife Protection and Restoration: From climate change to increasing development activities along the shores of the Great Lakes, a multitude of threats are affecting the health of the Great Lakes habitats and native wildlife. Service projects will work to identify, restore, and protect important habitat for the area's fish and wildlife.

• Foundations for Future Restoration Actions: The Service will foster climate resiliency in GLRI-funded projects, educate the next generation about the importance of the Great Lakes to fish, wildlife, plants and people, and continue a science-based adaptive management approach for new and ongoing projects.

Want more information?
Go to http://www.fws.gov/GLRI

Bad Actors: 11 Animals We Hope You Never Meet in Midwest Waters

By Katie Steiger-Meister

In an era when the Midwest is frustrated by a seemingly endless litany of unwelcome guests in our waters, from zebra mussels and Asian carp to Eurasian watermilfoil and spiny water fleas, we have decided that enough is enough.

It's time to go on the offensive.

The U.S. Fish and Wildlife Service's Midwest Region is helping to stop the next invasion of nasty critters in our waterways before it even begins. We've scoured the globe and created a bad actor list of 10 fish and one crayfish that we want to make sure never find their way to the Midwest. Nearly all of these animals would find our rivers, lakes and streams a suitable home. Coupled with their unfortunate tendency to invade new places, we've decided the risk these animals pose to our environment is too high.

Wels catfish, Dieter Florian/Creative Commons

Why Prevention is Key

Experience has taught us that invasive species remedies are costly, both in time and in resources. Additionally, society loses billions of dollars a year because of the damage invasive species cause to industries and the environment. Stopping invasive species before they cross our borders is the most efficient and cost-effective approach to battling these unwelcome guests.

In the absence of a crystal ball to show us future invasive species, we turn to science to help us create a line-up of our bad actors. We use a process we call Ecological Risk Screening Summaries to focus our prevention efforts. Starting our bad actor search with freshwater animals, we use international databases, scientific literature, and a computer model to locate areas of the United States that provide the right climate, such as temperature and rainfall patterns, for animals known to be invasive in other parts of the world. The potential risk an animal poses to our country's waters increases when we find a strong climate match. Since 2010, approximately $1.3 million is Great Lakes Restoration Initiative funding has supported more than 1,400 risk assessments to examine potential invaders.

Preempting the Next Invasion

Ecological Risk Screenings have revealed our bad actors: Amur sleeper. Crucian carp. Eurasian minnow. European perch. Nile perch. Prussian carp. Roach. Stone moroko. Wels catfish. Zander. Yabby crayfish.

The next step is to keep them out.

The Service's Fish and Aquatic Conservation Program used the information collected in the Ecological Risk Screening Summaries to support a multi-species proposed rule that evaluated the 11 species for potential listing as injurious under the Lacey Act. Finalized on October 31, 2016, the import of all 11 animals is now illegal, except with a permit for certain purposes. It demonstrates our narrowing focus in our battle against animal invaders. While the Service has listed at least 200 hundred species as injurious before they entered the United States in many separate listing actions, we have never focused so completely on preventing the introduction of all species that are in a single listing action.

Another crucial part of the effort to stop animals before they enter our country is our partnership with industry and state conservation agencies. In 2013, the Service signed a Memorandum of Understanding with the Pet Industry Joint Advisory Council and the Association of Fish and Wildlife Agencies. Both groups agreed to help us in our efforts by voluntarily refraining from the importation of high risk species not yet introduced to the country in trade. Their ongoing support is a vital part of our future success.

The interplay of science, policy and partnerships is important in our fight to keep invasive animals out of Midwest waters. The Service has successfully taken steps to place Amur sleeper, crucian carp, Eurasian minnow, European perch, Nile perch, Prussian carp, roach, stone moroko, wels catfish, zander and yabby crayfish on the injurious species list. Our hope is that the names on our bad actor list slip from your memory in a few months or years. It will mean our offensive is doing the job. With help from our partners we preempted the next invasion before it ever became a problem.

Prussian carp, Zeynel Cebeci/Creative Commons

Dear Asian Carp, the Road to the Great Lakes is Closed!

By Katie Steiger-Meister

Since 2009, U.S. Fish and Wildlife Service employees from the Carterville Fish and Wildlife Conservation Office and the Wilmington Substation in Illinois have logged thousands of hours working on the stretch of water that connects the Illinois River to Lake Michigan, known as the Chicago Area Waterway System. In their time collecting fish and water samples above and below the U.S. Army Corps of Engineers' electric dispersal barriers, field observations were made of barge traffic. Service employees working on the water routinely saw barges move through locks and dams, and across the electric dispersal barriers designed to prevent the movement of Asian carp and other aquatic invasive species. This led to the emergence of a research question. Could commercial barges accidentally be a way for Asian carp to piggyback through our defenses and gain access to Lake Michigan?

Golden shiners used in research are marked before being placed in the water. Fish biologists Trevor Cyphers (right) and Wiliam Lamoreux (left) are standing at the junction of four barges demonstrating how nets are used to recapture marked fish out of a juncture gap following the upstream movement of a barge. Rob Simmonds, USFWS

"Previous research conducted in 2012 and 2013 by the Service in collaboration with the U.S. Army Corps of Engineers suggested that there was the potential for fish to gain passage through locks and over barriers within a barge junction gap," said Jeremiah Davis, lead Fish Biologist from the Wilmington Substation working on the project.

The junction gap is the space between where two barges are connected. When an animal or object is caught in this space it is known as "entrainment."

"During those early studies, we used caged and tethered fish, but their ability to move was limited," continued Davis. "I knew there had to be a way I could use our sonar technology to show conclusively what was happening within the barge gaps."

