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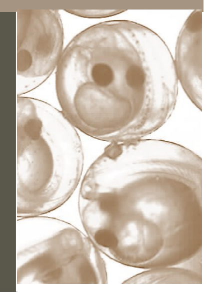
Iowa Chapter of the American Fisheries Society

Lateral Lines



current topics >>>

2015 Iowa AFS Election

President-elect & secretary/treasurer

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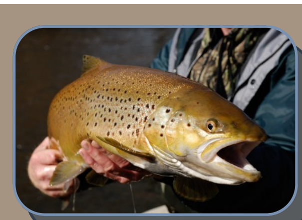

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To improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science and promoting the development of fisheries professionals.

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President's Corner

D. Allen Pattillo

Hello and greetings from Ames. Hard to believe it has been a year already, but this will be my final president's corner. It has been a pleasure serving as your president for the Iowa AFS. Thank you all for your support and please join me in welcoming Lewis Bruce as the new president for the 2015-2016 term. I would also like to thank Ben Wallace and Dan Rosauer for fulfilling their integral roles in the Executive Committee. I look forward to our new leadership stepping into their new roles and moving the Iowa AFS forward.

I am heading to Portland, OR for the 145th Annual Meeting of the American Fisheries Society to represent the Iowa Chapter. This will be a great opportunity to learn about the status of fisheries in North America and how we can apply some of the research knowledge to the great state of Iowa.

In other news, this year's continuing education program entitled "Fish Population Analysis and Simulation with FAMS" was taught by Dr. Clay Pierce on July 22nd and 23rd. The 2-day workshop covered basic principles in the Fishery Analysis and Modeling Simulator (FAMS) program. If you were unable to attend and would like some information please contact Dr. Pierce at 515-294-3159 or cpierce@iastate.edu. Dr. Pierce is looking for input for upcoming programs, please contact him with suggestions.

Additionally, one of our members, Rebecca Krogman, has taken the chairperson role in the Electronic Services Advisory Board with the AFS. As such, she has been tasked with updating the American Fisheries Society Website. She recently sent out a survey request for input and it looks great!

I am looking forward to my new role as Past President, and I know Lewis will do an outstanding job as President.

All the Best,

2014 President Elect: Jeff Kopaska

I am a graduate of Iowa State University, and I am currently a biometrician in fisheries research for the Iowa Department of Natural Resources. I have been very involved in the American Fisheries Society (AFS); I am a past President of AFS-Fisheries Information and Technology Section, and previously served as the Chair of AFS-Electronic Services Advisory Board. I have also worked extensively with Clay Pierce on many of our Iowa Chapter continuing education courses. I serve as the Iowa representative to MARIS (Multi-state Aquatic Resources Information System), and on the Science and Data Committee of the National Fish Habitat Partnership. As an employee of Iowa DNR Fisheries, my areas of responsibility include overseeing most technology-related efforts we undertake. I look forward to the opportunity to potentially serve you as President of the Iowa Chapter of the American Fisheries Society. As president, I would work to update the Chapter by-laws, an effort that was identified as necessary during our 2015 chapter meeting. I also have some ideas for new continuing education opportunities for our members.

2014 Iowa AFS Treasurer: Ryan Hupfeld

My appreciation for natural resources became apparent early in life with family outings of fishing, hunting, and just enjoying the outdoors while working on a small family farm in Iowa. I realized that I could have a career that I could enjoy as well as contribute in protecting and enhancing our natural resources in order for other people to enjoy as much as I do. As such, I began working summer positions for the Iowa Department of Natural Resources while completing an Associates of Arts and Science Degree in Natural Resources Management at Hawkeye Community College. I then transferred to Upper Iowa University and finished my Bachelor's of Science Degree in Conservation Management, also while working summer positions for the Iowa Department of Natural Resources. Following my undergraduate education, I attended graduate school at Southeast Missouri State University and graduated with my Master's of Natural Science degree in Biology. While attending school, I also worked for the Long Term Resource Monitoring Program for the Missouri Department of Conservation at the Big Rivers and Wetlands Field Station. During my time in Missouri, my research mainly focused on Paddlefish and Sturgeon management, along with a host of other research projects including work on Asian Carp, White Bass, Channel Catfish, Blue Catfish, American Eel, etc. Following my education and employment in Missouri, I worked for the Minnesota Department of Natural Resources working on a project to develop a potential tool for monitoring Cisco populations in inland lakes. Most recently, I obtained a position with the Iowa Department of Natural Resources at Lake Rathbun Fish Hatchery producing Walleye, Channel Catfish, Hybrid Striped Bass, as well as any other species requested.

I am currently a member of the Parent Chapter of the American Fisheries Society, Student Subsection of the Education Section, Fish Management Section, Fish Habitat Section, Fisheries Information and Technology Section, and the Iowa Chapter. I am also currently a committee member on the Young Professional Committee of the Fish Management Section, as well part of the Foundation Committee of the North American Sturgeon and Paddlefish Student Subunit. Previously, I was the vice president for Southeast Missouri State University Student Subunit. I have been a member of the American Fisheries Society since 2010 and would like to continue to be a contributing member of this important organization. As a fisheries employee with just over one year of full-time experience, I understand the importance of this position and would be honored to able to continue to be actively involved in the Iowa Chapter of the American Fisheries Society.

Rotenone Application in Iowa's public waters

Mark Flammang, Fish Management Biologist ~ Iowa DNR

Rotenone is an organic pesticide that occurs naturally in the seeds, stems, and roots of several legumes and has been used by indigenous peoples for centuries as a means of capturing fish for consumption (while interestingly enough, label requirements preclude the consumption of these fish today). It's been used as an insecticide to treat scabies, head lice, and a host of garden pests. As a piscicide, it's been used in North America since the 30's.

