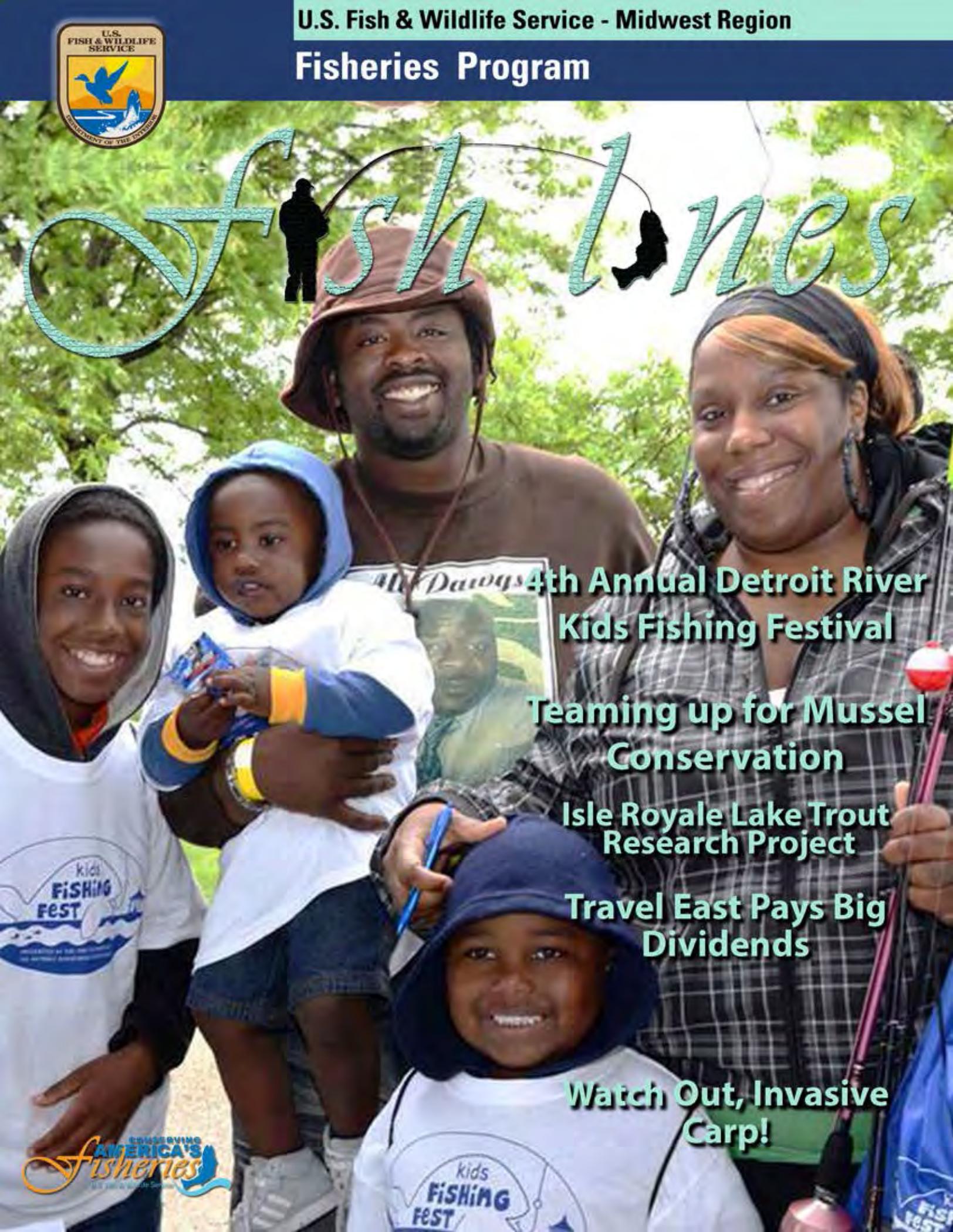




Fisheries Program

Fish Lines



4th Annual Detroit River Kids Fishing Festival

Teaming up for Mussel Conservation

Isle Royale Lake Trout Research Project

Travel East Pays Big Dividends

Watch Out, Invasive Carp!





