Fisheries Management Section

of the American Fisheries Society

Newsletter **March 2016**

Inside this issue:

President's Message

As this will be my final message serving as your FMS President, here is a brief thought on our profession. I feel like I have won the lottery. Twenty three years ago Dr. Ed Peters, fisheries professor at the University of Nebraska-Lincoln, offered me a chance at a master's program studying the effects of hydro-electric generation operations on reservoir fish populations. Unlike most lottery winners who immediately slip away to sip mojitos on an island get-a-away, instead I began a career with years spent gunnel-deep in nets, electrofishing till dawn collecting fish guts, and handling stacks upon stacks of zooplankton and benthic grabs. Followed by long winter months sequestered in a lab hunched over a scope and playing with all things pickled. An absolute ***Nirvana*** compared to earlier life stints breaking-out and pouring concrete, shoveling out livestock stalls, and standing behind a display case of electronic gadgets with a fixed smile. And even though my current position doesn't allow me to "play outside" near as much as I would like, this is a career where every day is both a challenge and an opportunity to make a difference in the world around us. A lifetime surrounded by professionals putting the betterment of the resource ahead of themselves. It has been an honor to serve with you. Thanks for the opportunity.

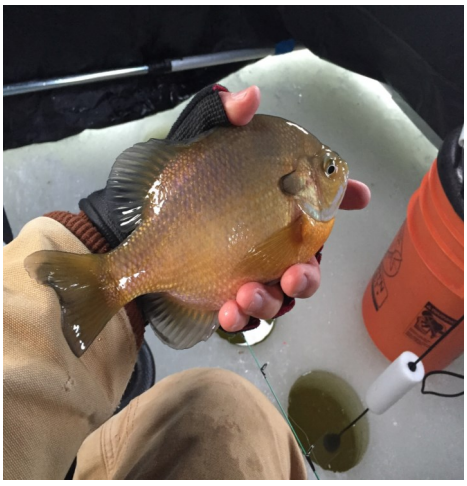
In recent years, as a Section we have expanded opportunities for students and young professionals, supported numerous symposia including several international efforts, produced publications and books, recognized and awarded outstanding professionals, had a significant voice in the governing of the Society, and made a difference in the millions of lives who have benefitted from the wise management and stewardship of our aquatic natural resources. That'll do.

All of this would not have been possible without your involvement and support as Section members and the leadership of Ron Essig, Dirk Miller and Brian Graeb (Past-Presidents), Randy Schultz (President-Elect), Quinton Phelps (Secretary/Treasurer), and Regional Representatives Eileen O'Donnell, Jason Olive, Jeff Koch and Mike Colvin. Support from Travis Neebling and Kyle Bales (web masters), and Geno Adams and Sara Tripp (newsletter editors) were critical in keeping us connected and all have been fantastic to work with. I owe them all a great debt and feel extremely lucky to have worked with them.

Yep, I've been rolling in this post-lottery win euphoria ever since! I hope you feel that way too.

Best wishes,

Mark



Nice bluegill caught by President Mark Porath through the ice.

Call for Award Nominees

Hello AFS Fisheries Management Section (FMS) Members.
Each year the FMS accepts nominations for the Award of Excellence, Award of Merit, Conservation Achievement Award, and induction into the Fisheries Management Hall of Excellence. There is a description of each award on the FMS web site http://www.sdafs.org/fmsafs/awards/ including past recipients and nomination criteria.

Please take the time to nominate a mentor or colleague who has made significant contributions in fisheries management. Most of you know someone who is deserving of one of these awards. Please consider submitting a nomination by April 15, 2016 in the form of a detailed letter describing the nominee's qualifications for the specific award. Electronic versions of nominations are requested to facilitate Awards Committee review. I look forward to your nominations. Please feel free to contact me if you need more information.
Thank you,

Randy

Randall Schultz, FMS Pres-elect
Supervisor, Mississippi River Resource Management Iowa Department of Natural Resources Southeast Regional Office
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AFS 2015 Fisheries Management Section Award Winners

Congratulations to Stan Moberly who was awarded the FMS Award of Excellence and to Gil Radonski and Steve Miranda for being inducted into the Hall of Excellence at the 2015 Annual meeting in Portland .