Silver carp (left) and bighead carp (right) are the two species of Asian carp the U.S. Fish and Wildlife Service is working to keep out of the Great Lakes. Katie Steiger-Meister, USFWS

In 2015, a study began to examine the likelihood that small free-swimming fish, such as Asian carp, can be inadvertently trapped and transported by commercial barge tows through locks and electric dispersal barriers. Results indicated that free-swimming fish, both wild fish and fish placed in and around barges by researchers, can remain between barges for substantial distances. In one trial, live fish were transported more than nine miles on the Illinois River through Brandon Road Pool, Lockport Lock and the U.S. Army Corps of Engineers' electric dispersal barriers.

Research was conducted using golden shiners, but findings hold implications for groups working to prevent the spread of Asian carp into the Great Lakes. Golden shiners, a native fish species that naturally occurs in the Illinois River, were selected for the study due to

Golden shiners were used in research because they are similar in size to small Asian carp. USFWS

their similar size to small Asian carp. The research is timely as 2015 Service field sampling confirmed the presence of small silver carp within 39.5 miles of the electric dispersal barriers.

"The results of this work are concerning," said U.S. Fish and Wildlife Service Midwest Deputy Regional Director, Charlie Wooley. "However, we still have time to work with our partners to reduce the potential risk that small Asian carp could be accidentally transported across the barriers."

To date, there is no evidence that Asian carp have crossed any of the electric dispersal barriers in the Chicago Sanitary and Ship Canal.

"Proactive prevention is key," explained Wooley. "A goal in our monitoring work is to identify vulnerabilities so that we can counter them with additional safeguards. We're taking the 'best offense is a good defense' approach."

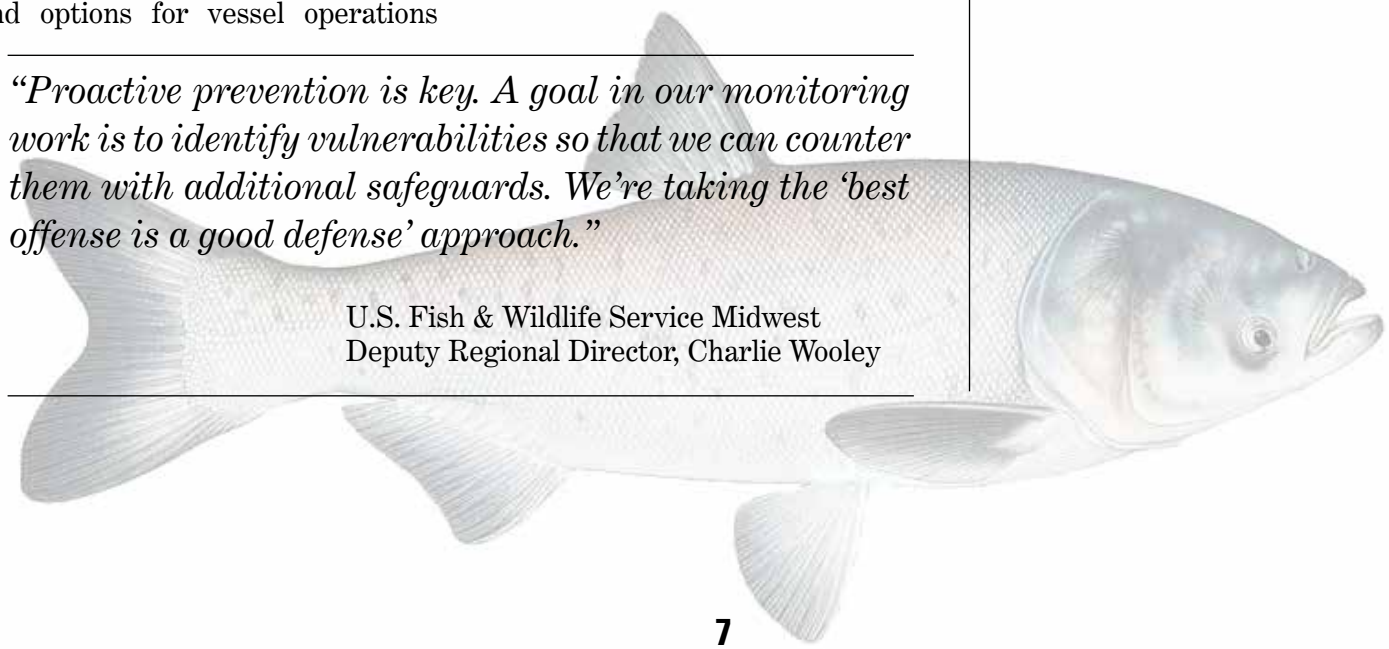
The Service continues to work with the U.S. Army Corps of Engineers, U.S. Geological Survey and other federal, state and maritime industry representatives to identify and address additional study needs and potential management options. Activities in 2016 include the investigation of potential tools and options for vessel operations to reduce the likelihood of small fish entrainment between barges, and to test entrainment with small Asian carp in parts of the Illinois River where Asian carp are already abundant.

From the illegal trafficking of live Asian carp across state and international boundaries, to baby Asian carp sold to unassuming customers as baitfish, it is often the forward thinking and keen observations of employees on the front lines that allow us to circumvent calamity. Through the innovative work of employees from the Carterville Fish and Wildlife Conservation Office and the Wilmington Substation, another potential pathway for the accidental introduction of Asian carp into the Great Lakes may be on its way to being closed.

The barge entrainment research was supported in part by the Great Lakes Restoration Initiative through more than $1.6 million in funding from the U.S. Environmental Protection Agency and the Asian Carp Regional Coordinating Committee. To read the complete 2015 barge entrainment report, please visit www.AsianCarp.us. Research findings are also published in the August 2016 issue of the Journal of Great Lakes Research.