U.S. Fish & Wildlife Service Fisheries, Midwest Region

Conserving America's Fisheries

4th Annual Detroit River Kids Fishing Festival

BY JUSTIN CHIOTTI, ALPENA FWCO-WATERFORD, MI-SUBSTATION



A family preparing to fish during the 4th Annual Detroit River Kids Fishing Festival. Credit: Detroit River Front Conservancy

and supporters for the event grows each year and it's easy to understand why after seeing the joyful smile of a child catching a fish for the first time. The Detroit River is designated as an Area of Concern in the Great Lakes, but is undergoing a transformation before our eyes. Funding through the Great Lakes Restoration Initiative is restoring fish and wildlife habitat all along the Detroit River and the children attending the Detroit River Kids Fishing Festival are reaping the benefits.



All Smiles: These anglers show off a white bass caught from the Detroit River during the 4th Annual Detroit River Kids Fishing Festival. Credit: Detroit River Front Conservancy

The weather cleared up for the 4th Annual Detroit River Kids Fishing Festival held at Milliken State Park and Harbor along the Detroit River Walk. This year, the event was held on June 8th during Michigan's Free Fishing Weekend. Fish biologists from the Alpena Fish and Wildlife Conservation Office (FWCO) – Waterford Substation and staff from the Detroit River International Wildlife Refuge were present to introduce children and adults in the Detroit Metropolitan Area to fishing and to promote aquatic stewardship. Over the past three years nearly 2,000 children have fished along the Detroit River during this event.

Children were taught "fishing basics" by instructors from the Michigan State Parks Explorers Program. Staff from the United States Coast Guard was on hand to teach children about boating safety, and Michigan Sea Grant educated children about invasive species in the Great Lakes.

The Detroit River Kids Fishing Festival gives the youth in the Detroit Metropolitan Area an opportunity to connect with the outdoors. The list of volunteers



Staff from the Alpena FWCO – Waterford Substation enjoying the moment with the winner of the "largest fish" in the boys division. Credit: Detroit River Front Conservancy

This year the event was presented by PNC Bank and the Detroit River Front Conservancy in support with the U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, Rivertown Detroit Association, Concentra, Wayne County Parks, Sierra Club, IHOP, and Michigan State University Extension.



U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries

Upper Mississippi River NWFR McGregor District and Genoa NFH: Teaming up for Mussel Conservation

BY DOUG ALOISI, GENOA NFH

Working alongside the mighty Mississippi has its advantages if you are in the aquatics field. For the Genoa National Fish Hatchery (NFH) it can provide a source of fish and mussels to use in aquatic resource conservation efforts. In our neck of the woods, it also means that we are included within the boundaries of one of the country's largest conservation projects, the Upper Mississippi River National Wildlife and Fish Refuge (NWFR).

The benefits to this became evident to us when McGregor District refuge project leader Rich King, and Lisa Maas, refuge biologist approached the hatchery with an offer to use abandoned National Fish Hatchery ponds located on the Refuge to further mussel conservation. Mussel conservation is also a goal of the Upper Mississippi River basin. However, threats to this fauna are very real. Currently, in the Midwest (Minnesota, Wisconsin, Iowa, Missouri, Illinois, Indiana and Ohio) more than half of the 78 known species are classified as federally endangered, threatened or State species of special concern. No other group of animals in the Midwest is so gravely imperiled.



Genoa NFH mussel team placing cages. Credit: USFWS



Floating mussel cage array in refuge pond. Credit: USFWS

So it seems only natural, for branches with similar conservation goals within the same agency, to team up to conserve this valuable fauna. Years ago, the U.S. Fish and Wildlife Service operated a federal fish hatchery in the floodplain in Guttenburg, Iowa adjacent to Lock and Dam 11. These ponds were released to the refuge system when the hatchery closed in the 1970s. They were being used as moist soil units for the past 30 years until a very real need surfaced with the birth of mussel propagation as a recovery tool in the Upper Mississippi River basin.

Mussel propagation to recover endangered species began in the early 2000s at the Genoa NFH, and localized increases in endangered mussels are being witnessed in Iowa, Illinois and Minnesota. Hatchery ponds that are supplied by river water would seem to be ideal for mussel propagation using the current method of caging host fish in somewhat still waters that have a

productive water supply as a mussel food source. Nathan Eckert, our hatchery mussel biologist, is very excited to research this site as it appears to have the makings for a successful cage site. This spring adult freshwater drum were obtained directly from the Mississippi River, and transferred into the ponds in attempts to create a fingerling drum year class, to serve as mussel hosts.