Stan Moberly (middle) receiving the FMS Award of Excellence from President Mark Porath (right) and Tom Bigford (left).

Gil Radonski

Dr. Steve Miranda (left) receiving the plaque for being inducted into the FMS Hall of Excellence from President Mark Porath (right).

An International Exchange, An Amazing Opportunity!

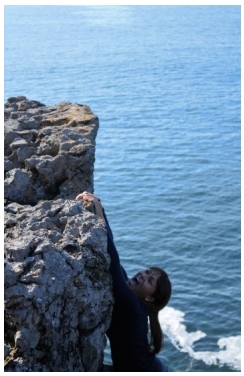
During October 2015, I had the incredible honor of representing the American Fisheries Society and Fisheries Management Section at the annual meeting of the Institute of Fisheries Management. The meeting was held in Plymouth, a historic naval town in south Devon and the port of origin of the Mayflower.

Pictures from Plymouth.

Plymouth is also the home of one of the oldest marine laboratories in the world, the Marine Biological Association. The city is closely tied to the sea and boasts the National Marine Aquarium, where the IFM held its formal dinner and a behind-the-scenes tour.

An amazing backdrop for the meetings formal dinner.

The meeting's theme was "Extreme Fisheries," an appropriate topic for my talk given the extremity of water quality conditions and fishery issues in Iowa. But we're not the only ones dealing with extreme problems. The plenary speaker opened with the "vandalism" of rivers on a massive scale in Britain, but he could just as easily have been talking about the U.S. Education, outreach, and partnership with angling nonprofits and lobbyist groups are some of the strategies being used to revamp the fishing opportunities in the U.K. while facing dire budgetary challenges; again, they may as well have been talking about the U.S. I learned that many of our challenges in fisheries are common, but our solutions may differ. We have a lot to learn by sharing information in both directions with our sister societies.



As the theme was "Extreme Fisheries"—I almost died on the Cliffs of Moher

This exchange program was truly a once-in-a-lifetime experience for me, and I had the amazing opportunity to bring my husband Kerry along. We stopped in Ireland along the way, touring Dublin and the Irish countryside, before flying into Exeter and driving through the part of England that inspired the "Hound of the Baskervilles." I hope I never forget the sights, the food, the fun, and most of all, the wonderful people we met along the way. Thank you so much to the Fisheries Management Section for supporting this professional development opportunity and to the Institute of Fisheries Management for being such gracious hosts.

More details from Rebecca's trip will be posted on the FMS website soon!

Hound Tor, Devon, England

St. Patrick's Cathedral

Rebecca Krogman, Large Impoundment Research Biologist
Iowa Department of Natural Resources

