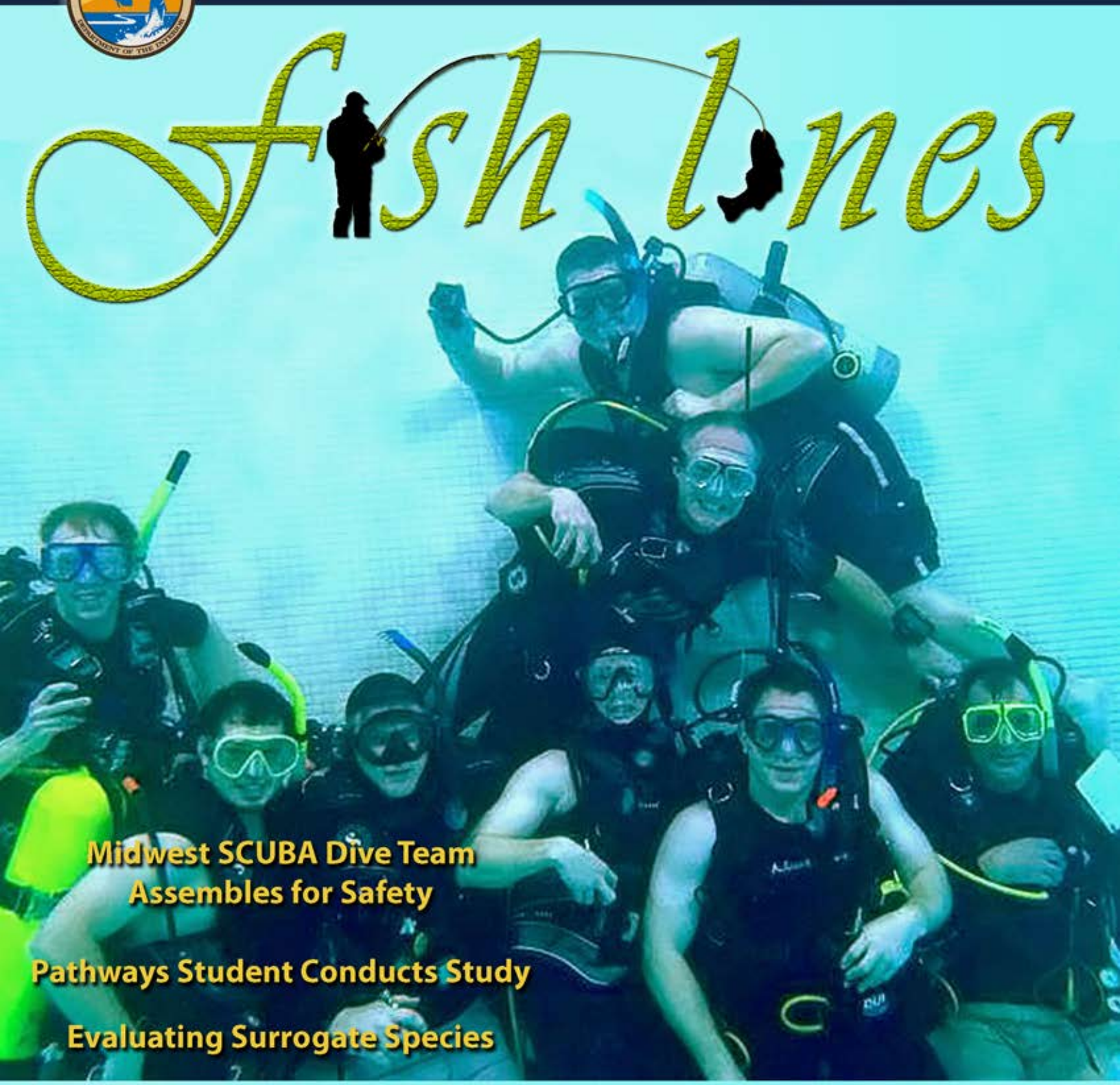
U.S. Fish & Wildlife Service - Midwest Region

