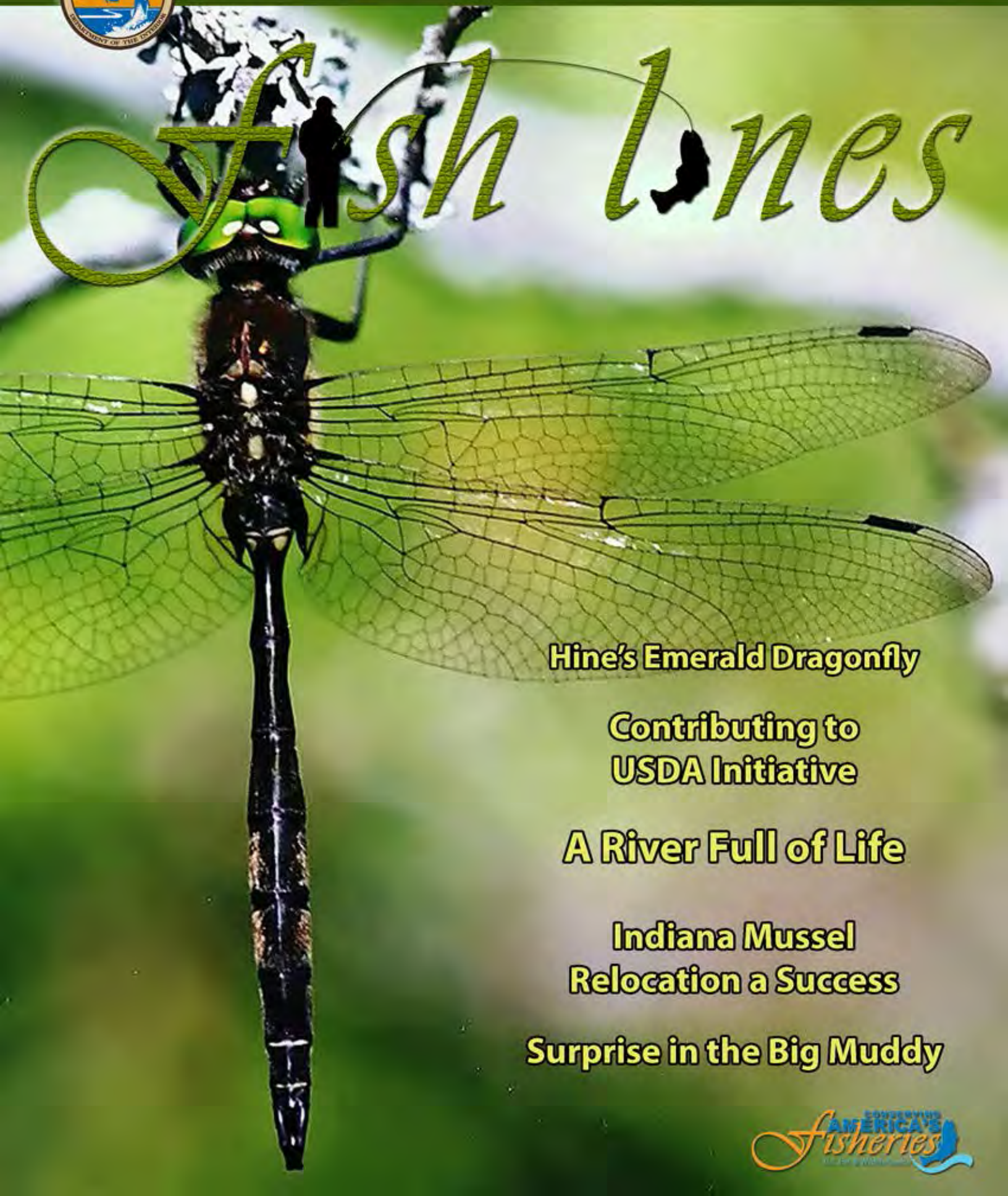
U.S. Fish & Wildlife Service - Midwest Region

Fisheries Program

Fish lines



Hine's Emerald Dragonfly

Contributing to USDA Initiative

A River Full of Life

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Surprise in the Big Muddy

Conserving America's Fisheries

Hine's Emerald Dragonfly

BY SCOTT COVINGTON, REGIONAL OFFICE

When you think of the U.S. Fish and Wildlife Service (Service), what comes to mind? Is it endangered species or your favorite refuge? You're a birder, so it must be migratory birds. How about all of the above – and more?