We look forward to continued work with the Upper Mississippi River NWFR, on these and other unique projects, in order to further aquatic species conservation in the Upper Mississippi basin.



U.S. Fish & Wildlife Service Fisheries, Midwest Region

Conserving America's Fisheries

Green Bay FWCO Fish Biologist Assists with Isle Royale Lake Trout Research Project

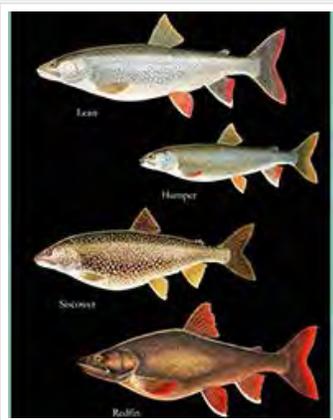
BY KEVIN PANKOW, GREEN BAY FWCO

Fish Biologist Kevin Pankow, from the Green Bay Fish and Wildlife Conservation Office (FWCO), assisted the Michigan Department of Natural Resources (DNR), NOAA Northwest Fisheries Science Center, Ashland FWCO, National Park Service and University of Wisconsin-Milwaukee the week of June 2nd with a lake trout research project near Isle Royale National Park on Lake Superior.

The cooperative, two-year research project, coauthored by Chuck Bronte from Green Bay FWCO, was funded by a competitive grant from the Great Lakes Fishery Commission. The objectives of the project are to characterize the seasonal reproductive development, assess the genetic relatedness of individuals within a given morphotype collected seasonally to determine if they are derived from the same morphotype populations, and compare fecundity and skeletal muscle lipid levels among lean, siscowet, humpert and redfin lake trout at Isle Royale. The two-year project began in 2013 and fish are sampled during spring, summer and fall.



Ashland FWCO Fish Biologist Mike Seider prepares a lake trout for a digital photograph. Credit: Kevin Pankow, USFWS



The four principal morphotypes of lake trout found at Isle Royale, Michigan in Lake Superior. Credit Below.

Lake trout were captured by gill nets from the Michigan DNR Lake Char research vessel at multiple sites off the north shore of Isle Royale for three days. All lake trout were assessed for length, weight, morphology, sea lamprey wounding and visceral fat index. Specimen collections included otoliths for ageing, a tissue sample for genetic analysis, and blood samples for plasma profiling. All fish were digitally photographed for morphometric measurements that are used for morphotype identification. In addition, gonads were removed, digitally photographed and weighed to calculate the gonadosomatic index (GSI). A cross-section of each pair of gonad was fixed for histological examination to determine the developmental stage of the gametes. Eggs were collected from mature females of each morphotype to determine fecundity.

Historical and recent accounts document that the various lake trout morphotypes reproduce at a variety of times during the year in Lake Superior, particularly at Isle Royale. Seasonal sampling will document the reproductive timing

and spatial and temporal isolation of these forms. This research project will highlight more options for reestablishing lake trout populations in the lower Great Lakes that have lost their morphotypic and life history diversity.



Green Bay FWCO Fish Biologist Kevin Pankow displays a lake trout captured gill netting near Isle Royale on Lake Superior. Credit: Mike Seider, USFWS

*From: A. M. Muir, C. R. Bronte, M. S. Zimmerman, H. R. Quinlan, J. D. Glase & C. C. Krueger (2014). *Ecomorphological Diversity of Lake Trout at Isle Royale, Lake Superior, Transactions of the American Fisheries Society*, 143:4,972-987. Credit: Artist: Paul Vecsei



U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries

Travel East Pays Big Dividends in Fisheries Conservation

BY DOUG ALOISI, GENOA NFH



Newly hatched St. Lawrence River strain lake sturgeon. Credit: USFWS

joined biologists from the New York Department of Environmental Conservation, U.S. Geological Survey office at Cortland NY, and the FWS's New York Field Office to collect eggs for propagation in New York's lake sturgeon restoration efforts. Over 40,000 eggs were taken, disinfected and brought back to Genoa NFH for rearing. Once the fish reach fingerling size in the fall (5-7 inches) they will be transported back to upper New York State for release. During the trip, over 40 hours of road time carried two very different species to two very different fisheries facilities over 1100 miles apart.