"Proactive prevention is key. A goal in our monitoring work is to identify vulnerabilities so that we can counter them with additional safeguards. We're taking the 'best offense is a good defense' approach."

U.S. Fish & Wildlife Service Midwest
Deputy Regional Director, Charlie Wooley



Meet the Asian Carp Regional Coordinating Committee

Chaired by the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency, the Asian Carp Regional Coordinating Committee is a consortium of international, federal, state and local partners united in their efforts to prevent the spread and establishment of Asian carp in the Great Lakes.

Learn more at www.AsianCarp.us.

Wilmington Substation

It takes a lot of muscle to fight Asian carp. That's why the U.S. Fish and Wildlife Service created the Wilmington Substation in the spring of 2015. Co-located with the U.S. Forest Service at Midewin National Tallgrass Prairie in the southern outskirts of the Chicago metro, the new team of fish biologists and fish technicians is strategically located to provide boots-on-the-ground support for the Asian carp battle being waged in Illinois waters.

Great Lakes Restoration Initiative Helps Bring Piping Plovers Back to Wilderness State Park

By Georgia Parham

This pair of plovers is performing a tilt display, a type of courtship display, at the nest. Jordan Rutter, University of Minnesota

Two years ago, Great Lakes Restoration Initiative funds and dedicated efforts of staff from the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service helped restore nesting habitat for the endangered Great Lakes piping plover on the Lake Michigan shoreline in Michigan's northern Lower Peninsula. The site was Waugoshance Point at Wilderness State Park, which once supported one of the region's highest nesting concentrations for the endangered shorebird. However, nesting habitat had been erased, overrun by spotted knapweed and other invasive species as well as a general succession of native plants, possibly due to lack of ice scour during the long period of low lake levels. For 10 years, no plovers nested at Waugoshance Point.

Beginning in 2014, workers restored nesting habitat by removing non-native and other plant species to recreate the sparsely vegetated, open beach habitat the birds prefer. The habitat restoration work occurred at three areas along the shoreline at Waugoshance Point. These are areas where plovers nested in the past and where conditions looked best for the possible return of plovers if habitat was restored.

Their efforts paid off in May of 2016 when park staff observed a nesting pair on the beach within a restoration area at the tip of Waugoshance Point. The pair produced three chicks, the first young plovers in a decade to hatch at the site. Additionally, a separate male plover was spotted holding territory at another restoration area, indicating favorable habitat conditions and possible use by an additional pair in coming years.

Thanks to the use of color-coded leg bands, researchers can identify and track individual plovers from year to year. Chicks are banded each year to help researchers track the birds' future nesting and migration patterns. The parents of the Waugoshance nest appear to be first time breeders. Park staff and piping plover researchers identified the male bird as one that hatched at North Manitou Island, part of Sleeping Bear Dunes National Lakeshore in Michigan, while the female hatched near Gulliver in the Upper Peninsula of Michigan. Great Lakes Restoration Initiative funds support seasonal technicians that monitor at both locations.

Great Lakes piping plovers were listed as endangered under the Endangered Species Act in 1986. By 1990, populations had fallen to 12 known nesting pairs in the Great Lakes due to alteration of habitat and nest disturbance. Piping plovers place their nests directly on sand and cobble beaches often frequented by humans. Beach users can inadvertently disturb plover breeding sites causing nest abandonment or can accidentally crush birds or eggs. The Service and its partners protect individual nests with signs and exclosures alerting people of the bird's presence and keeping people and dogs away from nests.

Great Lakes Restoration Initiative-funded efforts like the one at Waugoshance Point are paying off in other areas of the Great Lakes as well. For example, this year saw the first plover nest at Cat Island in Wisconsin's Lower Green Bay in 75 years, thanks in part to Great Lakes Restoration Initiative-supported restoration work. In 2015, the Great Lakes piping plover population was estimated at 75 pairs, about half way to the recovery goal of 150 pairs. In 2016, a record breaking 133 Great Lakes piping plover chicks fledged. Nesting piping plovers at Wilderness State Park and Cat Island are not only a sign of hope for the bird's recovery, but also a sign of hope for recovery of the Great Lakes ecosystem as a whole.

Preventing Asian Carp Access to Lake Erie at Eagle Marsh

Asian Carp Berm at Eagle Marsh that will protect Lake Erie from Asian carp. Katie Steiger-Meister, USFWS

By Mara Koenig

On May 11, 2016 the U.S. Fish and Wildlife Service Midwest Region and partners celebrated the completion of the Eagle Marsh project in Ft. Wayne, Indiana that will protect Lake Erie from Asian carp. The Service's Midwest Fisheries Program and Wildlife and Sport Fish Restoration Program, along with the U.S. Environmental Protection Agency, U.S. Department of Agriculture Natural Resources Conservation Service, Indiana Department of Natural Resources, Little River Wetlands Project and several other partners provided key support for the construction of a berm on Eagle Marsh to prevent the spread of Asian carp during floods into waters that connect to the Great Lakes.

Eagle Marsh lies between two rivers, the St. Mary's and the Wabash, on a continental divide for the Mississippi River and Lake Erie. In 2010, scientists discovered that Asian carp, an invasive fish found in the Wabash River, could reach waters that connect to the Great Lakes during a major flood event at Eagle Marsh. The partnership effort at Eagle Marsh addresses an interbasin pathway of high concern for the potential dispersal of aquatic invasive species into the Lake Erie watershed, as indicated in the U.S. Army Corps of Engineers-led Great Lakes Mississippi River Interbasin Study.