Fisheries Program

Fish Lines



Midwest SCUBA Dive Team Assembles for Safety

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Conserving America's Fisheries
U.S. Fish & Wildlife Service

Region 3

SCUBA Dive Team Assembles for Safety

BY ANDREW BRIGGS, ALPENA FWCO-WATERFORD MI SUBSTATION

The USFWS Region 3 SCUBA dive team poses for a picture in the pool at Logan High School in La Crosse, Wisconsin. Credit: Andy Roberts, USFWS

Fish biologists Andrew Briggs and James Boase of the Alpena Fish and Wildlife Conservation Office (FWCO) – Waterford substation traveled to La Crosse, Wisconsin for a SCUBA meeting and training session with other members of the U.S. Fish and Wildlife Service (Service) Region 3 SCUBA dive team. The meeting and training session took place March 4th – 5th at the La Crosse Fish and Wildlife Conservation Office and Logan High School pool. The training is one of the requirements to become an authorized diver for the Region 3 SCUBA dive team and must be completed annually. James was attending to become reauthorized and Andrew to become authorized for the first time.

During the meeting, dive team members were able to introduce themselves and discuss their SCUBA plans for the upcoming field season. The Alpena FWCO dive team plans to utilize SCUBA to evaluate habitat enhancement projects throughout the St. Clair-Detroit River System. Dive team members were also able to convey their plans and any safety concerns that they had to Service safety specialist Janet Dalton. All members agreed that safety was the top priority while SCUBA diving in the field.

In the pool, each dive team member had to demonstrate a number of swimming and SCUBA skills. The swimming skills included being able to free swim (no gear) 400 yards continuously, swim 800 yards continuously with snorkel and fins, and tread water for 15 minutes (hands out of the water for the last two minutes). SCUBA skills included a 100 yard disabled diver tow, clearing a mask underwater, removing and replacing gear underwater, breathing from a free flowing regulator, buddy breathing, and buoyancy control.

The SCUBA meeting and training session offered a great opportunity for dive members to share stories and advice on SCUBA diving along with work on skills. One of the priorities of the Service is to maintain a well trained staff so that they can perform their required duties efficiently in a safe manner. This meeting and training session definitely aided in that goal.

Fish biologists Andrew Briggs and James Boase of the Alpena Fish and Wildlife Conservation Office – Waterford, MI-Substation prepare and inspect their SCUBA gear prior to a SCUBA training session at Logan High School in La Crosse, Wisconsin. Credit: Andy Roberts, USFWS

Pathways Student Conducts Spawning and Recruitment Study in Restored Wetlands

BY RACHEL VAN DAM, GREEN BAY FWCO

Spring means the beginning of the busy field season at the Green Bay Fish and Wildlife Conservation Office (FWCO). The field season is proving to be especially busy for several staff that are collecting data for their master's degree at University of Wisconsin-Green Bay. These two-year projects not only focus on issues of interest to the US Fish and Wildlife Service (Service), but also contribute to furthering the Service mission. One of the projects, conducted by Pathways student Rachel Van Dam, focuses on wetland restorations along the West shore of Green Bay. We are using northern pike (Esox lucius) as an indicator of success in restoring wetlands. The wetlands were constructed in areas of degraded or altered wetland habitat, with the intention of supporting spawning and recruitment of pike. This report details the methods and results of the study.

Female Northern pike captured in a fyke net,entering a restored wetland to spawn. Credit: Rachel Van Dam, USFWS

The project began in the spring of 2014 during the spawning run of the adult pike. To determine the success of these wetlands, fyke nets were set in each of three restored wetland areas to catch all incoming or outgoing adult pike. In 2015, a natural wetland site was also added to compare to the restored sites. The nets are checked daily. Each adult is tagged with a numbered, color-coded floy tag (pink for females, green for males) to determine entry and exit timing and whether the fish returns to one of the spawning wetlands the next year. Adults are also measured, and a fin clip is taken for genetic analysis. Within each wetland, the vegetation, water depth, and water temperature are characterized both across the wetland and at individual spots where adult pike are observed spawning. This will help to inform those constructing the wetland on areas where adult pike preferred, so similar areas can be included in future projects and possible unnecessary factors can be excluded.