Life can be interesting by just its varied experiences, and the aquatic resources field has had plenty of these varied experiences to keep us occupied this spring.

A trip from Wisconsin to the East Coast, in early June, by Genoa National Fish Hatchery (NFH) staff, accomplished several different objectives in one long journey. Our first goal was to transport a brood line of Klondike Reef lake trout to the Berkshire NFH in Massachusetts to support the Fish and Wildlife Service's efforts to restore lake trout populations in the lower Great Lakes.

This lot of fish had been reared from wild eggs obtained in the fall of 2012 and quarantined to ensure that no fish diseases had been brought in with the eggs. After three fish health examinations in 18 months, the fish were released to the Iron River and the Berkshire NFHs. At these facilities the lake trout should produce eggs for many years to come to support re-stocking efforts in Lakes Erie and Michigan.

The lake trout were transported in early June to also coincide with the lake sturgeon spawning and egg collection activities on the St. Lawrence River in upstate New York (NY). Personnel from Genoa NFH



Distribution truck loaded and ready for the trip east. Credit: USFWS



U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries

Watch Out, Invasive Carp! A New Battleship has joined the Fleet!

BY JEREMIAH SMITH, COLUMBIA FWCO



Rigging the "Magna Carpa" for its maiden voyage. Credit: Jeremiah Smith, USFWS

Over the last year, I have enjoyed working on a new sampling technique to capture invasive carp. It took three years, but little-by-little Jeff Finley, Wyatt Doyle and others at the Columbia Fish and Wildlife Conservation Office (FWCO) have worked together to construct a prototype Butterfly-skimmer, also known as Paupier, boat designed to capture invasive carp. As we saw our prototype come to full fruition in the form of a modified work boat, we decided to build a new state-of-the-art Paupier called the "Magna Carpa".

In the past, we have sampled many different water bodies across the Midwest for invasive carp and with each and every field sampling trip, something seemed to break or go wrong. We would take one step forward and get knocked back two. Through the process though we had a vision of what a fully serviceable invasive carp battleship needed to look like. After a lot of trial and error at our office, we were finally able to perfect our design. We will be launching our new vessel next week. The Magna Carpa will be capable of deploying two electrified 12

foot nets off the sides of the boat, as well as tow a 35 foot surface trawl. The electricity can be compartmentalized in two different fields on either side of the boat to enable paired comparisons with electricity as a variable in determining how to best target carp of various sizes in different water conductivities.

Our boats are fully mechanized now and capable of sampling any body of water for any size of carp. We have shown we are capable of capturing thousands of young of the year carp in our surface trawls, and thousands of pounds of silver carps in a day. We are very excited to start writing the manual on how to use these techniques for invasive and native species management in the Midwest Region.



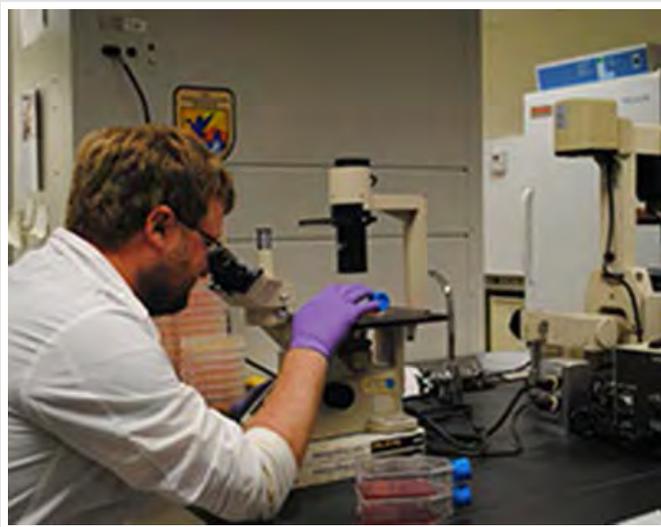
U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries

Asian carp Cell Lines: Possible Next Line of Defense against the Invasive Species