In 2007 EPA issued a Reregistration Eligibility Decision that maintained rotenone as a tool available for the renovation of fish populations. However, as a condition of this reregistration EPA requested a manual to provide guidance on the new, relatively complex label. The Rotenone SOP Manual (Planning and Standard Operating Procedures For the Use of Rotenone in Fish Management) provides important information that supplements the label and should be utilized by all persons planning and executing rotenone treatments.

Recently 17 Iowa DNR Fisheries Bureau employees attended a four-day training session at the Rathbun Fish Hatchery. The course was developed by the American Fisheries Society and concentrated on many aspects of rotenone use, including application techniques, personal protective equipment (PPE), and label requirements.

The Iowa DNR is known to AFS to be a very active user of rotenone. In fact, while some states have utilized rotenone on very large projects, exceeding anything ever attempted in Iowa, we remain one of the most proactive users of this important tool. Our progressive approach to Lake Restoration and managing unbalanced fish populations makes the IDNR Fisheries Bureau a recognized leader in application expertise.

Despite that level of expertise, one of the important lessons learned by those participating in the course was the need for bioassays to determined treatment concentrations. While the label limits the application of 5% rotenone formulation to 4.0 ppm, the bioassay is designed to determine if lower dosages might be practical on a regional or single lake basis.

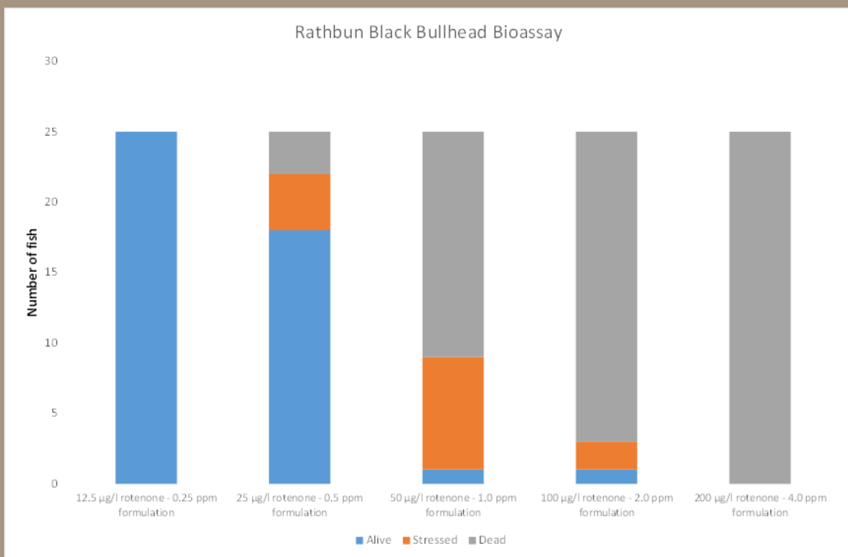
An important consideration in rotenone applications is that dissolved electrolytes, aquatic plants, and dissolved and suspended organic matter positively impact the quantity of rotenone needed to achieve complete fish mortality. Iowa is known for the highly organic quality of its waters, and thus rotenone renovations require higher rotenone concentrations to achieve project goals.

As a preliminary effort toward identifying required rotenone concentrations for the renovation of Iowa lakes and ponds, a bioassay was performed at the Rathbun Fish Culture Research Facility. We utilized 5 2,250 gallon raceways stocked with Black Bullheads. Black Bullheads are the preferred bioassay species for Iowa given their ubiquitous nature, their high tolerance to rotenone treatment, and the fact that they are typically a target species in Iowa systems.

As described by the Rotenone SOP Manual, the target rotenone concentration for any lake or pond renovation will be at least twice the Minimum Effective Dosage (MED; 100% target fish mortality), up to the maximum labeled application rate of 4.0 ppm.

We recognize that Iowa waters are inherently organic in nature; however, for purposes of this evaluation we utilized water from the Rathbun Fish Culture Research Facility which was filtered to approximately 20 microns, thus eliminating most suspended organics. Thus, the water used in this treatment would be low in organics, compared to many other water bodies. This action would theoretically reduce the rotenone concentration required for complete removal of Black Bullhead.

The graph below demonstrates that the minimum effective dosage for Black Bullhead in filtered Rathbun water was 4.0 ppm. Typically this would be multiplied by at least a factor of two, thus indicating a concentration of 8.0 ppm could be utilized. However, without a SLN 24(C) Special Needs Designation from the EPA, we would be limited to the maximum labeled dosage of 4.0 ppm. Interestingly, most treatments in Iowa have typically targeted 3.0 to 4.0 ppm, thus suggesting our proven track record has laboratory support .



Determination of minimum effective dose (MED) for Black Bullhead in the Rathbun Fish Culture Research Facility.

While additional bioassays may be performed, the reduced organic nature of the water used in this evaluation, and the high concentration of rotenone required in reaching the desired goal of Black Bullhead elimination, it is unlikely that most Iowa water bodies would require less rotenone for complete fish renovations.

In the end, while some additional requirements have been established for the use of rotenone, there is every indication that this important tool will be available to fishery managers into the foreseeable future.

SPIRIT LAKE'S DOC

Jim Wahl, Fish Management Supervisor~ Iowa DNR

My story is not unique. It's about a father and son who share something special -- the sport of fishing.