Tagging a female pike with a numbered floy tag to track movements in and out of the wetland. Credit: Rachel Van Dam, USFWS

After the eggs hatch, light traps are placed throughout the wetlands. These determine where young-of-year pike congregate and will inform future projects. Box traps are placed downstream of each wetland entrance to capture larval pike as they migrated out of the wetland. The traps are checked daily, with up to 30 larval pike measured at each site, and a total count is obtained. Ten percent of the larvae are collected for genetic analysis and will also be used to determine parentage information. Ultimately, one goal of this project is to determine how many fish are using the wetlands and whether recruitment is comparable to natural sites, which are being studied by others at the University. The other main goal is to provide useful information to those constructing the wetlands so future projects can include necessary elements but exclude anything deemed unnecessary. This will provide fish with more quality areas to spawn and will contribute to overall population recruitment of both northern pike and other species.

Two male pike tagged with floy tags. Credit: Rachel Van Dam, USFWS

Other notable species have been seen using these wetlands to spawn, including banded killifish, bowfin, white sucker, shortnose gar, common carp, central mudminnow, sunfish species, and several minnow species, mostly shiners. This indicates that the restored wetlands benefit not only northern pike, but many other fish in the Green Bay system, contributing to the populations of the whole fishery.

Genoa National Fish Hatchery

Encouraging Results for a New Mussel Culture Strategy

BY NATHAN ECKERT, GENOA NFH

Sub-adult fatmucket mussels in a bucket chamber. All of the yellow margin on the animals is new growth during the 60 day study. Credit: USFWS

Recent changes in how we run the mussel cage culture operation at Genoa National Fish Hatchery (NFH) have dramatically increased the number of sub-adult mussels that need to be held in the lab over winter. Over the last two winters these sub-adult mussels have been placed in a flow through system that utilizes pond water from the hatchery. This system has been quite effective, yielding 90 – 95 % survival in animals from fall to spring distribution. The drawback to the system is that the animals will not grow in the cold winter temperatures, and the increase in numbers has us needing additional room.

This winter we initiated a trial using our mucket buckets, a recirculating downweller system that is normally used for new juveniles, to grow some of our smaller sub-adults to larger sizes and spread out the culture load. Both fatmucket and Higgins' eye were placed in a mucket bucket and both growth and survival were monitored. Seven hundred animals were stocked in the chambers (500 Higgins' eye, 200 fatmucket) at 100 animals per chamber. The 60 day experiment concluded at the end of February. For this initial trial sub-adult survival was acceptable, but lower than anticipated (Higgins' eye 85.4%, fatmucket 76.0%). Growth of individuals is where results were particularly interesting. Higgins' eye grew 51.1% while fatmucket grew 66.7%. These numbers are very promising considering the time of year and duration of the study. This short term study indicates that below average size sub-adult mussels can be caught up to the larger individuals in their cohort by utilizing this method over winter.

Additional trials are planned to determine optimal feed rates and temperatures in an effort to improve survival. By taking advantage of existing technology in new ways the mussel restoration program at Genoa NFH can continue to grow and expand.