BY TERRY OTT, LA CROSSE FISH HEALTH CENTER



Eric Leis examining a flask of Asian carp cells developed at the La Crosse Fish Health Center. Credit: Ashley Kast, USFWS

Eric and Sarah Leis, fish health biologists at LFHC were given the daunting task to develop and maintain several viable cell lines from the two carp species. Juvenile Bighead and Silver carp were obtained from UMESC during the spring of 2013. The fish were euthanized and several organs were removed aseptically (liver, kidney, spleen, gill and skin) from the young fish. The biologists used a process or technique called "whole cell lysis homogenation" to determine if various types of cells from the different organs would attach to a sterile polystyrene flask containing enriched cell growth media. One of the first steps in starting a new cell line and probably the most important is to get the individual cells to attach to the bottom of the polystyrene flask. Once attached to the polystyrene the next step is to get these first attached cells to start dividing mitotically. Next the biologists have to examine the cells for proper growth, and monitor for bacterial and/or fungal contamination. These forms of contamination are often a problem in cell line development, because the fish organs are transplanted from an unsterile environment to a sterile flask. If a flask would become contaminated it would have to be discarded, because the contamination would outgrow the cells and eventually kill all the cells in the flask. Several disinfectants were employed to treat the organs of the juvenile carp to avoid the chance that some of the cells developing from the organs would become contaminated. However, this created a balancing act of determining the amount of chemical treatment required to kill potential bacterial/fungal contamination, but still allow the fish cells to remain alive. With any new endeavor comes a lot of trial and error, but eventually the biologists obtained the following cellular growth from the Silver and Bighead carp; skin, fin, gill and fry cell lines.

It takes three to four weeks of successful cellular growth before the bottom of the flask becomes filled with new cells similar to when a person throws grass seed out on a new lawn. The seed germinates and spreads growing a lush green lawn with the help of water and fertilizer. Eventually the cells multiplied to the point they filled the bottom of the flask and utilized all the growth nutrients in the flask. The last and most critical step was to split the over grown flask of cells into a new flask with fresh growth medium. This step involves removing the attached cells from the bottom of the old flask and using the appropriate split ratio to get the divided cells to restart their growth again in a new flask. Once the cells from a specific organ have grown and been split numerous times without any loss due to toxicity or mycoplasmas were they ready for the toxicity assays.

Several chemicals have already been tested on the cell lines to determine toxicity in Bighead and Silver carp. This testing is

The U.S. Fish and Wildlife Service (USFWS) - La Crosse Fish Health Center (LFHC) has performed many daunting tasks in regard to fish health activities throughout the years in assisting other Federal agencies, states, tribes, and commercial aquaculture growers in the Great Lakes Region. However, the development and culturing of Asian carp fish cell lines was a new, interesting, and a very difficult one. A team of scientists from the U.S. Geological Survey-Upper Midwest Environmental Science Center (UMESC), La Crosse, Wisconsin contacted LFHC in May 2012 to see if they could develop several viable fish cell lines from the Bighead and Silver carp. Both of these invasive species were introduced into the United States during the early 1970's and are threatening to invade the Great Lakes where they could have a major impact on the fisheries of the lakes. These scientists lead by research physiologist Mark Gaikowski, have a plan to test hundreds of chemicals on the newly developed carp cell lines to possibly find a select chemical that would be toxic to the invasive carp, but not harm other aquatic animals.



Sarah and Eric Leis first fish health biologists to successfully grow Asian carp cell lines. Credit: Ashley Kast, USFWS

ongoing and many more chemicals have yet to be tested. A plus in having these Asian carp cell lines is their usefulness in the virology laboratory with diagnostic cases involving Asian carp. In virology, it is very important to use cell lines that match the fish species when screening for viral or replicating agents in a population of fish. Before the development of these cell lines there were no appropriate cell lines to study Asian carp. Hopefully these cell lines will yield interesting answers in the search for a control method of these exotic carp.

Last updated: July 11, 2014



U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries



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.

New Faces at Columbia FWCO

BY SARAH ETTINGER-DIETZEL COLUMBIA FWCO

Hi everyone, my name is Sarah Ettinger-Dietzel. This May 2014, I became a new biological science technician for Columbia FWCO. I originally came from the Pacific Northwest, but have spent most of my adulthood living and enjoying the Missouri Ozarks.