Little Q in Big China - An International Exchange Experience

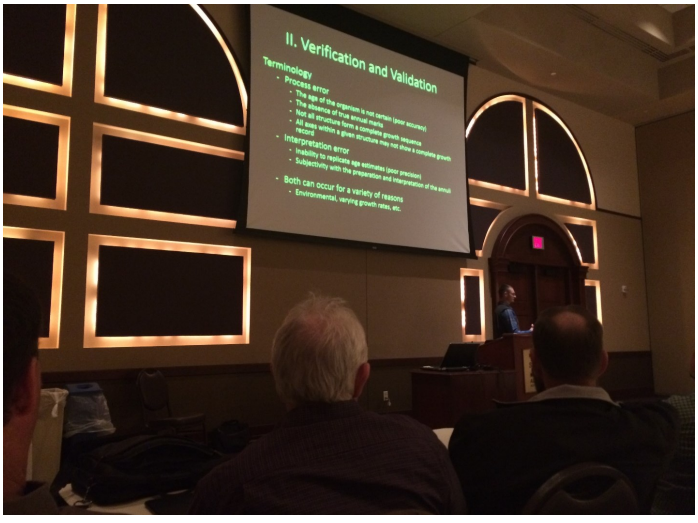
I was fortunate enough to attend The Second Mississippi-Yangtze River Basins Symposium from October 14th through October 18th, 2015 in Wuhan, China. I first wanted to give a sincere thank the fisheries management section of the American Fisheries Society and the Institute for Hydrobiology (Chinese Academy of Science) for providing the opportunity to attend this meeting. The meeting was an absolutely amazing experience. My flights started in St. Louis, and traveled through Detroit, Beijing, and eventually made it way to its final destination in Wuhan. Despite the long travel time, the flight "felt" short and was super cool! Once in Wuhan, we were welcomed by our hosts and provided outstanding accommodations. After a short rest, the first day was spent getting registered for the conference, meeting conference attendees, seeing the sights, and eating wonderful Wuhan cuisine. The next two days were a mix of United States and Chinese Scientists providing presentations as it related to the Mississippi River and Yangtze River fisheries and aquatic resources. The presentations were very eye opening- simply amazing that regardless of the location in the world, most fisheries scientists have parallel questions and are performing similar research. The third and fourth days of the meeting were spent in the field, touring various facilities, and visiting the Three Gorges Dam. The next morning my plane departed for St. Louis- Amazing experience!

Mississippi –Yangtze River Basins Symposium in Wuhan, China.

Quinton Phelps, Fisheries Ecologist
Missouri Department of Conservation

Kansas and Nebraska Joint Chapter Meeting

The Kansas Chapter of the American Fisheries Society hosted a joint meeting with the Nebraska Chapter on February 23-24, 2016, in Manhattan, Kansas. There were 140 meeting attendees that represented academia, state and federal agencies, and private companies. Highlights of the meeting included a half-day age and growth workshop coordinated by Dr. Marty Hamel (Nebraska Chapter) and Jeff Koch (Kansas Chapter), 26 oral presentations, and 8 poster presentations. Don Gabelhouse (professional) and Stephen Siddons (student) were best oral presentation winners, while Tony Barada (professional) and Alexis Fedele (student) were awarded best posters. Casey Pennock of Kansas State University was awarded the Otto Tiemeier-Frank Cross graduate student scholarship by the Kansas Chapter. The meeting provided an excellent opportunity for members of both chapters to interact and learn about research in neighboring states. We look forward to similar meetings in the future.



Dr. Marty Hamel explains validation and verification of age estimates during the age and growth workshop at the joint meeting of the Nebraska and Kansas Chapters.

2016 Joint Meeting of the Centrarchid, Esocid, and Walleye Technical Committees – North Central Division of the American Fisheries

ANNOUNCEMENT AND CALL FOR PAPERS
Dates: July 25-28, 2016
Location: Ak-Sar-Ben Aquarium, Gretna, Nebraska
Lodging Location: Super 8, 14355 NE-31, Gretna, NE (402-332-5188)

Registration Cost

Cost is anticipated at $60 for the entire meeting, which includes a fish fry or BBQ social Tuesday; morning and afternoon breaks, lunch and dinner on Wednesday; morning break on Thursday. Students are half price. A continental breakfast is available at the Super 8 in Gretna. A block of rooms have been reserved until June 25, 2016 at a rate of Single ($61.99/night + tax), and Double ($71.99/night + tax), Available under the name Fisheries Technical Committee Meeting (holding 30 rooms)

Continuing Education

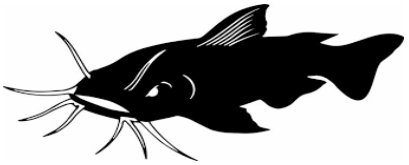
A continuing education workshop is planned for Tuesday, July 26th. The topic options will include: Habitat Improvement Workshop (Site Visit Included), Developing Methods for Sportfish Control with a panel of biologists from the northwestern US, and an Optional Float Trip. Cost is anticipated at $50 per person.