There are many programs in the Service, including Ecological Services, which is typically associated with endangered species work, the National Wildlife Refuge System (Refuges), Migratory Birds, Fisheries and more. But with the "stove pipe" system, it's easy for us to become entrenched in our own program and not look beyond our own four walls.

Dorsal (top) view of an adult male Hines emerald dragonfly. Credit: Paul Burton

Not so with Genoa National Fish Hatchery (NFH), where hatchery staff recently took the reins of a project to work with the Hine's emerald dragonfly, a native of upper Midwestern bogs and endangered because of fragmented and diminishing habitat. Genoa NFH obtained a Cooperative Recovery Initiative (CRI) grant from the Service's Refuge program. The CRI grant facilitates the restoration and recovery of threatened or endangered species by combining the resources of multiple programs across the Service as well as partnerships outside the Service to implement large-scale conservation efforts. Working with the Midwest Region's Ecological Services office and the University of South Dakota (USD), an aggressive multi-program effort to save this dragonfly began last year.

Winter is a slow time for sleepy dragonfly naiads (larval aquatic stage) that rest in a refrigeration box on the hatchery grounds until it warms up next spring. Credit : Scott Covington, USFWS

Erin Johnson, a biologist stationed at Genoa NFH, was recently tasked with raising the dragonflies to assist in expanding their population. Erin seems quiet, but becomes animated when she speaks of the project, "I'm very excited to be involved in working to restore populations of these endangered species." Erin is no stranger to difficult projects. She explains, "This project is a good fit for me. For my Master's thesis, I studied the effects of arsenic contaminated sediment on aquatic benthic macroinvertebrates." In English, that means critters that live on the bottom of streams or ponds.

Dragonflies have a three-part life cycle, which begins in the water. Typically, a female lays eggs either on an aquatic plant or eggs are dropped into the water. From an egg, the dragonfly grows into its aquatic form or naiad, which looks nothing like the adult. Dragonflies may live four to five years as a naiad until they mature into adult dragonflies. Then, within a few months, they mate and die.

This lifecycle means raising dragonflies can be a challenge. Erin explains, "During the early stages it is vital that we ensure the larvae have the best environment possible such as adequate food, oxygen levels and protection from predators. We must also maintain individual 'hotels' for each dragonfly as they are cannibalistic, and if raised in confined quarters, will eat each other." USD staff developed the initial methods to raise Hine's. Erin and the rest of the Genoa NFH team will continue to work with USD staff on how to scale up the operation so more dragonflies can be raised simultaneously.

Using the USD method, Genoa NFH staff constructed naiad "hotels", basically cylinders made of PVC and mesh screen. These allowed water and food to flow in and out of the "hotel", while keeping the dragonflies protected – somewhat. Angela Baran,

Assistant Project Leader at Genoa NFH, explains “Sometimes if the hotels aren’t checked often enough, a fast growing species of dragonfly can enter the hotel, grow bigger than the Hine’s and eat them. When we check the hotel, the Hine’s is gone and we’re left with a more common species.”

What’s next for the project? Erin sums it up, “During the winter we will be monitoring the larvae. This includes bi-weekly checks where their water will be changed. During this time, we will also construct additional dragonfly ‘hotels’ and hopefully move them back out to our ponds through the summer.”

Biologists evaluate naiads – note the dragonfly hotels (white cylinders in foreground). Credit: Angela Baran, USFWS

This project definitely meets the intent of the CRI grant process – with multiple programs working with the USD to save this species. Eventually, the dragonflies from Genoa NFH will supplement populations around the region. Project Leader Doug Aloisi is proud of the progress that the project team has made in such a short time. “Even though we have spent only one short season with the dragonfly on station, we have been able to answer many questions about water quality, food availability, site-specific growth and suitable rearing units for the dragonfly. We are very excited to see what next year brings as well, and to learn even more on how to recover this unique species.” Genoa NFH is practicing the “one Service” mantra that we try to achieve.