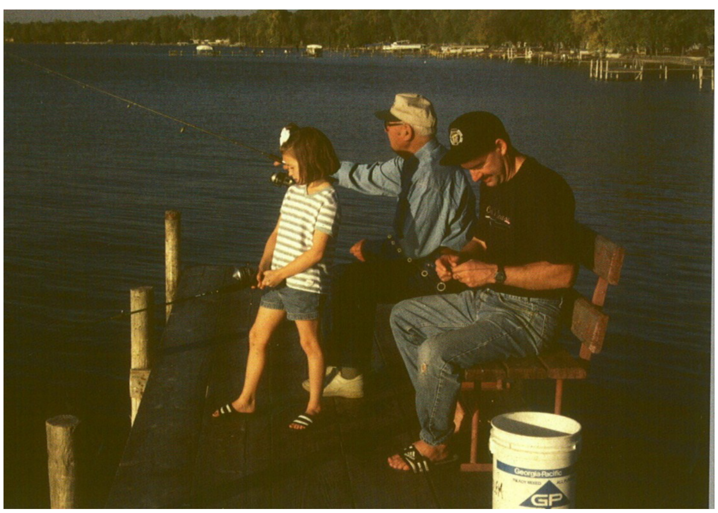
Most of us have a mentor. Someone who introduced us to fishing. It doesn't have to be a father. It could be a mother, uncle, brother, or sister. For me it was my dad – Doc.

I grew up in a small town in northwest Iowa. The only nearby water was Otter Creek and the local sandpit. You could catch creek chubs in the creek or an occasional bass in the pit, but if you really wanted to fish you'd travel to the Iowa Great Lakes – a 45 minute drive, or if dad was in a hurry – 30 minutes!

Doc was a large animal veterinarian and he spent most of his time pulling calves and vaccinating pigs. If he wasn't out to a nearby farm, he was in the area on call. On Saturdays he worked the sale barn. Rarely did he have any time off, but when he did he was usually fishing.

That's where it all started for me. I'm not exactly sure at what age, but I know I was young – grade school. We'd hook up to Dad's 1960 vintage Alumacraft boat and trailer and head for Spirit Lake. Often my brother would be along, and occasionally my older sisters. This wasn't just a brief afternoon trip on the water. This was an all-dayer. Doc got away so little, that he wanted to make the most of it when he did.

Once on the water I'd last for a while, usually longer than my brother, but let's face it patience isn't a strong suit for most grade schoolers. If there was a lull in the action, Doc would take us to shore and we'd spend the rest of the day exploring the wooded shoreline of Marble Beach on Spirit Lake.



By today's standards Doc violated the cardinal rule when taking a youngster fishing – (1) don't stay too long, and (2) fish for something easy to catch. We always stayed long, and we usually fished for walleyes – they weren't exactly jumping in the boat. When quitting time approached, I can remember praying that Doc wouldn't get another bite, because if he did it meant another 30 minutes. If he caught another fish – at least another hour! He never told mom when we'd be home, now I understand why!

Despite these all-dayers and some serious boredom in the boat my passion for fishing grew even stronger. Years went by and things didn't change, the fishing trips to Spirit Lake continued, but were all too infrequent.

Then one day things changed dramatically. Doc announced that he and his vet partner had bought a cottage on Spirit Lake. Maybe all those long hours and late night calls had paid off for the Doc after all. Eureka! Now I could fish all the time and if I got bored there'd be TV and pop waiting at the cottage. But it wasn't all that easy. Another tough decision had to be made. Do I give up summer league baseball for fishing all summer on Spirit Lake? I couldn't do both. Now I was no Kirby Puckett, but I was a pretty darn good baseball player. I chose fishing.

I spent my youth fishing on Spirit Lake, sometimes by myself, other times with friends, but mostly with Doc. Doc would guide and I would ride. The challenge of catching fish was always our goal, but there was more to a trip than catching fish. When you're in a boat on a 6,000 acre lake, there's plenty of time for conversation. We'd talk about fishing, or school, or the football team. It didn't matter what the subject was we were talking and enjoying each others company.

I didn't realize it then, but during those years Doc was also steering me towards my life-long profession. I had an aptitude for science and a love of the outdoors. So Doc suggested I go to college and study fisheries biology. After I graduated, I worked in South Dakota, New York, and Utah. All the time Doc followed my developing career with the keenest interest.

Several years into my career I got an opportunity to come back to Iowa. By this time Doc had retired and took up permanent residence on the north shore of Spirit Lake. Now the tables were turned, I had to work for a living, and Doc had all the time in the world to fish. Despite work, there was always time to fish and now I lived only two hours away in Clear Lake. The same spots that produced limits in the 60's were still good in the 1980's. The only difference was now I wanted to fish all day and Doc wanted to go to shore. I guess when you can fish every day there's no longer the urgency to be on the water for every waking minute of the day.

There were other differences. Instead of being satisfied to sit in the front of the boat, now I wanted to guide. And how about catch-and-release? I have a difficult time observing someone harvest an 18-inch smallmouth bass, even though the legal length is 15 inches. Have you ever tried to convince someone who grew up through the Depression to release a perfectly good eating fish? Well it's not easy and it took a while with Doc, but now he proudly releases legal-size bass. However he does draw the line when it comes to walleye – if it's legal – it's going in the basket! That's okay. I like to eat fish as much as anyone.

Another thing I always admired about Doc was his willingness to share his knowledge and good fortune with others. Maybe he likes to brag too much (all anglers are guilty of it sometimes), but usually he just wants others to enjoy and catch fish too. So you won't see Doc secretly guarding a honey hole. In fact, quite the contrary, he'll direct you in on a spot utilizing landmarks with the same precision that the finest GPS units can.

So where does this all lead. Well Doc and I still fish together. Sometimes on Clear Lake, but mostly on Spirit Lake. Through all these years the goal hasn't changed. We're still trying to catch fish. But that's not everything. Sometimes the fishing is great, but the catching is poor. The important part is a common interest that allows time for a parent and child to share time together.

Now I have two children of my own. Maybe someday my son or daughter will have to choose between baseball/softball and fishing. I hope not, but I do know in my case I made the right decision.

– Doc is now deceased. He died in 2004. Jim's children are grown, but Doc's legacy lives on. His grandchildren, Andy and Maria, visit Clear Lake often to fish with their Dad.