In response, a berm was designed to impede water from the Wabash River mixing with water from St. Mary's River during significant flood events. During a flood, the St. Mary's River, which flows toward Lake Erie, sends water back down Junk Ditch into Eagle Marsh, mixing with high water from the Graham-McCulloch Ditch, which flows toward the Wabash River, a watershed where Asian carp have been documented. The multi-million dollar construction project addresses this concern and is a prime example of federal, state and local partners working together to prevent the spread of Asian carp into the Great Lakes.

Assistant Midwest Regional Director Charlie Wooley, Indiana Private Lands Biologist Scott Fedders and Midwest Regional Chief for the Wildlife and Sport Fish Restoration Program Jim Hodgson celebrate the completion of the Eagle Marsh project that will protect Lake Erie from Asian carp.
Katie Steiger-Meister, USFWS

Restoring Coregonids in the Lower Great Lakes

By Mike Millard, Larry Miller, Bill Archambault and Dimitry Gorsky

The Northeast Region of the U.S. Fish and Wildlife Service is dedicating fisheries and habitat assessment capacity as well as propagation expertise and assets to native coregonid restoration in Lake Erie and Lake Ontario.

We are working with New York State Department of Environmental Conservation, U.S. Geological Survey and Cornell University to assess remnant stocks of cisco throughout Lake Ontario, including the Chaumont Bay, which contains one of the only known spawning populations in New York waters. The Lower Great Lakes Fish and Wildlife Conservation Office is also characterizing habitat in Chaumont Bay and other embayments, such as Thunder Bay in Lake Superior. We are using side-scan sonar, multi-beam sonar, drop cameras and an acoustic Doppler current profiler. This project is showing promising results describing availability of spawning habitat that can inform stocking strategies.

Working with the USGS Tunison Lab, the Northeast Fishery Center will develop spawning protocols for ciscoes to ensure retention of genetic diversity in captive populations and maximize genetic contribution from hatchery-produced cisco. The Allegheny National Fish Hatchery and the Northeast Fishery Center will begin producing ciscoes in the fall of 2017 for stocking in Lake Ontario. Developing rearing capacity at two facilities expands production potential, and when combined with egg-banking, provides a further safeguard against year-class loss due to disease or infrastructure failure. Strict biosecurity procedures will be followed to prevent potential transfer of inter-basin fish diseases.

Coordination and collaboration with the Service's Midwest Region, the Ontario Ministry of Natural Resources and Forestry, USGS, NYDEC and the Great Lakes Fishery Commission is essential at every step of restoration efforts.

Fish biologist Dimitry Gorsky holds a cisco from Thunder Bay collected during winter spawning. USFWS

The Chittenango Snail's Life on the Edge

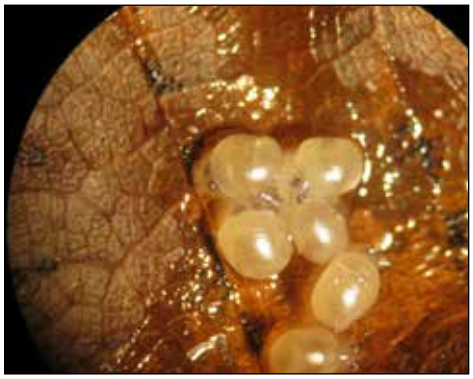
By Rebecca J. Rundell
State University of New York

Nonmarine molluscs are among the most threatened animals on Earth. Since the year 1500, 42 percent of animal extinctions recorded have been molluscs, and 99 percent of these are nonmarine molluscs. The terrestrial Chittenango ovate amber snail is particularly vulnerable to extinction because of its tiny geographic range. The snail is only found on the rocky edge of a single waterfall in Madison County, New York. The instability of the rocky ledges on which it crawls, and encroachment of nonnative plants on its habitat, has left the snail literally on the brink.

Working in a partnership with State Parks, Syracuse's Rosamond Gifford Zoo, Rochester's Seneca Park Zoo, the New York Department of Environmental Conservation, and dedicated volunteers, U.S. Fish and Wildlife Service lead Robyn Niver and biologists from the State University of New York College of Environmental Science and Forestry have succeeded in breeding hundreds of Chittenango baby snails in captivity. The thriving captive snail colony at SUNY College of Environmental Science and Forestry, developed by the project's graduate student trainee is helping to buffer the wild population from extinction and serves as a wellspring of previously unknown information about the snail's life history and diet.

Breeding efforts were so successful that in the spring of 2016, 280 snails were released into the wild to augment the population of fewer than 350 snails. All individuals above 9 mm were marked with bee tags so that the team can continue to monitor their survival through the ongoing mark recapture work. The snail release drew local and national media attention, focused on the message that there is a lot of hope in conservation work—quite a feat for such an unassuming little snail.

The Chittenango ovate amber snail lives on one side of Chittenango Falls in Madison County, New York. Below it is pictured at mere millimeters long after hatching, and above at adult size. Cody Gilbertson



Finding the closest diet to the Chittenango ovate amber snail's wild diet was a major challenge of the project. Graduate trainee Cody Gilbertson, pictured here holding a growth chamber, spent long hours trying to replicate wild conditions, induce snail mating, and rear tiny hatchlings. Rebecca J. Rundell

Working with Tribal Partners on Great Lakes Restoration Projects

Inside the streamside rearing unit where young lake sturgeon are raised. The project is a partnership between Genoa National Fish Hatchery, Michigan Department of Natural Resources Department, Match-E-Be-Nash-She-Wish Band Natural Resource Department and the Kalamazoo River Chapter of Sturgeon for Tomorrow. Katie Steiger-Meister, USFWS

By Alejandro Morales

The Midwest Region of the U.S. Fish and Wildlife Service is home to 36 federally recognized tribes, bands, and communities, including three inter-tribal organizations charged with natural resource conservation. The fish, wildlife and natural resource interests of Native Americans in the Midwest Region cover large areas of land and water included under the Treaties of 1836, 1837, 1842 and 1854. These lands and waters contain a great diversity of plant and animal life managed under authorities of federal agencies, tribal governments and state governments.