Last updated: November 25, 2015

Ashland FWCO

Contributing to Department of Agriculture Initiative

BY HENRY QUINLAN, ASHLAND FWCO

Brook Trout Team "Top 20" priority watersheds in Wisconsin's Lake Superior basin. Credit: Jason Ross, USFWS

Wisconsin's Lake Superior region was selected as a key area of the country to invest millions of dollars in water quality protection and wildlife habitat enhancement efforts. The Department of Agriculture's initiative, known as the Chief's Joint Landscape Restoration Partnership selected areas across the country to build on existing projects that benefited from strong partnerships and cooperative efforts among multiple federal, state, tribal and local natural resources agencies, private and public land owners, academia, and non-governmental organizations. The U.S. Fish and Wildlife Service is a leader in many of the region's existing partnerships through the Ashland Fish and Wildlife Conservation Office (Ashland FWCO) and Whittlesey Creek National Wildlife Refuge.

This project, known as the Wisconsin Lake Superior Landscape Restoration Partnership (Partnership) with an outreach campaign at: **http://www.mylakesuperiornorthwoods.org/**, will improve water quality and restore critical spawning habitat for brook trout by reducing sedimentation and stabilizing flow regimes, remove in-stream barriers to fish movement, increase water infiltration by reconnecting floodplains and restoring wetlands, and reduce phosphorus in surface water runoff. Other species to benefit from the Partnership are golden-winged warblers, Kirtland warblers and sharp-tailed grouse. Forest conservation practices will improve habitat for these species and also result in reduced wildfire risk on tribal and other lands in the project area.

Brook trout spawning in coldwater stream over clean gravel substrate. Credit: Chuck Basset, U.S. Forest Service

The brook trout team, comprised of federal, state, county, tribal and fishery biologists and watershed association members, has been charged to select areas for brook trout habitat enhancement, identify habitat restoration practices, conduct landowner site visits to identify habitat issues and restoration options, and develop metrics to measure progress and success.

The team used a Strategic Habitat Conservation approach to identify key areas to focus habitat protection and restoration activities within the region. Our strategy incorporated models of brook trout status and distribution and future climate change water temperature projections; agency actions such as management plans and fishing regulations; watershed association involvement, and fish community ecological interactions in cold water streams. Through this process each of the 105 watersheds in the region was scored and ranked. Landowners located in watersheds with high priority for brook trout protection and restoration have been contacted to inform them of agency funding available to support private land habitat restoration projects and applications for funding are being received by participating agencies.

Henry Quinlan, Assistant Project Leader at Ashland FWCO, leads the Partnership's brook trout team efforts to identify and prioritize areas for brook trout habitat enhancement. Ashland FWCO Fishery Biologist, Jason Ross, utilizes his data management and Geographic Information Science skills to analyze and map priority brook trout areas for evaluation. Both individuals conduct landowner site visits to contribute to the Partnership. Check out the effort at: **http://www.mylakesuperiornorthwoods.org/**

A River Full of Life

BY BILL LAMOREUX, LA CROSSE FWCO

Whether it's netting or electrofishing, fisheries crews come across many amazing creatures in the search for Asian carp. Never expect a dull day working in the fisheries field. The river always seems to amaze and impress. The variety of life is what keeps the job interesting. One day you might have close to 40 turtles in a mini fyke net, and the very next net has over 5,000 one-inch long baby bluegills. Some fish have such bright coloration, one would think only exists in the Amazon or coral reef.

Turtles and snakes are a common occurrence when sampling for fish in the shallow backwaters. The red ear, map and painted turtles provide some safe entertainment.

The snapping turtles on the other hand, make you diligent of where your fingers are at all times. Just last week we had set a larger fyke net in the backwaters of Pool 19. With larger fykes you target bigger fish, but also bigger turtles. When we pulled the net in it was quickly apparent that we had very few fish, but multiple large snapping turtles. In general snapping turtles don't like to be bothered. One of them in this net was the biggest I'd ever seen and he had the attitude to match. After some careful planning we safely got him and his buddies out and back home in the river.