Urban Pond Renovation: A Review of Mixed Results at For Des Moines, Iowa

Steve Konrady and Ben Dodd, Fish Management ~ Iowa DNR

Fort Des Moines Pond is a 14 acre water body located on the south side of Des Moines in Polk County. This urban park is managed by the Polk County Conservation Board (PCCB) and the lake is managed by local Iowa Department of Natural Resources (IDNR) Fisheries staff. Fort Des Moines Pond has been considered a priority urban fishery by IDNR staff and it was identified as the top priority urban site in Central Iowa by a recent study at Iowa State University (ISU). Its "steep and deep" basin shape, relatively small watershed, and baseline water quality all led to this ranking. The fishery is also close to home for many Des Moines residents.

Post-renovation Fort Des Moines Pond. Secchi disk depths over 5 meters have been observed following carp removal and sediment stabilization.

The watershed of Fort Des Moines Pond is developed with impervious surfaces, an 18-hole golf course, and fertilized lawns. Storm water was shown to enter the pond rapidly, causing significant gully erosion in the tributaries. This and the high abundance of rooting feeders such as common carp and grass carp led to periodic algae blooms, including blue-green algae, that occasionally triggered oxygen sag and summer fish kills. Additionally, development and construction in the watershed, historic uses of the area as a landfill for the original fort, and shoreline erosion led to significant sedimentation and loss of depth. With passage of the Polk County Water and Land Legacy Bond in 2012, the PCCB were able to draft and fund a master plan for the improvement of Fort Des Moines Park and Pond. This plan was implemented in 2013 with funding assistance from the IDNR's urban fisheries fund and technical guidance from IDNR, ISU, and Polk County Soil and Water Conservation District staff.

Completed rock check and stabilized tributary in Fort Des Moines Park.

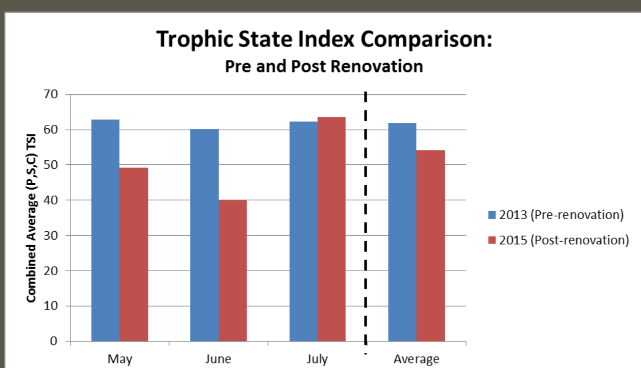
The master plan incorporated watershed and in-lake improvements to increase water and fisheries quality. The lake was drained in 2013 to allow for a dry dredging process to take place. This draining also allowed for a complete fishery renovation to remove carp species. Watershed improvements included the installation of rock checks, grade stabilization features, and a wetland structure. Fish habitat structures, shoreline stabilization, sediment retention dikes, and a rebuilt outlet structure rounded out the in-lake work. Additional amenities and access improvements such as a new access road with parking lot, handicap fishing pier, canoe/kayak ramp, and new restrooms were also installed.

In-lake habitat structure installation and dry dredging efforts at Fort Des Moines Pond.

Watershed grade stabilization and rock check installation at Fort Des Moines Park. Prior to renovation, gully erosion was common and severe in the watershed due to fast moving storm flow off the highly developed watershed.

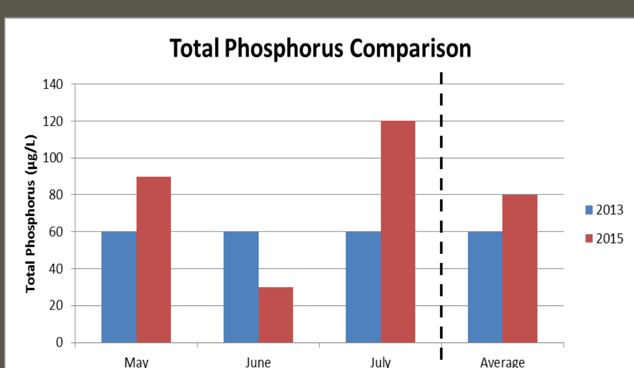
Grass carp removed from Fort Des Moines Pond during renovation. Grass carp and common carp were the primary nuisance species at the site, and were removed during a renovation in 2013.

As part of pre-renovation, water quality data was tabulated from lab analyzed samples in 2013. Continued monitoring is in progress to assess post-renovation improvements and effectiveness of installed treatments. Improvements to nutrient concentrations, water clarity, and trophic state index (Carlson Index) were observed in May and June of 2015 (Carlson 1977). Unfortunately, a July sample indicated a rebound and overall increase of total phosphorus. This led to a subsequent rise in chlorophyll-a and a corresponding blue-green algae bloom. In contrast, impressive gains in water clarity can be observed as a result of carp removal and other sediment stabilization improvements.

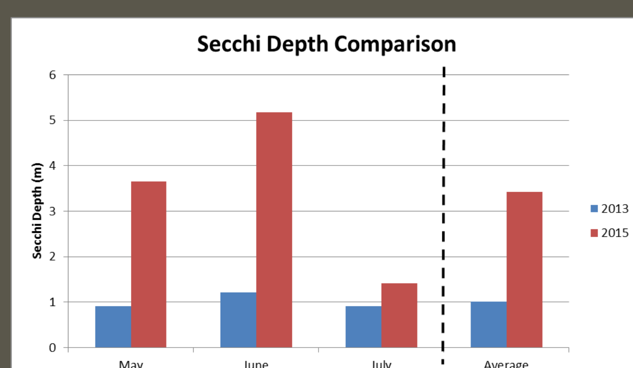


Results of the combined Carlson Trophic State Index comparison between pre- and post-renovation Fort Des Moines Pond. Carlson's Index combines total phosphorus, secchi disk, and chlorophyll-a data into a single, standardized index statistic for comparison between sites and samples.