The Federal Government, Department of Interior and the U.S. Fish and Wildlife Service have tribal trust responsibilities to assist Native Americans in conserving, protecting, restoring and utilizing their reserved, treaty guaranteed, or statutorily identified trust assets. The lake sturgeon are just one of many species found in the Midwest Region with strong cultural ties to the residing Native American tribes and in need of conservation and restoration.

"Sturgeon or Nmé in Pottawatomi, is culturally important to the Match-E-Be-Nash-She-Wish Band, as the fish represents an animal clan in traditional beliefs. Sturgeon clan people have spiritual knowledge offered as guidance to others and they live to an old age, just like lake sturgeon," Stated James Nye, Tribal Spokesman for the Match-E-Be-Nash-She-Wish Band of Pottawatomi. "The rehabilitation of lake sturgeon is a reflection of the tribes present day progression as a community and tribal government."

In the 1950s, due to overfishing and habitat loss, lake sturgeons were eradicated from the Midwest watersheds such as Kalamazoo River, Michigan, Red Lake, Minnesota, and the Bad River, Wisconsin. Through funding provided by the Great Lakes Restoration Initiation several projects across the Midwest Region have assisted in the recovery of lake sturgeon.

The first example is a multiple agency and organization partnership between, the Service's Genoa National Fish Hatchery, Michigan Department of Natural Resources Department, Match-E-Be-Nash-She-Wish Band Natural Resource Department and the Kalamazoo River Chapter of Sturgeon for Tomorrow. By working together on a streamside rearing unit where young sturgeon are reared and then released into the Kalamazoo River in Michigan. The importance of this partnership and rearing unit is to keep you sturgeon in a safe environment when they are most vulnerable to predation and pollution.

The second example is in Wisconsin where the Ashland Fish and Wildlife Conservation Office, with GLRI funding, was able to prioritize working with the Bad River Band of Lake Superior Chippewa's Natural Resources Department to gather information on lake sturgeon

spawning populations in the Bad and White rivers in Wisconsin. For weeks the two offices worked together to capture 400 lake sturgeon. All the sturgeon caught without a pit tag received one and were then released back into the wild. The information gathered has informed and guided the the two offices in creating a strategic plan for habitat restoration, harvest controls, assessment and monitoring.

Midwest Deputy Regional Director Charlie Wooley recognizing Alberta Norris and the Red Lake Band for their many years of support and partnership. USFWS

By working with tribal partners the Service's Midwest Region is fulfilling several aspects of our tribal trust responsibilities by providing consultation, technical assistance, cooperative partnerships and training opportunities to Native American fish and wildlife professionals - consistent with the principles of tribal self-determination and self-governance. The mentioned restoration projects, made possible with Great Lakes Restoration Initiative funding, help support our mission to work with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

Return of Lake Trout Heralds the Cisco Comeback

By Katie Steiger-Meister

Lake trout are starting to make a comeback! Anglers and biologists are finding unclipped wild lake trout with more frequency, indicating that lake trout are successfully reproducing. Great Lakes Restoration Initiative funding provided to the U.S. Fish and Wildlife Service has played a key role in lake trout restoration efforts by supporting increases in the quality and quantity of stocked lake trout. Additional funding has also provided opportunities for more intensive assessment and evaluation of lake trout populations and restoration strategies.

With lake trout populations on the rise, and with changes in available prey, there is a need for more forage species, such as coregonids. GLRI funding is supporting ground breaking coregonid restoration work starting with the deepwater cisco, commonly referred to as bloaters. In the winter of 2016 the U.S. Fish and Wildlife Service collected a record-setting two million deepwater cisco eggs from Lake Michigan. The eggs were delivered to the Ontario Ministry of Natural Resources and U.S.Geological Survey facilities to help meet fish stocking goals for restoration in Lake Ontario. Another major step was taken at a recent Department of Interior coregonid workshop where the Service and U.S.Geological Survey identified key science needs and capabilities to support basin-wide restoration of coregonid species across the Great Lakes.

Cisco restoration is also coming home to our Midwest hatcheries as we begin to develop our capacity to raise ciscoes. This fall we had crews from Jordan River National Fish Hatchery in Michigan working on Lake Huron to collect eggs for our new rearing programs. Once the eggs are collected, they are sent to Genoa National Fish Hatchery in Wisconsin. With wild lake trout populations on the rise, the time of the cisco has arrived!

A deepwater cisco, commonly referred to as a bloater, collected in Lake Michigan during winter spawning efforts. Katie Steiger-Meister, USFWS

U.S. Fish and Wildlife Service staff brave winter waves on Lake Michigan in late January and February to collect deepwater ciscoes during their spawning season.
Katie Steiger-Meister, USFWS

Protection Grows for Lake Michigan's 'Stepping Stones'

By Tina Shaw

Last fall, along with our conservation partner The Nature Conservancy, we announced the expansion of the Green Bay National Wildlife Refuge to include most of St. Martin Island and all of Rocky Island in Lake Michigan, adding another 1,290 acres to the 330-acre refuge. The islands are part of the Grand Traverse chain, which extends from Wisconsin's Door Peninsula to Michigan's Garden Peninsula.