Here are a few very interesting facts about the Mississippi River and its watershed sourced from the National Park Service website. **http://www.nps.gov/miss/riverfacts.htm**

Biological science technician Katie Lieder with a Bigmouth Buffalo from the Mississippi River. Credit: USFWS

A Fox Snake encountered during our work on the Mississippi River. Credit: USFWS

Biological science technician Tyler Harris with a Northern Pike and a "photo bombing" Snapping Turtle! on the bank of the Mississippi River. Credit: USFWS

- At least 260 species of fish, 25% of all fish species in North America
- Forty percent of the nation's migratory waterfowl use the river corridor during their Spring and Fall migration
- Sixty percent of all North American birds (326 species) use the Mississippi River Basin as their migratory flyway
- From Cairo, Illinois upstream to Lake Itasca there are 38 documented species of mussel. On the Lower Mississippi, there may be as many as 60 species of mussel
- The Upper Mississippi is host to more than 50 mammal species
- At least 145 species of amphibians and reptiles inhabit the Upper Mississippi River environs.

Definitely FULL of LIFE!

Warmouth a member of the sunfish family reside in the Mississippi River. Credit: Katie Lieder

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Indiana Mussel Relocation a Success

BY BRIAN BARTOS, CARTERVILLE FWCO

Northern Riffleshell prior to placement in Lake Shafe. Credit: Brant Fisher, Indiana DNR

A bridge replacement project in Pennsylvania provided a unique opportunity for the Carterville Fish and Wildlife Conservation Office (FWCO) to be involved in the relocation of two species of federally endangered mussels, the clubshell and northern riffleshell, to Indiana this past September. The Hunter Station Bridge on the Allegheny River had been slated to be replaced for over a year, and would have serious impacts on mussel survival at the project location. This prompted the decision to relocate mussels to other suitable locations in the Ohio River Basin. States that received mussels from this project include Pennsylvania, West Virginia, Ohio, Kentucky, New York, Seneca Nation (located in NY), and Indiana.

The Carterville FWCO and the Ohio River Basin Fish Habitat Partnership (ORBFHP) working in conjunction with Pennsylvania's Department of Transportation, Indiana's Department of Natural Resources, Manchester University, and the Service's Bloomington, Indiana Ecological Services Field Office were able to secure 150 individuals each of northern riffleshell and clubshell mussels for translocation. This will be a pilot study for a larger relocation of 3,000-5,000 of each species in 2016-17. The streams chosen for relocation were the Tippecanoe and Eel rivers, both exceptional coolwater systems that currently support a host of mussel species and other aquatic organisms. The Eel River has been transformed in the past decade thanks to a comprehensive dam removal and habitat restoration effort by Manchester University and the ORBHFP, increasing chances of survival for the clubshell.

Female Northern Riffleshell after placement on the Tippecanoe River. Credit: Brant Fisher, Indiana DNR

This Clubshell is alive and well one month after relocation to the Eel River. Credit: Brant Fisher, Indiana DNR

The mussels were shipped overnight from Pennsylvania to Indiana, and each came fitted with a PIT tag on one valve and a small numbered tag on the other. They were placed for overnight holding in a cage with sand/gravel substrate, and were observed to be buried and actively filtering the next morning. After confirming viability, northern riffleshell were placed into the Tippecanoe River, and the clubshell into the Eel River. All individuals were observed to be active, many of them filtering within 10 minutes of placement. At the end of October, clubshell were still at the original placement site, and individuals were observed to be alive and in good shape. So far, the pilot project looks to be a success!

Next year, biologists and students will return to the rivers to search for tagged mussels with a PIT tag reader to evaluate success of this pilot effort. After survival is confirmed, the relocation effort with the large number of individuals will be made. In addition to the translocation of adult mussels, propagation techniques and host fish inoculation will also be conducted to provide additional northern riffleshell and clubshell for each of the augmentation and reintroduction sites. The hope is with the combination of habitat/passage improvements, coupled with relocation/propagation efforts, these two endangered species will be well on the road to recovery in their new home!