Blue-green algae bloom at Fort Des Moines Pond. These blooms remain a periodic occurrence at the site, indicating a continuing nutrient problem.



Total phosphorus concentrations (in micrograms per liter) at Fort Des Moines Pond pre- and post-renovation.



Secchi disk depth comparison between pre- and post-renovation samples at Fort Des Moines Pond.

Despite the recent disappointment with the post-renovation algae blooms, angling has been very popular at Fort Des Moines Pond. The stocking regime involved adult and fingerling largemouth bass (1.5/ac and 75/ac) and fingerling bluegill (145/ac) in the first year post-renovation. Adult crappie and channel catfish fingerlings will be stocked in year two. Young-of-the-year large-mouth bass in high abundance were observed in year two and bluegill growth rates were exceptional; reaching 6 inches after the first growing season and approaching 8 inches mid-way through the second. Continued monitoring of water quality in August and September will provide additional data for evaluating renovation impacts. IDNR staff will continue to monitor the fishery, vegetation, and basic water parameters (e.g., secchi disk depth, DO/Temp profile). Potential solutions to remedy the new-found nutrient issue will also be explored.

Post-renovation year two crappie stocking at Fort Des Moines Pond.

Carlson, R.E. 1977. A trophic state index for lakes. Limnology and Oceanography 22(2):361-369.

Post-renovation Fort Des Moines Pond. Secchi disk depths over 5 meters have been observed following carp removal and sediment stabilization.

Standardization of Fish Name Abbreviations: Why We Should Bother and How It Can Be Done

Rebecca M. Krogman, Large Reservoirs Research Biologist ~ Iowa DNR

Have you ever been in the field collecting data, and didn't know the abbreviation for a fish species name? Have you experienced different abbreviation systems while working for the Iowa DNR, the USGS Long Term Research and Monitoring crew, or Iowa State University? Have you ever abbreviated a name for the sake of brevity in writing a report? Fish name abbreviations are a convenient method for making our jobs as fisheries biologists more efficient. An abbreviation like "LMB" saves time in the field and space on paper.

But how do we know we're all speaking the same language?

Fish name abbreviation systems exist across North America, having been developed independently by state, federal, academic and non-profit agencies. Most systems were developed locally and apply to a specific program (for example, sportfish management teams); their scope is thereby geographically and systematically limited. Although we Iowegians (specifically DNR Fisheries) have a very useful standard abbreviation system based on common names, imagine the confusion someone from Illinois, Wisconsin, or Arkansas might have trying to interpret our data without help. The variety of abbreviations used for the same species, even very common species, hinders communication between agencies (e.g., Common Carp *Cyprinus carpio* = CARP in Pennsylvania and for U.S. Geological Survey, CRP in Iowa, CAP in Illinois, COCA in Florida, CP in North Carolina and California; BC = Black Crappie *Pomoxis nigromaculatus* or Blue Catfish *Ictalurus furcatus* depending on where you are). Or, imagine how a monitoring team might record data, encountering thirty or more species on a regular basis. Some of these species are uncommon except in high-quality streams, and we may not have a designated abbreviation for them. Imagine working on a climate project that spans state or even national boundaries, or perhaps compiling a large database like MARIS (Multistate Aquatic Resources Information System) or USGS BioData (https://aquatic.biodata.usgs.gov/landing.action).

The point is, our challenges are getting bigger, and our world is getting smaller. Think beyond our state boundaries and consider what it will take to communicate with another Bureau, another agency, another state or another country. We will be sharing data. We will be investing in "big data." We will be communicating data to a large, geographically-widespread audience. This kind of data sharing necessitates standardization. Standard fish name abbreviations are only a part of that standardization, but they are important nonetheless.

Why Not Use Common Names?

Common names are popular for abbreviation systems, partly because they are fairly easy to remember but also because they can be more stable over time than scientific names. (For example, Walleye were recently reclassified from genus *Stizostedion* to *Sander*.) However, common names can actually be less intuitive, especially on a continental scale. Consider the following points:

- The spatial scope of the standardized system is very large, spanning from areas where English is dominant to areas where French or Spanish is dominant. Not everyone calls *Micropterus* spp. a black bass.
- Even in the U.S. common names differ and can be easily misinterpreted. "Perch" may refer to species in the *Morone*, *Pomoxis*, *Aplodinotus*, and *Perca* genera. And what exactly is a "bream"? Does it include *Ambloplites* or *Archoplites* sunfishes?
- Common names range from one to four words, plus compound words (e.g., "Bluegill," "Bluntnose") and hyphenated words (e.g., "Two-wing"). How would you encapsulate this diversity in three or four letters, using a consistent and unambiguous rule set for almost 4,000 species?

These points resulted in the choice to use scientific names. They are the most unambiguous reference to taxon identification and use a language common to all of North America.

How It Can Be Done

All known fish species in the continental United States (including Alaska), Canada, and Mexico can be abbreviated using a simple system based on scientific name and date of taxonomic description. Fish species names should be abbreviated by concatenating the first two letters of the genus name and the first two letters of the species name, yielding a four-letter code. In the case of duplicate four-letter codes, a tie-breaking number is assigned in chronological order of their first description, with the first species described retaining the simpler four-letter code. Fish genus names (e.g., unidentified *Lepomis* or *Ictiobus*) should be abbreviated by writing the first five letters of the genus name and applying a tie-breaking number if necessary. Fish family names (e.g., unidentified catfish Ictaluridae) should be abbreviated by writing the first six letters of the family name and applying a tie-breaking number if necessary. Additional rules have been proposed for naming subspecies, hybrids, new species, and reclassified species. The complete ruleset is included in a peer-reviewed manuscript which will be published soon in Fisheries Magazine.