"It's gratifying to see our shared conservation missions coming together to protect these unique Great Lakes islands," said Tom Melius, Midwest Regional Director of the U.S. Fish and Wildlife Service. "We couldn't do this without a common vision among all the partners."

Green Bay National Wildlife Refuge was established in 1912 as habitat for migratory birds and consists of the 325-acre Plum Island and the smaller Pilot and Hog Islands. With the addition of St. Martin and Rocky Islands, the refuge will increase by five times its original size.

St. Martin Island bluffs, Frykman Gallery

Along with the other islands in the Grand Traverse chain, St. Martin Island is part of the Niagara Escarpment and has significant bluffs, which have rare native snails and plants associated with them. In addition to the bluffs, the island also supports forests, wetlands and an extensive cobblestone beach.

These islands act as stepping stones for a wide host of migrating birds and other wildlife as they cross Lake Michigan. During their long journeys, migratory animals need places along the way to stop, eat, rest and sometimes seek shelter from storms. More than 400 plant species, including the dwarf lake iris, a federally-threatened species, have been found on the island. The broad shallow "flats" offshore of St. Martin Island are likely to be a prime area for fish spawning and reproduction.

The Nature Conservancy purchased the majority of St. Martin Island - 1,244 acres - from the Fred Luber family in 2013, and an additional 36 acres from David Uihlein, Jr. in 2014. The remainder of the island (57 acres) and the lighthouse are owned by the Little Traverse Bay Band of Odawa Indians. Ten-acre Rocky Island was donated to The Nature Conservancy in 1986.

Funding for the acquisition of St. Martin Island was provided by the Luber and Uihlein families, who generously donated a portion of the value of their lands to The Nature Conservancy, other private gifts to the Conservancy, grants from the North American Wetlands Conservation Act program and the Great Lakes Restoration Initiative, and settlement funds administered by the Fox River / Green Bay Natural Resource Trustee Council.

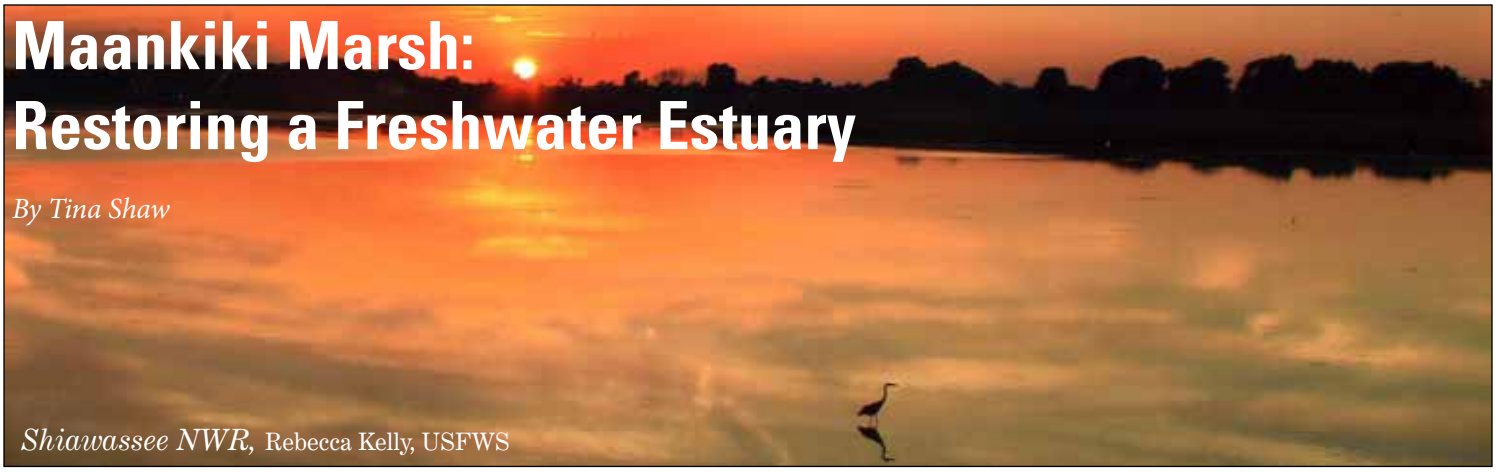
St. Martin Island is located about five miles from Washington and Rock islands at the tip of Wisconsin's Door Peninsula. Rocky Island is located approximately two miles off Michigan's Garden Peninsula in close proximity to Little Summer Island.

Learn more about Green Bay National Wildlife Refuge: http://www.fws.gov/refuge/green_bay/

St. Martin Island map, The Nature Conservancy

Maankiki Marsh: Restoring a Freshwater Estuary

By Tina Shaw



Shiawassee NWR, Rebecca Kelly, USFWS

Part of Michigan's largest freshwater estuary has been restored thanks to Great Lakes Restoration Initiative funding and the vision of biologists and land managers at Shiawassee National Wildlife Refuge. Together with partners at Ducks Unlimited, we restored a highly-altered agricultural landscape and reconnected rivers long separated.

Shiawassee National Wildlife Refuge is part of an area known as Shiawassee Flats, historically a 50,000 acre wetland complex. The refuge and the "flats" lie within the Saginaw Bay watershed. At almost 9,000 square-miles, Saginaw Bay is Michigan's largest watershed and home to 1.4 million residents. Four rivers, the Shiawassee, Flint, Cass, and Tittabawassee, all converge at the refuge to form Saginaw River, which is approximately 22 unobstructed river-miles from Saginaw Bay in Lake Huron. Shiawassee Flats is one of the most unique wetland complexes in the entire Great Lakes, because it functions as a freshwater estuary even though it is 20 miles inland.