Hine's Emerald Dragonfly
Evaluating Surrogate Species

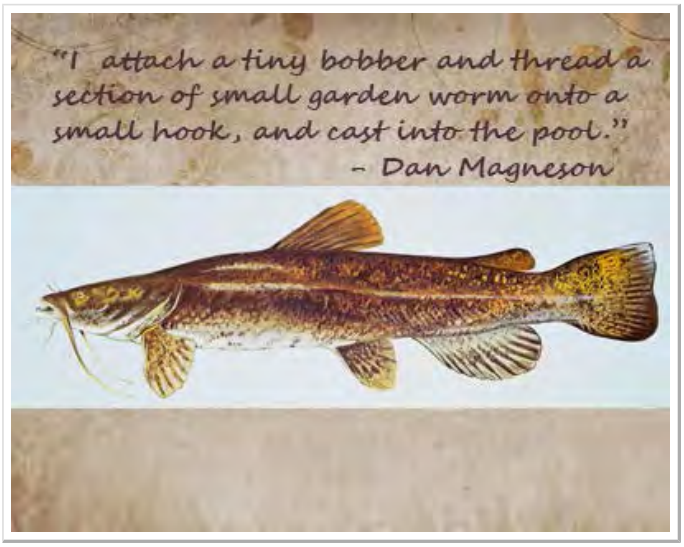
BY DARIN SIMPKINS, GREEN BAY FWCO

Hine's emerald dragonfly larvae. Credit: Cathy Carnes, USFWS

Experimentation is often necessary to determine if management actions have positive or negative impacts on a population of interest. Unfortunately, many of these populations for the US Fish and Wildlife Service are threatened or endangered, with few specimens available for experimentation. One solution to this conundrum is using surrogate species to approximate responses of an endangered species from those of similar, but more numerous species. Hine's emerald dragonfly (Somatochlora hineana) is an endangered species that occupies rare wetland habitats that frequently are invaded by reed canary grass (Phalaris arundinacea) and common reed (Phragmites australis). In an effort to control their spread, management actions often include spraying invasive plants with herbicides containing various mixtures of glyphosate. The effects of glyphosate on Hine's emerald dragonfly and other similar dragonflies are unknown. To determine if other species of dragonfly could serve as surrogates for evaluating the effects of herbicide treatment on Hine's emerald dragonfly, static acute toxicity tests for glyphosate were conducted using the larvae of four dragonfly species: Aeshna umbrosa, Boyeria vinosa, Epitheca princeps, and Somatochlora williamsoni. Results of these tests were then compared to those of two age classes of endangered Somatochlora hineana. Significant differences were observed in sensitivity among species and between the two age classes of S. hineana. Though younger larvae were more sensitive to glyphosate than older larvae, S. hineana were the least sensitive (i.e., most tolerant) dragonfly species evaluated. Results of this study suggest that a surrogate species approach may be possible to indirectly evaluate the effects of glyphosate-based herbicides on Hine's emerald dragonfly. For more information, contact University of South Dakota professor Dr. Jake Kerby at (605) 677-6170.

Fishing the Graveyard Shift

BY DAN MAGNESON, QUILCENE NATIONAL FISH HATCHERY



Fishing the Graveyard Shift

In the late spring of 2014, I visited family and friends in my native Iowa and spent some time trying to land a big flathead catfish from the West Nodaway River.

I knew I stood a better chance of success on one of the big border rivers like the Mississippi or Missouri, or at least one of the larger interior streams like the Iowa or Des Moines.

But the West Nodaway was the river of my youth, a river of memories close to both heart and home.

There is a little tributary creek with a series of slow pools just upstream of its mouth, and from which I hoped to first catch some green sunfish for bait.

The sun was dipping beneath the western horizon as I arrived with a little telescoping, ultralight rod and reel. The western sky was lavender with blushes of pink, and thin slate-blue clouds stretched through the scene.

I attach a tiny bobber and thread a section of small garden worm onto a small hook, and cast into the pool.

Across the river is a broad expanse of blondish, driftwood-strewn sand. A young couple is fishing over there, sitting close to a small campfire in the breezy evening, but even closer to each other.

I am reminded, and my thoughts wander to another time, another place, out on the Pacific coast, this one complete with salt air, the sounds of surf and the scream of seagulls. But it's a surprising-similar scene nonetheless. And I remember her sun-streaked hair, those hazel eyes, that golden-toasty tan…

The bobber bounces and dances, then submerges and begins to be pulled from sight, and soon I pull up a little green sunfish between four and five inches long. Perfect. I fish a little longer and catch a few more of equivalent size.