Registration and Presentation Submittal

If you have a paper for inclusion please forward the abstract to John Bruner jbruner@ualberta.ca. Meeting registration will be via email to Hilary Meyer at Hilary.Meyer@state.sd.us. We will accept payment by cash or check at the door. Sorry, we are not equipped to accept credit cards or other forms of electronic payment. Deadline for registration is June 17th, 2016. Hope to see you there!

Catfish 2020 - Announcement

The North-Central Division AFS Ictalurid Technical Committee and the Southern Division AFS Catfish Management Technical Committee would like to announce that planning has begun for the 3rd International Catfish Symposium to be held in 2020. Information on dates, location, manuscripts, etc. will be announced at a later date. The two committees wanted to get the word out now to make catfish researchers and managers aware of this upcoming outlet to present and publish the results of their work. Questions or potential sponsorship opportunities may be directed to Jason Olive at Jason.olive@agfc.ar.gov.



Piece of History—Fisheries Management Section Newsletters from 1985—1988

Big Thanks to William Gardern of Fisheries and Oceans Canada , who recently found a gold mine of Fisheries Management Section Newsletters from 1985 through 1988. Imagine picking up the newsletter and reading the new invasive species in the Great Lakes being river ruffe, fishing was the number 2 leisure activity, a computerized database for fisheries data was news worthy, and the big political news was wins for Congressmen Wallop and Breaux in keeping funds from boating and fishing fees for boating and fishing enhancement purposed. If you get a chance browse these pieces of history on the Fisheries Management Section Website.

*Another big **THANKS** to our new Fisheries Management Section Website Manager—Kyle Bales for uploading these to the web: http://fms.fisheries.org/newsletters/archive/*

Future of the Nation's Fisheries and Other Aquatic Resources

Each presidential election signals a significant "changing of the guards" throughout the federal agencies, including those with jurisdiction over our nation's waterways and aquatic resources. The transition challenges us to build on progress, address shortfalls, or change directions. AFS is working with hundreds of individuals and partners to create a set of actionable recommendations for the next administration.

AFS has spent the first few months of 2016 sharing this mission with members (at division and chapter meetings, Governing Board discussions, etc.) and in meetings with our more engaged partners. Our goal is to gather ideas this spring, to spend the early summer converting ideas into draft recommendations, and then share those results with attendees at the AFS annual meeting in Kansas City and elsewhere, all aiming toward a final release this fall.

These discussions span freshwater and marine systems, and include priorities from science, management, policy, education, and budget. Topics we've heard about, include: climate change impacts; ecosystem-based management of fisheries and aquatic systems, including forage fish management; funding for conservation programs, and the possibility of involving public-private-partnerships; Illegal, Unreported, and Unregulated fishing; coral reef management; connections to energy development; federal and state coordination; water quantity and quality; imperiled species; invasive fishes; public access; and more.

"AFS is working with hundreds of individuals and partners to create a set of actionable recommendations for the next administration. "

The Fisheries Management Section should be a solid source of ideas for this effort – science-management connections, over-arching policy needs, lessons learned, challenges for aquatic resource professionals, important trends.

Our vision is a relatively short list (perhaps 20, but flexible) of recommendations appropriate for federal agencies. For example, we could identify a specific research need and mention how some jurisdiction has addressed that need, e.g., recommend diagnostic tools such as e-DNA and note how that technique is being used to focus management to avoid listings. With so few recommendations, and limited time to convey them to national leaders, we'll need to be super succinct while focusing on large-scale issues.

If you, your organization, or a representative from your organization would like to participate in this effort, please contact Taylor Pool at tpool@fisheries.org , or 301-897-8616 ext. 202 or Tom Bigford at tbigford@fisheries.org or 301-897-8616 ext 207.