Mussels being harvested from the Allegheny River for relocation. Credit: USFWS

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Surprise in the Big Muddy

BY SARAH ETTINGER-DIETZEL, COLUMBIA FWCO

Fairy shrimp. Credit: Josh Hull, USFWS

The hydraulics rowdily pulled the heavy benthic net back aboard the Silver Bullet stern trawl boat, a necessity of the Columbia Fish and Wildlife Conservation Office. The deck hands quickly hauled in the benthic net in hopes of collecting both larval and adult species of interest from the ever changing depths of the Missouri River. In most cases, benthic trawling yields a wide array of species for collection. This includes chubs, suckers, sturgeon and even shiners, but recently we were perplexed when finding a few very strange alien looking creatures. Upon further study the small being was found to be a fairy shrimp, a type of branchiopod rarely found in the Missouri River system. The Columbia crew was able to get an up close look at these diminutive crustaceans while collecting samples for the Habitat Assessment Monitoring Program. Three specimens were collected in individual benthic trawls in the Missouri River, just outside of Columbia, Missouri.

Fairy shrimp are relatives of lobsters, crabs, shrimp and other small crustacean species, but are lacking a protective carapace. These little guys have evolved to live in habitats not normally known for containing predatory species, and often do not exceed 1.5 inches in length. Branchiopods are unusual due to their modified legs that serve as both a breathing apparatus and feeding mechanism for algae and plankton. Fairy shrimp are often found in vernal pools; temporary pools of water where they mature quickly at around 41 days and reproduce laying thick “cyst” eggs that can lay dormant in extreme conditions until the next rainy season. While fairy shrimp are special in evolutionary individuality and appearance they serve a large role in aquatic ecosystems as a much sought after food source due to their lack of protective cover.

The rare sightings of these little crustaceans leads to the question of just how they are able make it into the large Missouri River system? The simplest answer is flooding. Transitory wetlands and accompanying floodplains become inundated due to increased rainfall. These systems form temporary connections increasing macro invertebrates and other aquatic species; in this case fairy shrimp to be flushed into the larger riverine system.

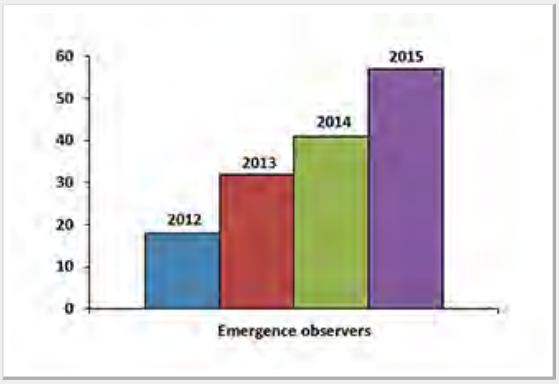
The rainfall for 2015 has been at or above flood stage with little variation for quite some time. The increased depths have led to contingency sampling at much greater depths than what would be considered normal. With the influx of water from a multitude of tributaries and other groundwater sources, species not normally seen within the Missouri River have been maneuvered into this much larger body of water. While this can often lead to unwanted species entering the system, these small delicacies are much appreciated by fish species and unfortunately do not last long in the system before being consumed leaving little evidence of their presence.

The presence of fairy shrimp in the Big Muddy goes to show that when we haul in a net, we never know exactly what we are going to find.

Tracking the Pulse of *Old Man River*

BY MARK STEINGRAEBER, LA CROSSE FWCO

The Upper Mississippi River National Wildlife and Fish Refuge (NWFR) was established in 1924 as a refuge for fish, wildlife, and plants, and a breeding place for migratory birds. The refuge encompasses one of the largest blocks of floodplain habitat in the lower 48 states. Bordered by steep wooded bluffs that rise above the river valley, the Mississippi River corridor and refuge offer scenic beauty and productive fish and wildlife habitat unmatched in the heart of America. Covering a total of more than 240,000 acres in Minnesota, Wisconsin, Iowa, and Illinois, the refuge extends 261 river miles and is designated as both a Wetland of International Importance (Ramsar) and a Globally Important Bird Area.



The number of citizen scientists reporting UMR mayfly emergence events has increased steadily since 2012.