The ruleset was applied to all fish, cephalochordate and craniate species listed in the American Fisheries Society's seventh edition of "Common and Scientific Names of Fisheries from the United States, Canada, and Mexico" (Page et al. 2013). Abbreviations were established for all 3,875 species, as well as for their 1,134 genus and 260 family names (Table 1). A few minor oddities were created by the ruleset (e.g., genus *Amia* being only four letters long) and were adjusted to eliminate confusion between species, genus and family codes; these changes are discussed in the manuscript.

Table 1. Number of abbreviations developed for North American fish taxa, including the number of abbreviations with duplicate codes and assigned tie-breaking numbers.

Taxonomic Level	Total Number	Abbreviations with Duplicate Alphabetic Codes	Abbreviations Assigned a Tie-Breaking Number
Species	3,875	1,442	844
Genus	1,134	416	267
Family	260	20	10

In Iowa, 184 taxa with common name-based abbreviations were assigned a code according to the ruleset (Table 2; end of article). Generally, most taxa did not require a tie-breaking number and are simply 4-letter codes. Genera (e.g., black basses or unidentified *Micropterus*) and families (e.g., unidentified Ictaluridae catfish) were assigned 5-letter and 6-letter codes, respectively. Hybrids were named with both species codes separated by a multiplication sign. One subspecies was identified for demonstration purposes (i.e., Northern Logperch *Percina caprodes semifasciata*).

Hmm...Not Sure If I Like It...

The standard abbreviation system presented here yields numerous benefits but also some challenges. Oftentimes the biggest obstacle is overcoming convention and adopting new practices, especially within state agencies with established programs. Their respective abbreviation systems permeate databases, spreadsheets and reports. Iowa DNR, specifically, is ahead of the game in terms of establishing a statewide abbreviation system based on common names, so the system presented here is simply another progressive step forward. Consider this food for thought as we move toward "bigger data," more data sharing with our partners and colleagues, and more streamlined data collection techniques. The benefits are numerous, including but not limited to:

- Inclusion of all North American species, including marine, euryhaline, and freshwater species, regardless of how common or uncommon they are
- Designated rules for flexibly dealing with subspecies, hybrids, unidentified taxa, new species descriptions, and taxonomic reclassifications
- Improved integrity of data shared between a funding agency (e.g., DNR) and its contractor (e.g., Iowa State University)
- Improved integrity of data shared between collaborating agencies and programs
- Improved reliability and reduced labor for compiling "big data" projects like MARIS
- Reduced employee training, when an employee worked for another agency with the same standardized system
- Reduced "guessing" in the field if an abbreviation is unknown
- Rapid data recording and data entry
- Clear differentiation among different taxonomic levels due to a differing number of letters in their codes
- Ease of memorization and hierarchical data organization, since fish in the same genus will always share the same first two letters of their codes
- More efficient writing in text, tables and figures
- Availability online through the American Fisheries Society (coming soon)

Publication of the North American standard fish name abbreviation system is forthcoming. Please direct any questions or comments to Rebecca Krogman at rebecca.krogman@dnr.iowa.gov.

Page, L. M., H. Espinosa-Pérez, L. T. Findley, R. N. Lea, N. E. Mandrak, R. L. Mayden, and J. S. Nelson. 2013. Common and scientific names of fishes from the United States, Canada, and Mexico, 7th Edition. American Fisheries Society, Special Publication 34, Bethesda, Maryland.

Table 2. Standard Abbreviations for selected Iowa fish taxa.

Taxon	Common Name	Abbreviation	Authority
Acipenseridae	Sturgeons	ACIPEN	
Scaphirhynchus platorynchus	Shovelnose Sturgeon	SCPL1	Rafinesque 1820
Catostomidae	Suckers	CATOST	
Catostomus commersonii	White Sucker	CACO	Lacepède 1803
Hypentelium nigricans	Northern Hog Sucker	HYNI	Lesueur 1817
Ictiobus bubalus	Smallmouth Buffalo	ICBU	Rafinesque 1818
Ictiobus cyprinellus	Bigmouth Buffalo	ICCY	Valenciennes 1844
Centrarchidae	Sunfishes	CENTRA	
Lepomis spp.	Unidentified *Lepomis*	LEPOM	
Lepomis cyanellus	Green Sunfish	LECY	Rafinesque 1819
Lepomis macrochirus	Bluegill	LEMA	Rafinesque 1819
Lepomis microlophus	Redear Sunfish	LEMI	Gunther 1859
Micropterus dolomieu	Smallmouth Bass	MIDO	Lacepède 1802
Micropterus salmoides	Largemouth Bass	MISA	Lacepède 1802
Pomoxis annularis	White Crappie	POAN	Rafinesque 1818
Pomoxis nigromaculatus	Black Crappie	PONI	Lesueur 1829
Clupeidae	Herrings	CLUPEI	
Dorosoma cepedianum	Gizzard Shad	DOCE	Lesueur 1818
Cyprinidae	Minnows	CYPRIN	
Campostoma anomalum	Central Stoneroller	CAAN	Rafinesque 1820
Cyprinus carpio	Common Carp	CYCA	Linnaeus 1758
Luxilus cornutus	Common Shiner	LUCO	Mitchill 1817
Pimephales promelas	Fathead Minnow	PIPR	Rafinesque 1820
Semotilus atromaculatus	Creek Chub	SEAT	Mitchill 1818
Esocidae	Pikes and mudminnows	ESOCID	
Esox lucius	Northern Pike	ESLU	Linneaus 1758
Esox masquinongy	Muskellunge	ESMA	Mitchill 1824
Esox lucius × *E. masquinongy*	Tiger Muskellunge	ESLU×ESMA (unknown parentage)	
Ictaluridae	North American catfishes	ICTALU	
Ameiurus melas	Black Bullhead	AMME	Rafinesque 1820
Ictalurus punctatus	Channel Catfish	ICPU	Rafinesque 1818
Ictalurus furcatus	Blue Catfish	ICFU	Lesueur 1840
Pylodictis olivaris	Flathead Catfish	PYOL	Rafinesque 1818
Moronidae	Temperate basses	MORONI	
Morone mississippiensis	Yellow Bass	MOMI	Jordan and Eigenmann 1887
Morone chrysops	White Bass	MOCH	Rafinesque 1820
Morone chrysops ⍰ × *Morone saxatilis* ⍰	Sunshine Bass	MOCH×MOSA (known parentage)	
Morone saxatilis ⍰ × *Morone chrysops* ⍰	Palmetto Bass	MOSA×MOCH (known parentage)	
Percidae	Perches and darters	PERCID	
Perca flavescens	Yellow Perch	PEFL	Mitchill 1814
Percina caprodes semifasciata	Northern Logperch	PECA-SE	Rafinesque 1818
Sander canadensis	Sauger	SACA	Griffin and Smith 1834
Sander vitreus	Walleye	SAVI	Mitchill 1818
Polyodontidae	Paddlefishes	POLYOD	
Polyodon spathula	Paddlefish	POSP	Walbaum 1792
Salmonidae	Trouts and salmons	SALMON	
Oncorhynchus mykiss	Rainbow Trout	ONMY	Walbaum 1792
Salmo trutta	Brown Trout	SATR	Linnaeus 1758
Salvelinus fontinalis	Brook Trout	SAFO	Mitchill 1814
Sciaenidae	Drums and croakers	SCIAEN	
Aplodinotus grunniens	Freshwater Drum	APGR	Rafinesque 1819
No fish caught		NFSH	