Tom Bigford and Taylor Pool
AFS Office, Bethesda, Maryland

Effects of Silver Carp on Sport Fish in Mississippi

As Silver Carp populations continue to expand throughout the United States, the body of research examining how these exotic invasive fish affect native aquatic ecosystems is growing as well. Many recent publications have focused on Silver Carp dispersal patterns, habitat use, life history characteristics, management options, and environmental effects on plankton communities and native planktivorous fishes. All of this information is extremely beneficial to fisheries managers. However, for biologists in state agencies that are specifically tasked with sport fish management in public water bodies (such as myself), understanding how Silver Carp affect popular sport fish species is also very important, and little research has been directed towards understanding these relationships.

Silver Carp (top) and Bighead Carp (bottom) are exotic invasive species that continue to expand their range throughout the United States.

The Yazoo River Basin in Mississippi is near the initial introduction site of Silver Carp into the United States, and Silver Carp have been found in the Yazoo River and its tributaries for over a decade. This area is part of the Mississippi River Alluvial Valley (aka "the Delta") and contains hundreds of floodplain lakes known as oxbow lakes. Many of the oxbows in the Yazoo River Basin routinely connect to a river during annual high water periods and have been colonized by Silver Carp, but there are also some disconnected oxbows that rarely flood where Silver Carp have not gained access. In 2011, however, record high Mississippi River water levels led to massive flooding throughout the Yazoo River Basin which allowed Silver Carp access to two lakes, Bee Lake and Wolf Lake, where they had not previously been documented. This provided us with a unique opportunity to track how Largemouth Bass, White Crappie, and Black Crappie populations changed in Bee and Wolf Lake after Silver Carp colonized the lake. Two other oxbow lakes, Little Eagle Lake and Belzoni Cutoff, remained disconnected during this flooding event and were not inundated with Silver Carp. These two lakes were used as control lakes to ensure changes to the fish population of Bee and Wolf were directly linked to Silver Carp inundations. These four lakes are all located within 30 miles of one another in Humphreys and Holmes Counties, Mississippi.

Electrofishing sampling at Bee Lake and Wolf Lake collected thousands of juvenile Silver Carp following severe flooding of the Yazoo River Basin, Mississippi in 2011.

Effects of Silver Carp on Sport Fish in Mississippi - Continued

Generally, our data show a dramatic decline in the Largemouth Bass and crappie populations in Bee Lake and Wolf Lake following Silver Carp introductions in 2011. Electrofishing catch rates fell substantially for bass and crappie at both lakes in 2012 and have remained low ever since (Figure 1.) We compared electrofishing data from multiple years pre-carp (2007 - 2010) and post-carp (2012 - 2015) and found that mean Largemouth Bass catch rates declined 43% at Bee Lake and 85% at Wolf Lake, while average crappie catch rates declined 80% at Bee Lake and 75% at Wolf Lake (Figure 2). Average catch rates at Little Eagle and Belzoni Cutoff, however, did not show the same downward trend. Catch rates were similar for Largemouth Bass in these two lakes over the same time period, and catch rates for crappie increased at both lakes.