Darkness is falling by the time I rendezvous with a friend and his wife downstream. There is an amazing cottonwood overhead, not so much impressive for its size or girth as for the fact that it is still standing: the roots for several feet beneath the point where the base of the trunk and start of the roots would normally intersect are in contact with nothing but air. The high flood waters have washed away all the surrounding soil. The strong, raunchy odor of rotting fish emanates from the riprap behind us.

I have a stout rod and beefy baitcasting reel, and bait it up with one of the sunfish caught previously. My buddy and his wife are fishing for channel catfish with pieces of shad; despite the slow fishing, he remarks that he'd forgotten just how enjoyable fishing at the river really was. And he relates an observation made by an acquaintance who fishes the Missouri River, who had noted the most of flathead action seems to be centered at around 2 or 3 o'clock in the morning.

The hours pass and still I wait; when fishing with live bait between two-thirds to three-quarters the size of a dollar bill, it "high-grades" the potential takers, deliberately excluding the smaller specimens. And by doing this, the wait can be transformed into a very long one.

Shortly after 1:00 AM, my friends depart for home.

At 2:00 AM, I note that the couple across and up the river are gone. Their fire has died down to glowing embers, but an occasional burst of strong breeze fans it into ephemeral flame.

I'm all alone now.

A friend recently remarked, with a downcast face, that the worst part of being by yourself is that you are stuck with only your own thoughts for company. I guess that she must be quite the extrovert, because as a bona fide introvert I revel and even

wallow in such time.

Ultimately, I think the lure of the riverbank and this flathead fishing is that life slows down so much. It is so very simple, so basic and elemental, almost like a form of asceticism. Life is reduced to its simplest terms; except for its being strong and sturdy, you need little in the way of gear. But you do have to cultivate a lot in the way of patience. You can unburden and unclutter your mind and are freed to think long, mostly uninterrupted thoughts.

When the bite finally happens, you move from one pleasant state of being to another: from utter relaxation to alert, ardent anticipation.

"Flathead catfish" is the antonym for the word "hectic" and the antidote for its meaning.

Other than the chirp of crickets, there is only the sound of splashing fish periodically punctuating the night; when surrounded by so much quiet, it really startles you when it happens very close by.

I've seen no sign of the moon all night, but the constellation Cassiopeia is nearly facing me; I need only tilt my head just a bit left and upward. Craning my head further to the left and I see the Big Dipper. Both seem to be slowly rotating in a counter-clockwise direction around Polaris as the night wears on. Meanwhile, the Teapot rises from the southeastern sky, hugs the horizon, and begins a southwesterly nosedive.

Errant June bugs blunder clumsily into me from every so often, and there is a thick swarm of flying insects constantly orbiting the lantern light; when I lean in close in order to write in my journal, they begin to bounce off my face. One gnat gets run over by my ballpoint pen.

The lantern sits on a thin slab of wood directly atop the sand, and the harsh light projected from such a low angle onto the prowling spiders casts exaggerated, grotesque shadows across the sand beyond.

My stomach growls and my thoughts turn to food – and naturally, catfish as food.

No matter if I were fishing for flatheads way up north on the Minnesota River, catfish are forever fixed in my mind as being distinctly and deeply southern: I envision a heavy, humid haze hanging over fields of tobacco and cotton, the call of a bobwhite quail, a little wooden farmhouse, magnolias and mockingbirds in the yard.

There's a vine-covered porch and a swing within, a rickety screen door, the metallic stretch of a spring, the inevitable slap of wood.

Inside the kitchen, Mason jars line the pantry shelves, and the table is covered in red-and-white gingham.

Atop that table is a feast: hushpuppies, buttered cornbread, collard greens, grits, fried green tomatoes, black-eyed peas and mashed potatoes accompanied by thick gravy. Pecan pie for dessert and a squat, globular glass pitcher of cold buttermilk, beaded with condensation, with which to wash it all down. And on a big, oval platter in the center of it all, fried catfish…

My rod bounces so hard in its holder that it flips upside down.