Accumulating mayflies halt traffic on the Mississippi River bridge in Winona (MN) on July 8, 1966. Credit: Calvin Fremling

Among all the creatures that inhabit the refuge, the brief, synchronous, annual emergence of mayflies from the river in mid-summer is one of the most spectacular phenomena to occur here. Large emergence events can number in the millions - enough to be picked up by weather radar and attract visitors from around the globe eager to experience it. As larvae, these aquatic insects cannot tolerate low levels of dissolved oxygen; thus, their annual appearance is widely regarded is an indicator of good water quality conditions during the past year. As avid anglers know, mayflies are an important food source for fish, not only during the summer emergence, but throughout the year.

As a means of monitoring the relative health of the river over a broad spatial scale and to learn more about the basic biology of this iconic insect, the La Crosse Fish and Wildlife Conservation Office (FWCO) has been monitoring the annual “pulse” of mayflies that emerge from *Old Man River* in the Upper Mississippi River NWFR (and beyond) since 2012 with the help of a growing volunteer network of citizen scientists.

As it happens, this effort closely parallels the National Wildlife Refuge System (NWRS) Inventory and Monitoring Initiative to collect and analyze data on seasonal changes in key plants and animals from year to year (*e.g.*, the emergence of insects), especially their timing and its relationship with prevailing weather and climate patterns. Technical support for this NWRS endeavor is provided by the USA-National Phenology Network (NPN), an organization that brings together citizen scientists, government agencies, non-profit groups, educators, and students of all ages to monitor the impacts of climate change on plants and animals in the United States. This initiative is designed to support refuge operations by providing standardized methods and protocols for widespread data collection to help make better informed management decisions and facilitate implementation of on-the-ground actions.

A female Hexagenia limbata mayfly (sub-adult). Credit: John Sullivan

Thus in 2015, La Crosse FWCO and Upper Mississippi River NWFR staff successfully petitioned the USA-NPN to have two species of burrowing mayflies (*Hexagenia bilineata and H. limbata)* added to N*ature's Notebook,* the organization's national online program where professional scientists and amateur naturalists regularly record observations of plants and animals to generate long-term data sets used for scientific discovery and decision-making. The value of this on-line application was publically recognized at the **Forum on Federal Crowdsourcing and Citizen Science Toolkit** held

recently at the White House.

Emergent Hexagenia bilineata mayflies swarm on a road sign beside Upper Mississippi River Pool 8. Credit: USFWS

A total of 57 citizen scientists observed and reported 174 discrete mayfly emergence events in the UMR this year in a reach of river spanning more than 350 miles from St. Paul, Minnesota to Muscatine, Iowa. Some of these **timely reports** were also used in research and management efforts to restore mayfly populations in portions of Lake Michigan.

Although only a small fraction of Americans are formally trained as “scientists”, that doesn’t mean that only a small fraction of Americans can participate in scientific discovery and innovation. Citizen science is one approach to educate, engage, and empower the public to apply their curiosity and talents to a wide range of real-world problems. At the Upper Mississippi River NWFR, plans are to promote and expand the use of *Nature’s Notebook* to increase citizen science participation in monitoring populations of other fauna (*e.g.*, bald eagles, monarch butterflies) and flora (*e.g.*, milkweed) on the refuge. The USA-NPN is also planning to increase participation in the ***Mayfly Watch*** program in 2016 with a special campaign highlighting this effort. For more information, visit: **https://www.usanpn.org/fws/mayflywatch**.

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Fish Tails

Articles submitted by field staff that do not appear as a feature within Fish Lines. These articles provide examples of the diverse work that is performed on behalf of aquatic resources.

Great Lakes Fish Tag and Recovery Lab 2015 Lake Trout Mass Marking

BY KEVIN PANKOW, GREEN BAY FWCO

The Great Lakes Fish Tag and Recovery Lab, headquartered at the Green Bay Fish and Wildlife Conservation Office, has concluded mass marking the 2015 year class of lake trout. The team mass marked 5,032,941 lake trout with a coded wire tag (CWT) and adipose fin clip. These fish, destined for Lakes Michigan and Huron, are raised at three FWS Region 3 National fish hatcheries (NFH) and one Michigan Department of Natural Resources State Fish Hatchery (SFH).