Researchers develop fast test for invasive carp

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A Case Western Reserve University graduate student turned a research paper into a field test that quickly determines whether an Asian carp invading Lake Erie is sterile or can reproduce.

If proven successful, the technique could save money and time in the effort to keep the carp out of the Great Lakes, where the fish could grow unchecked and devour food supplies and habitat critical to native species..

Grass carp, the species *Ctenopharyngodon idella*, have been introduced throughout the Midwest and South to clear ponds choked with weeds. Also called the white amur, fertile fish are illegal to release or buy and sell in Ohio and surrounding states, but have been found in Lake Erie's western basin.

Hatcheries have breeding carp, but shock their eggs with drastic changes in water pressure. The shock results in a third chromosome in the eggs and makes the fish that grow from them sterile. These sterile fish can then be responsibly used for biological control of invasive aquatic plants, but fertile fish could result in growing populations that could devastate the Great Lakes ecosystems.

The U.S. Fish & Wildlife Service and the Ohio Department of Natural Resources monitor for--and are trying to prevent--the spread of grass, black, silver and bighead carp into the Great Lakes.

To confirm whether grass carp caught in the Great Lakes can reproduce, conservation agents must have an eyeball or fresh blood taken from the species tested at a United States Geological Survey laboratory in Wisconsin. The test equipment can run to more than $80,000 a USGS field biologist said.

But Katherine Krynak, who recently earned a PhD in biology at Case Western Reserve, led the effort to develop an inexpensive test that can be done in a boat or on shore in about 15 minutes with a conventional microscope.

Krynak worked with Case Western Biology Instructor Ronald Oldfield and Cleveland Metroparks Zoo's Pam Dennis, a veterinary epidemiologist; Mike Durkalec, aquatic biologist; and Claire Weldon, aquatic research coordinator. Their research is published in the journal *Biological Invasions*."With this technique, people can quickly recognize the problem animals and remove them from the population," Krynak said.

While doing her homework for a research paper, she found that Chinese scientists had discovered the shape of the nuclei in red blood cells of hybridized goldfish and Wuchang bream--members of the carp family-- looked different depending upon whether the fish had a pair or three or more chromosomes. The proportion of abnormally shaped nuclei grew with the increasing number of chromosomes.

Krynak thought the cellular differences might be used to identify sterile grass carp from those that can reproduce, and therefore be used to monitor the species caught in the Great Lakes or rivers that feed them.

She discussed the ideas with Oldfield and they, Dennis, Durkalec and Weldon developed a technique they could use in the in the lab and field.

They smear a drop of fish blood on a slide, let it dry and fix it with methanol. They then stain the slide to bring out the nucleus, and, after rinsing and drying, view it under a standard microscope.

Like its relatives, sterile grass carp have a noticeably larger proportion of red blood cells with abnormal nuclei.

The researchers tested how well others could accurately differentiate sterile from normal fish. By viewing blood-smear slides, 14 of 15 staff and interns of the Natural Resources department of Cleveland Metroparks correctly identified the fish; a single intern incorrectly identified a single fish's reproductive potential.

Grass carp were first found in the Sandusky River, which flows into Lake Erie's western basin in 2012. Whether they came from fertile carp that were illegally or mistakenly brought into the area or originated from states such as Iowa, Missouri, Arkansas and Mississippi, which have permitted fertile fish since importation began in the 1960s, is unknown. But, the four caught had the potential to reproduce, and the minerals found in the bones of their heads, which can be used to track where the fish have been, indicated the fish had lived in the Sandusky all their lives.

Grass carp pose a number of threats because they eat soft-stem vegetation--the kinds of plants that dominate coastal marshes. The marshes are prime breeding grounds for game fish and act as filters that clear the water, said Eugene Braig, program director for the Aquatic Ecosystem Extension at Ohio State University.

Loss of the vegetation and native fish also poses a threat to ducks, geese and other large aquatic birds, the U.S. Geological Survey says.

"This test has the potential to be very helpful," Braig, said. "The results are pretty convincing, but I would like to see it field-tested by management agencies."

Braig said that if this method comes to be recognized as more affordable, consistent, and reproducible, it could become a new standard practice for agencies charged with protecting the Great Lakes.