Then the clicker on the reel makes a buzzing-sizzling sound as the line pays out. A tingly rushing-rising feeling progresses from the tops of my shoulders up into the sides and back of my neck, thence into my scalp
.
At 3:45 AM, I'm wide awake and fully focused on my fishing rod, the rest of the world falling away.
I rear back; the line goes taut as a banjo string, the drag moans, and the butt of the rod digs into the side of my belly.

The fish is finally coming within reach, the rod is bent over in nearly a half-circle when the pressure suddenly releases; the rod tip reverses direction and shoots upward in the direction of the tree tops. Standing with now-slack line I catch a glimpse of a shadowy apparition about 2 ½ - 3 feet long in the murky water. Then it fades back into deeper and darker water.

I quickly bait up and resume my vigil.

An 18-wheeler crosses the bridge downriver. The red and amber lights stun me with their vividly-intense color; it occurs to me that other than the few fireflies now abroad, the dying embers of that distant campfire and the pastel of the brownish-tan sand directly beneath the lantern, I've discerned very little in the way of color since nightfall. It's been a world of black, white and grays.

At 4:23 AM, I'm trying to decide whether the sky is becoming lighter. Then I notice the strong and steady light of Venus rising straight up from the eastern horizon and at 4:48 AM, the robins begin calling. By 5:06 AM I hear cardinals and killdeers; a great blue heron silently wings its way downriver over the opposite bank. It's time to gather my gear and pack it in.

I walk along the edge of a field of young corn and find my car soaked with dew; no wonder I feel so damp and clammy.

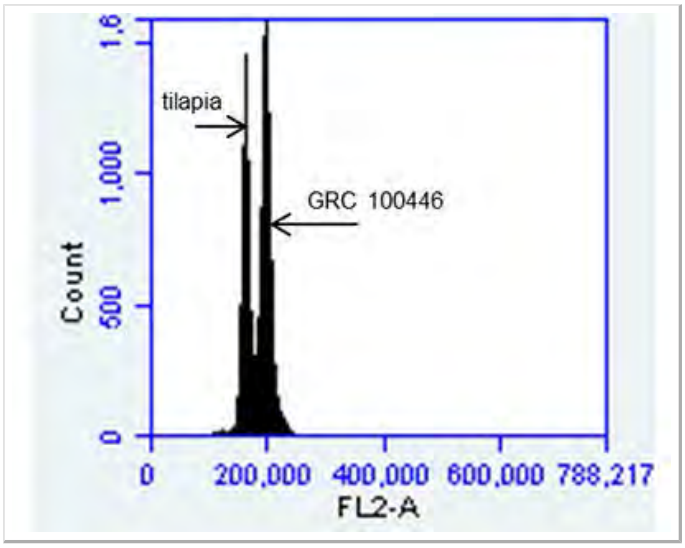
It occurs to me that the last time I spent the entire night down at the river was nearly 4 decades ago, back on my 17th birthday, and coincidentally, in almost the same exact spot.
I start the car and head for home, towards bed, with heavy eyelids but a light heart.
And despite the fatigue, I feel curiously younger.

La Crosse Fish Health Center

Applications of Flow Cytometry for Asian Carp Management, Endangered Mussel Culture, and Fish Health Research

BY JEN BAILEY, LA CROSSE FISH HEALTH CENTER

The La Crosse Fish Health Center (LFHC) is expanding the capacity of its current flow cytometry program, which currently provides DNA ploidy determination of wild-caught invasive Asian carps to resource managers for control of grass and black carp. Biologists at LFHC are accomplishing this by increasing partnerships and advancing flow cytometry techniques that may prevent more reproductive grass and black carp from entering public waters. In addition to augmenting the LFHC's current use of flow cytometry technology, biologists are exploring ways to use the laser technology to improve freshwater mussel culture techniques, which may aid in freshwater mussel recovery programs, and applying the technology to rapid response identification of challenges to fish health, both in culture and in the wild.