The 2015 season began at Marquette SFH where over 218,000 lake trout were mass marked July 10th to 12th. During August 4th to September 2nd, mass marking operations resulted in 1.15 million lake trout completed at Pendills Creek National Fish Hatchery (NFH); operations at Jordan River NFH from August 5th to September 26th yielded 2.39 million mass marked lake trout; and 1.36 million lake trout were mass marked at Iron River NFH September 23rd to October 7th.

To accomplish this monumental task, the lab operated four mobile tagging trailers that automatically inject a CWT and remove the adipose fin of hatchery reared fish with little human handling. The CWT is a 1.1-mm long piece of stainless steel wire etched with a six-digit code that is unique to a batch of fish, referring to its year class, strain, stocking location and hatchery origin.

The information gained from CWT returns provides the Service and its partners the ability to estimate levels of natural reproduction, evaluate post-release survival of various strains, identify fish movement within and among the lakes, assess the contributions of the hatchery reared fish to regional fisheries, and to evaluate the performance of various hatchery rearing and stocking practices. Biological data collected from tagged fish will also help to evaluate the health of the populations by providing growth rates and age composition of the fish at time of capture.

Since the program's inception in 2010, over 54 million fish stocked into the Great Lakes have been mass marked by the Lab. The program is currently funded by the Great Lakes Restoration

Midwest Region Fisheries Divisions

National Fish Hatcheries

The Region's National Fish Hatcheries (NFH) focus on native species recovery and restoration. Primary species include: lake trout, endangered pallid sturgeon, and endangered, threatened, and native mussels. Other major programs include coaster brook trout and lake sturgeon restoration, fulfilling tribal trust responsibilities for native aquatic species, and cost reimbursed rainbow trout production for recreational fishing. Hatcheries also provide technical assistance to other agencies, provide fish and eggs for research, and develop and maintain brood stocks of various species and strains.

Fish and Wildlife Conservation Offices

Fish and Wildlife Conservation Offices (FWCO) conduct assessments of fish populations to guide management decisions, play a key role in targeting and implementing native fish and habitat restoration programs; perform key monitoring and control activities related to aquatic invasive species; survey and evaluate aquatic habitats to identify restoration/rehabilitation opportunities; work with private land owners, states, local governments and watershed organizations to complete aquatic habitat restoration projects under the Service's National Fish Passage Program, National Fish Habitat Partnerships, Partners for Fish and Wildlife and the Great Lakes Coastal Programs; provide coordination and technical assistance toward the management of interjurisdictional fisheries; maintain and operate several key interagency fisheries databases; provide technical expertise to other Service programs addressing contaminants, endangered species, federal project review and hydro-power operation and relicensing; evaluate and manage fisheries on Service lands; and, provide technical support to 38 Native American tribal governments and treaty authorities.

Sea Lamprey Biological Stations

The Fish and Wildlife Service is the United States Agent for sea lamprey control, with two Biological Stations assessing and managing sea lamprey populations throughout the Great Lakes. The Great Lakes Fishery Commission administers the Sea Lamprey Management Program, with funding provided through the U.S. Department of State, U.S. Department of the Interior, and Fisheries and Oceans Canada.

Fish Health Center

The Fish Health Center provides specialized fish health evaluation and diagnostic services to federal, state and tribal hatcheries in the region; conducts extensive monitoring and evaluation of wild fish health; examines and certifies the health of captive hatchery stocks; and, performs a wide range of special services helping to coordinate fishery program offices and partner organizations. The Whitney Genetics Lab serves as a leading edge genetics laboratory and conducts environmental DNA (eDNA) sample processing for early detection of invasive species.

Whitney Genetics Lab

The Whitney Genetics lab provides environmental DNA (eDNA) surveillance for the early detection of invasive Silver and Bighead carp as part of the Asian Carp Regional Coordinating Committee's plans to detect, monitor, and respond to the threat of invasive carp in the Great Lakes. The lab also provides analysis for determining the ploidy of wild-caught Black and Grass carp, two more invasive carp species.

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