While attending Missouri State University I had the privilege from 2007 through 2013 to work seasonally with the Resource Science and the Fisheries Divisions of the Missouri Department of Conservation (MDC). During my employment with MDC I had many opportunities to develop my skills in fisheries conservation techniques. This included but was not limited to fish sampling, developing watershed profiles, aquatic organism passage assessment, aquatic conservation opportunity area evaluations, stream bank stabilization projects, creating artificial nest boxes for federally endangered Ozark Hellbenders and varying outreach programs such as fishing clinics, just to name a few. While working with MDC I received my undergraduate degree in Wildlife Biology at Missouri State University, Springfield, in May of 2011.

Throughout my time with MDC I had the chance to work with other departmental regions, the National Park Service, fellow graduates and fisheries biologists. This brought about the opportunity to develop and carry out my thesis work on smallmouth bass (*Micropterus dolomieu*). Using internal radio tags and telemetry, I was able to assess the twenty four hour movement and habitat selection of smallmouth bass in a section of the Current River.

In December of 2012, I received my Master's degree in natural and applied sciences, and graduate certification in geographic information systems (GIS) through Missouri State University, Springfield. I am excited to be back in fisheries working for Columbia's FWCO. I hope to continue to have new experiences in my field of study and offer some of my own insights in return.

Staff Addition to the Columbia Fish and Wildlife Conservation Office

BY ADAM PREHODA, COLUMBIA FWCO

The opportunity to provide an introduction article was expressed by some of the senior staff at the Columbia Fish and Wildlife Conservation Office (FWCO). I would like to utilize this opportunity to paint a backdrop for Adam Prehoda, Biological Science Technician, Fisheries. I grew up in rural Upstate New York enjoying natural resource based recreation afforded by the wild Adirondack Mountain landscape. Upon graduation of high school my desire to serve in the US Air Force became a reality. After completion of basic and technical training in areas of Texas, I found myself stationed in Tucson, Arizona. Marriage and the birth of my first of three children influenced my decision to not re-enlist after the completion of my four year enlistment contract. Post Air Force life positioned me in my wife's home town in Western Kentucky. With training and experience in maintaining equipment, a transition was made into industrial maintenance career. After working in a few different manufacturing facilities a desire for something more began to build. A decision was made to pursue a degree in wildlife management.

Working full time, raising a family, and chipping away at classes led to a ten year journey that resulted in a natural resource management degree with a concentration in fisheries science from the University of Tennessee at Martin. The constraints of working between semesters prohibited participation in any formal internship and I quickly became aware of this deficiency on my evolving resume. I attempted to fill this void in experience with any and all volunteer opportunities encountered. Experience relevant to a career in fisheries science began to accumulate. One of the highlights of my volunteer experiences was participating in multiple offshore fisheries independent sampling cruises in conjunction with the National Marine Fisheries Services and South Carolina Department of Natural resources. The sampling cruises occurred along portions of the South Atlantic Bight and focused on support for reef fish stock assessments and development in using video cameras as a region wide survey gear. The ability to assist in resolving a hydraulic failure on a major piece of equipment during one cruise and outfitting new gear with necessary hardware brought to light the value my background in maintenance.

As one of the new technicians at the Columbia fisheries office I look forward to my contribution to the conservation of a big river. My time spent living in a port town in western Kentucky included recreational boating and fishing on the Mississippi River and I look forward to an increased knowledge in the ecology of a big river system. The short time I have been employed with the

Service, I have participated in Pallid Sturgeon Monitoring Program, Habitat Assessment and Monitoring Program, and look forward to future involvement with the Asian Carp Monitoring Program. Integration into the office maintenance program also brings me satisfaction through utilizing my many years of maintenance experience in maintaining the vehicle and boat fleets which appear to be workhorses that play an integral part in reaching mission objectives. The possibility for contributing mechanical knowledge in the evolving gear development projects at the office is an exciting challenge as well.

Last updated: July 10, 2014



U.S. Fish & Wildlife Service

Fisheries, Midwest Region

Conserving America's Fisheries

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.



U.S. Fish & Wildlife Service Fisheries, Midwest Region

Conserving America's Fisheries

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