Histogram showing Grass carp tested for ploidy with tilapia blood as an internal control. Credit: USFWS

Flow cytometry is a technology that uses lasers and flourescence detection to examine multiple parameters of cells in solution. While this technology has been around for more than forty years, it has traditionally been used in human medicine for cell cycle analysis, cancer research, hematology and genetics. More recently, flow cytometry has been used to monitor phytoplankton populations in marine research, and only in recent years have conservation scientists begun developing methods to apply this technology to management of wildlife species.

Tilapia blood collection to be used in fish pathogen research. Credit: USFWS

Methods for flow cytometric analysis of wild caught grass and black carp were first developed by Dr. Jill Jenkins, microbiologist at the National Wetlands Research Center – U.S. Geological Survey (USGS) in 2004, when a fisheries management biologist brought samples from a free-ranging grass carp that had been captured in state waters. The reproductive status of the free-ranging fish was determined by Dr. Jenkins when she examined the nuclear DNA content of sample cells using flow cytometry. Cells of black and grass carp normally have two copies of each chromosome (diploid) in the nucleus. Diploid carp are capable of breeding when the fish reaches maturity, which can be undesirable if they are stocked into water bodies to be used as a biological control. Hatchery produced triploid fish eat and grow normally, but their reproductive cells contain three copies of each chromosome, making them unable to produce viable offspring. The difference between these two types of cells is detectable by the amount of flourescence and scattered light caused by cells as they pass through the cytometer detectors in solution. Once detected, data from thousands of cells is collected and interpreted by the analyst, and a definitive determination is provided to the resource manager. The concern for state biologists is that escaped, or free-ranging, diploid black or grass carp could have a negative impact on native fish and wildlife if successful reproduction occurs in the wild.

The analysis technique using flow cytometry was refined by Dr. Jenkins over the years through much work and collaboration of scientists at the NWRC lab at USGS, Private and University researchers as well as commercial triploid and diploid carp producers and the US Fish and Wildlife Service (FWS) Triploid Grass Carp Inspection and Certification

Tilapia are an integral part of the ploidy program. Credit: USFWS

Program. The Ploidy Analysis Program using flow cytometry was turned over to the USFWS in 2012, and was set up in the Whitney Genetics Lab just in time for the spring sampling season. Research and technical assistance continues under Dr. Jenkins leadership at the NWRC Laboratory in partnership with the program at FWS to adapt USGS-developed methods to fit the mission of the USFWS and to increase capabilities to perform fast and efficient ploidy analyses as demand and incidence of captured Asian carps continues to increase. Increasing demand is expected, as the attention of resource managers is shifting to include prevention of new introductions of reproductive grass carp in conjunction with control and eradication of previously introduced, reproductive populations.

The LFHC staff has been training on flow cytometry methods since transfer of the program from the Whitney Genetics Lab to the LFHC. The increased support will be a terrific boost to analysis capabilities during the busy spring months at LFHC. Ploidy samples are usually processed within 24 to 48 hours of receipt to ensure the highest DNA quality of sample data, so having an increased number of analysts capable of producing high quality results will be a help to colleagues and a help to the resource managers submitting samples and awaiting results. The expanded capabilities and location in the new lab has been met with enthusiasm as biologists begin to adapt flow cytometry methods to assist in problem solving in the Federal Hatchery System.

Grass carp samples used for ploidy determination.
Credit: USFWS

Staff at LFHC has recently teamed up with mussel biologists Jorge Buening and Nathan Eckert of Genoa National Fish Hatchery and fish biologist Mark Steingraeber of La Crosse Fish and Wildlife Conservation Office to examine juvenile freshwater mussel feeding rates in culture. Applications for detecting bacterial fish pathogens are being explored at the LFHC as well. The real time results that flow cytometry analysis provides could be a powerful tool if methods can be developed to produce test results for partners within hours of sampling sick fish. Combined with traditional methods for identifying fish pathogens in moribund fish, flow cytometry may also help provide rapid response answers to fish kills in the field. Advances in science are always important, and with the new addition of flow cytometry to the LFHC, some of those advances will help manage aquatic species right here in Region 3.