Refuge staff wanted to honor the first inhabitants of the area by naming the restored wetland in their native language. To do so, staff reached out to the Saginaw Chippewa Indian Tribe of Michigan for their input and worked together on crafting the place name. In the traditional language of the Chippewa, and related Ojibwa Tribe, mannkiki is Anishinaabemowin for marsh or marshland of any size.

In 2011, Ducks Unlimited was granted 1.5 million dollars through a Sustain Our Great Lakes Grant and we were pleased to welcome them to put that grant to work at Shiawassee. Before work could begin in January 2016, we completed a full hydrogeomorphic study and worked with biologists at Ducks Unlimited to develop a restoration plan.

"This has been the most significant restoration project I have worked on in my career," notes Shiawassee National Wildlife Refuge wildlife biologist Eric Dunton. "Restoring 10 percent of the refuge, almost 1,000 acres of our land base, will directly benefit fish and wildlife populations on a huge scale," continued Dunton.

Marsh restoration reconnects watersheds and natural cycles. Jeremiah Heise,Michigan Department of Natural Resources

With more than 50,000 ducks, 30,000 geese and 2,000 shorebirds during peak times of the year, it is no surprise that Shiawassee National Wildlife Refuge is designated as an Important Bird Area by the American Bird Conservancy.

"Opportunities are few to restore areas of this size in the Great Lakes region," said Dane Cramer, Ducks Unlimited regional biologist for Michigan. "Waterfowl used to skip right over this project area during migration. Now, they'll look down and see a healthy and productive habitat."

What makes this restoration effort different is the huge amount of information we have about the area before work even began. Since 2012, our biologists have been collaborating with researchers from University of Michigan School of Natural Resources and Environment and U.S. Geological Survey Great Lakes Science Center to capture a snapshot of the watershed's overall health before the area was restored. By collecting baseline data on everything from phytoplankton and macroinvertebrates, to fish and waterbirds we will be able to fully gauge our success as the natural processes return to Maankiki.

The real benefits to wildlife and people will start to become apparent in the months and years to follow. We look forward to welcoming the marsh back and seeing all of the benefits of wetlands return as well. From flood storage and retention, to the natural filtration of contaminants, Maankiki will improve our overall water quality for healthy wildlife populations and for people.

Modern Science Meets Ancient Life: Contaminant Concentrations in Lake Sturgeon

By Daniel Gefell and JoAnn Banda

Successful management of natural resources and complex ecological systems require timely acquisition and synthesis of information about how ecosystems adjust to change. Effective natural resource management is particularly challenging in situations where changes in human uses or other kinds of stressors are widespread and new to the ecosystem, such as the increasing influx of Contaminants of Emerging Concern (CECs) in recent decades.

There are tens of thousands of CECs, which are found in commercial products, and the most common are consumed by the hundreds of tons per year. Although they are recognized as a global issue, little is known about the fate or impacts to life of these essentially unregulated chemicals that are continuously entering our waterways through waste streams and in runoff from urban and rural landscapes. They include human and veterinary drugs; personal care products such as fragrances, cosmetics, and insect repellants, flame retardants in fabrics, hormones, newly developed pesticides, plasticizers and other commercially common chemicals.

There is growing evidence that even at low concentrations these chemicals and chemical mixtures disrupt endocrine and immune systems, and are having other physiological effects such as impaired reproduction, modified behavior, inhibited growth and development, accelerated aging, increased disease and parasitism, and reduced ability to adapt and survive. While many of these chemicals have the ability to significantly impact wildlife, many of the effects are not obvious in an individual animal. Subsequently, unmasking these hazards before impacts to whole populations occur is crucial.

Since 2010, the U.S. Fish and Wildlife Service has led a challenging Great Lakes Restoration Initiative project, leveraging a variety of inter-office and inter-agency collaborations to better understand whether CECs are impacting fish and wildlife populations across the U.S. Great Lakes basin. We have found that cross-programmatic collaborations and those among agencies bring together different strengths in expertise and capacity to pursue project goals at a scale and quality unachievable by any single collaborator. Such collaborations promote cross-fertilization of ideas and efficiencies of scale and resources.

The stakes are raised when there are potential impacts to a species of special interest to managers, such as an economically important species or threatened or endangered species, like lake sturgeon. About 130 million years before the earliest known human civilization, the sturgeon family of fishes could be found in waters around the world. Despite their persistence over geologic time, sturgeons have recently encountered new challenges to their survival. As a result, Atlantic sturgeon and short-nose sturgeon are federally listed as endangered, and lake sturgeons are state-listed in 19 of the 20 U.S. states within their original range, including the Great Lakes states.

In 2015 a team of U.S. Fish and Wildlife Service biologists from offices in Ohio and New York coordinated a non-lethal sampling effort to measure CEC concentrations in sturgeon blood serum on a regional scale at sites in major rivers across the lower Great Lakes. The field team drew on the collective experience and skills of Service staff and partners to help understand how CECs may be accumulating in lake sturgeon, and in turn how these chemicals may be impacting their health.

Sampling activities included coordinated blood collection for CEC analysis from fish that were already being captured and handled for related assessment efforts, including Alpena Fish and Wildlife Conservation Office biologists studying population dynamics of sturgeon in the Detroit River; studies by scientists from the Northeast Fish Health Lab in Lamar, Pennsylvania, investigating fish biology, population structure, and movement patterns in the upper Niagara River near Buffalo Harbor; investigations in the lower Niagara River, where the Lower Great Lakes Fish and Wildlife Conservation Office is exploring spawning behavior; and a long-time collaboration between the New York Field Office and New York State Department of Environmental Conservation in coordination with the St. Regis Mohawk Nation, to collect sturgeon eggs, fertilize them, and rear thousands of young fish at a NYSDEC hatchery and Genoa National Fish Hatchery for subsequent release back into the St. Lawrence River watershed.