Journal Reference:

Katherine L. Krynak, Ronald G. Oldfield, Patricia M. Dennis, Michael Durkalec, Claire Weldon. **A novel field technique to assess ploidy in introduced Grass Carp (Ctenopharyngodon idella, Cyprinidae)**. *Biological Invasions*, 2015; 17 (7): 1931 DOI: 10.1007/s10530-015-0856-9

Pollution Spurs Rapid Adaptation in Trout

Fish evolution is tied to key moments in human history

By Dan Eatherley | August 4, 2015

Research on wild fish populations is adding to a growing body of evidence that human activities—particularly polluting the environment—can spur rapid evolution in complex life-forms. In the past biologists assumed that the genetic makeup of such organisms changes slowly, over thousands if not millions of years. In the last decade, though, the Atlantic tomcod (*Microgadus tomcod*) and killifish (*Fundulus heteroclitus*) in New England have been shown to have developed resistance to toxic PCBs (polychlorinated biphenyls) dumped in lakes, rivers and coastal waters during the 20th century. Similarly, populations of yellow perch (*Perca flavescens*) in several Canadian lakes have managed to adapt to more than 80 years of heavy-metal emissions from smelters. The same seems true of brown trout (*Salmo trutta*) in the rivers of southwestern England.

Now a new study reveals not only that the local populations of these trout have changed rapidly in response to pollution, it also ties distinct genetic changes to precise events in human industrial history.

The region has a long legacy of mining, dating back to the bronze age, and zinc, copper, tin, arsenic and other heavy metals continue to get washed into watercourses. Indeed, certain river catchments are now so toxic that only local populations of trout can survive there; fishes entering from elsewhere would die.

To test for pollution-induced evolution and assess the timing of the changes, scientists from the University of Exeter compared DNA samples from 15 populations of wild trout (700 fish in total), nine inhabiting polluted catchments and six from clean sites. Not only did the genetic composition of the populations differ significantly, the divergences mapped remarkably well to key moments in recent human history.

Molecular dating suggests that the metal-tolerating fish split from their clean-river counterparts in medieval times, about 960 years ago—the period when mining in the region was starting in earnest. A second split was also discerned among the metal-river fish, with populations from the most contaminated catchments diverging approximately 150 years ago, this time coinciding with the height of mining in the area and Britain's industrial revolution. "Dating techniques can be quite imprecise but the fact that *both* splits fit events in history so well was compelling and a big surprise," says Jamie Stevens, the research team leader. "The adaptation appears to be metal-specific, with trout in each river adapted to a unique cocktail of metals. A fish in one river might tolerate arsenic but would die in a catchment high in tin or zinc." The scientists, whose findings were published in the July 2015 issue of *Evolutionary Applications*, consider the trout from these waters to be unique variants of the species and should be protected, as they might one day allow contaminated rivers to be restocked.

But there is a downside for the fish. The trout variants best adapted to metal pollution also suffer from a reduced genetic repertoire—probably a result of initial population crashes when the metals first started flooding the waterways. The fish surviving these bottlenecks, as they are known, had less genetic diversity to pass on to their descendants. "While they have adapted to their unique environments," Stevens says, "the metal-tolerating trout may not be well suited to future change as they lack the broader genetic repertoire needed to cope with new and unexpected challenges."

Dan Eatherley is an environmental consultant and the author of Bushmaster: Raymond Ditmars and the Hunt for the World's Largest Viper. *He lives in southwestern England.*

Fisheries Abstracts

~ Sciencedirect.com

Species selectivity in different sized topless trawl designs: Does size matter?

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Most demersal trawl fisheries are conducted in a multispecies setting, and the catch consists of several different species. An inherent challenge in such fisheries is to provide both biologically and economically sustainable exploitation of individually fluctuating stocks and vessel- or fleet-specific quotas. The topless trawl design was developed to improve species-specific selectivity in such fisheries. In a topless trawl, the foot rope is located more forward than the headline to allow fish to escape upwards, whereas the headline is located in front in traditional trawl designs. In this study we conducted twin trawls with a topless trawl towed parallel to a similar standard trawl; we tested a topless trawl design on a small trawl with a low headline height and on a larger trawl with a high headline height. We conducted the tows in the *Nephrops* (*Nephrops norvegicus*) directed mixed fisheries. For both the small and large trawls, we found a significant topless effect for haddock (*Melanogramus aeglefinus*) and no effect for *Nephrops*. For Atlantic cod (*Gadus morhua*) we found a significant topless effect for the low headline trawl but no effect for the high headline trawl. In both the eastern and western Atlantic, topless trawls have been introduced as legal cod-selective trawl designs. However, this study demonstrates that identical gear modifications made to similar trawls of different sizes and used in the same fishery can lead to different results.

Hydroacoustics as a relevant tool to monitor fish dynamics in large estuaries

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As areas where salt and fresh water meet, estuarine ecosystems are complex and highly dynamic natural environments. Because of this, assessing fish densities in such areas is challenging. Hydroacoustics is rarely used to analyze fish populations in large estuaries, even though such approaches have in the past proven effective in providing information on fish distribution, abundance and size-structure in other aquatic systems. In this study, we compare densities detected acoustically with those obtained using traditional fish sampling methods in the Gironde estuary (France), where regular monitoring surveys using fishing gear have been carried out since 1979 to track ecological changes. With the aim of complementing traditional fish sampling, our study used vertical beam mobile acoustic surveys at 70 and 120 kHz between May 2010 and June 2012. There was a highly significant correlation between fish densities obtained with traditional fish sampling and those obtained using hydroacoustics. Both inter-annual variations and the timing of peak densities were similar for the two methods. This shows that the less labor-intensive acoustic method can be used to monitor estuarine fish populations. However, there is a need to develop internationally-accepted standards for collection and analysis of these data in order to ensure comparability of results across systems.