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.

On-line Great Lakes Stocking Database Updated

BY DALE HANSON, GREEN BAY FWCO

Dale Hanson, biologist at the Green Bay Fish & Wildlife Conservation Office (FWCO), recently worked with the Great Lakes Fishery Commission's web developer, Jeff McAuley, to update the Great Lakes Fishery Commission's fish stocking database with all reported fish stocking events that occurred in the Great Lakes during 2014. Hanson works with state, tribal, federal, and provincial agencies across the Great Lakes to report the number of fish stocked in a standard database. The database, available on-line at **http://www.glfc.org/fishstocking/** enables fish managers, researchers and the general public to determine the number of fish stocked by species, location, and date for each of the five Great Lakes. Users can also find information on tagged fish; tag numbers can be entered on-line and users can get information such as the strain of the fish, its original stocking location and the age of the fish. The database is generally updated with the previous year's stocking events by April 1st.

Report on the Progress of Lake Trout Rehabilitation in Lake Michigan

BY DALE HANSON, GREEN BAY FWCO

Green Bay FWCO biologist Dale Hanson and Chuck Madenjian (USGS Great Lakes Science Center) recently completed the annual report summarizing the progression of lake trout rehabilitation in Lake Michigan. This report is based on the consolidated data from spring and fall gillnet surveys completed by state, tribal, and federal agencies throughout Lake Michigan. Average catch rates, the proportion of wild origin lake trout, and the age structure of lake trout populations within each statistical district of Lake Michigan are highlighted in the report. Overall, lake trout abundance in spring surveys are below the benchmarks defined in the rehabilitation plan; however the fall spawner survey catch rates exceed the benchmarks in most locations of the lake with the exception of the Northern Refuge. Most importantly the surveys have shown consistent detection of unclipped "wild" lake trout in recent years. Wild fish accounted for up to 50% of the spawners caught in southern Lake Michigan waters and between 10-30% in the MidLake Refuge and waters along the western shore of Lake Michigan and Little Traverse Bay in northern Lake Michigan. This report was provided to the Great Lakes Fishery Commission's Lake Michigan meeting on March 25th in Ypsilanti, Michigan.

Fish Tower Renovations

BY BRANDON KESSLER, IRON RIVER NFH

This winter at the Iron River National Fish Hatchery we renovated one of our fish towers. The fish tower uses a pump to move fish from the raceways into the tanks on the truck. Fish leave the dewatering tower via a short or long pipe and gently slide into the tanks. We measure the amount of fish we are loading by using volumetric displacement. We currently raise about 1.3 million lake trout which are stocked into Lake Huron and Lake Michigan. The purpose of the renovation was to make fish loading safer, quicker and easier, and to reduce the stress on the fish. The first problem we sought to overcome was the need for a long loading pipe which can cause stress on the fish and is heavy for the staff to lift onto the trucks. Due to space limitations, the tower needed to be located between the raceways. In this position, the trucks can only back up to the tower instead of pulling up alongside it. We remedied this by creating a platform that bolts onto the tower. The tower can be lifted with a forklift and placed on top of the raceway, clearing space for a truck to park alongside it. The modification will eliminate the need for moving trucks during loading, and get trucks on the road faster. Second, we wanted to make attaching and handing of hoses easier, to speed up moving from one location to another. This was accomplished by making the water discharge tube permanent and free moving so when the tower is raised and lowered the hose does not need to be moved or detached. The loading tube was modified by attaching a permanent section of tube to the tower, creating a lower more manageable connection point for the pump hose. This improvement eliminated the need to have a 30 foot stiff hose to move from raceway to raceway. It will also increase safety because the old hose was heavy and cumbersome, and when flexed it could straighten and push people off raceway walls. These two renovations will make fish loading smoother, faster, and safer. All of this will lead to happier and healthier fish upon arrival at their stocking locations.

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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