The Lake sturgeon project is just one example of how our Great Lakes CEC project has utilized a number of cross-programmatic, inter-agency, and other collaborations to find efficiencies in the pursuit of project goals.

Enhancement of Savanna, Prairie, and Wetland Habitats at Park 562 of the Chicago Park District

By Anna Sidie-Slettedahl

The Chicago Park District has recently been approved for a project totaling almost $570,000, which will be used to enhance Park 562, an undeveloped property on Chicago's far southeast side. Upon completion the site will be a much needed ecosystem for millions of resting, nesting and foraging birds that migrate through Chicago every year. The Great Lakes Restoration Initiative funding of $434,240 is a combined effort between the Great Lakes Restoration Initiative grant programs through the Upper Mississippi River and Great Lakes Region Joint Venture and through the U.S. Fish and Wildlife Service Ecological Services Program. The balance of the project total is being provided by the Chicago Parks District as matching funds.

Wetland habitat at Park 562, Emanuel Love, Chicago Park District

Prairie savannah habitat at Park 562, Chicago Park District

Wooded Pools at Park 562, Chicago Park District

In 2012, Chicago Park District acquired the 138-acre Park 562 from the City of Chicago and has been working with partners, volunteers and professional contractors to design and implement an ecological restoration plan. This two-year project is focusing on the enhancement of 16.6 acres of savanna, 10.5 acres of prairie and 2.5 acres of wetland habitat. Invasive plants will be removed and native plants and seeds will be installed to improve ecological conditions and establish healthier native habitats for migratory birds and other desirable wildlife. Species that will benefit from habitat enhancements include short-eared owls, olive-sided flycatchers, mourning warblers, Blackburnian warblers, monarch butterflies and many more.

Project Manager Naureen Rana said, "This project gives us the opportunity to significantly advance the establishment of healthy wetland and upland habitats at a large municipal park within the post-industrial landscape of southeast Chicago's section of the Lake Michigan flyway."

Chicago Park District's ultimate goal is to convert Park 562 into an official Chicago Park District Natural Area, which means professionals and volunteers will continue to enhance and maintain its native ecosystem types in perpetuity once it is established. Chicago Park District's strong partnerships and dedication to monitoring and evaluation are key components for success, and the park's increased biodiversity and resilience will be welcomed by many species of wildlife.

Conserving Great Lakes Coastal Wetlands

By Brad Potter

Lillies, lotus and smartweed at Ottawa National Wildlife Refuge, U.S. Geological Survey

The Upper Midwest and Great Lakes Landscape Conservation Cooperative is a conservation community coordinated by the U.S. Fish and Wildlife Service to identify and address conservation challenges across broad geographic regions. A steering committee comprised of partners identified coastal wetland conservation as an area to align agencies and programs for more effective conservation. Three interrelated Great Lakes Restoration Initiative funded Landscape Conservation Cooperative projects are identifying and quantifying coastal wetlands that are currently providing value to people, wildlife and the environment, as well as identifying areas that if converted back to coastal wetlands would provide high value to the surrounding area. With research focused on coastal wetlands from Saginaw Bay, Michigan to the western basin of Lake Erie, Ohio, the goal is to better guide conservation investments.

In October of 2016, two new decision support tools will be available to conservation practitioners and communities interested in making wise coastal wetland conservation investments. The first from the Great Lakes Coastal Wetland Monitoring Program will provide a tool to help rank and prioritize coastal wetlands based on current conditions and ecological values. The second, identifies an index of restorable areas. These are places where coastal wetlands were once, but have since been converted to other uses or disconnected from the Great Lakes. Theses vital pieces of information will be linked with forthcoming results of the third Landscape Conservation Cooperative project, which seeks to better understand the benefits of coastal wetlands to humans and human well-being. By comparing and combining human values with the ecological values, the places where high values intersect can be targeted for future conservation efforts.

Found throughout the Great Lakes region, coastal wetlands provide much needed places for fish and wildlife to live. If you appreciate fishing, eating fish from the Great Lakes, or clean drinking water, then you are enjoying a benefit of a Great Lakes coastal wetland. Wetlands provide important services for people including flood control, wildlife habitat, as well as intangible benefits like a sense of place. Many cities in the region are near the coast with nearby coastal wetlands creating unique ecological, economic and recreational hotspots.

Some high-quality coastal wetlands remain, but it is estimated that two thirds of the original coastal wetlands in the Great Lakes were converted for another land-use benefiting humans like productive farming, residential development and industry. Unfortunately, much of this conversion occurred before we understood the many benefits coastal wetlands provide. Interest in restoring and maintaining this treasured resource continues to grow.

The Great Lakes Restoration Initiative has provided $460,000 in funding support to the Upper Midwest and Great Lakes Landscape Conservation Cooperative's three coastal wetlands projects.

For more information on the the projects, please visit www.greatlakeslcc.org/projects.

Smartweed in bloom at a restored coastal wetland at Ottawa National Wildlife Refuge in the western basin of Lake Erie. U.S. Geological Survey

Signs of Progress

All U.S. Fish and Wildlife Service field sites which receive Great Lakes Restoration Initiative funding will be marked by a sign similar to the one pictured above. Identifying our field sites is part of our interagency agreement with the U.S. Environmental Protection Agency. This funding requirement was design to increase public awareness and transparency with regard to the use of GLRI funding.

To learn more about other Service GLRI projects, please visit http://www.fws.gov/glri/

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