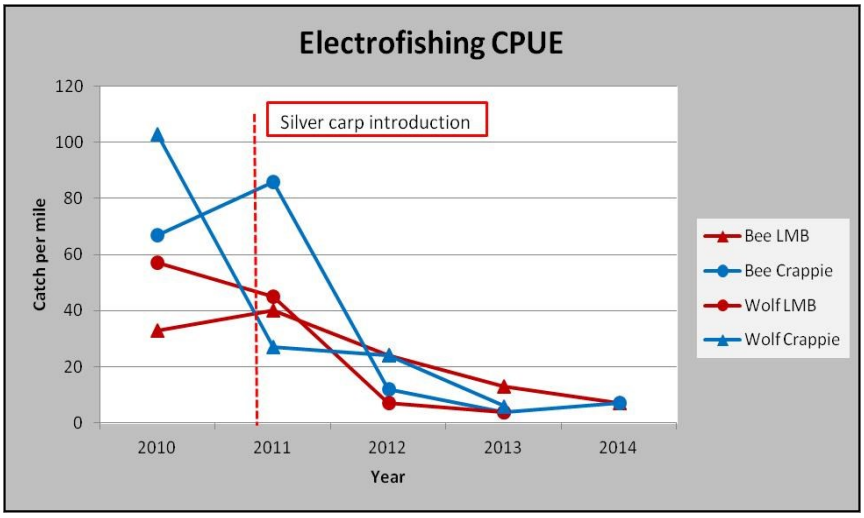


Figure 1. Electrofishing catch rates for Largemouth Bass and crappie in Bee Lake and Wolf Lake before and after Silver Carp introduction.

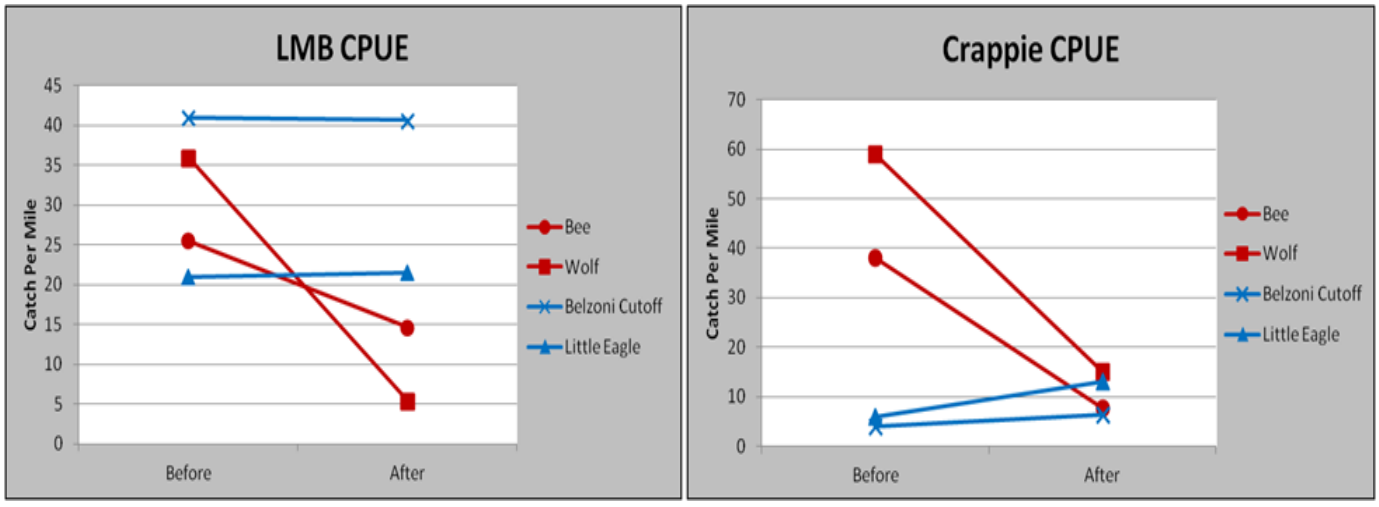


Figure 2. Mean electrofishing catch rates for Largemouth Bass and crappie before and after Silver Carp introduction (red) and in lakes where Silver Carp have not been introduced (blue) over the same time period.

Effects of Silver Carp on Sport Fish in Mississippi - Continued

We also compared average relative weight (Wr) values of sport fish collected pre-carp and post-carp using paired T-tests and found significant differences in fish condition after Silver Carp introductions. Relative weight values for Largemouth Bass and crappie were significantly lower at Bee Lake following Silver Carp introductions, and relative weight values were lower at Wolf for larger fish (crappie > 10 inches and bass > 12 inches; Figure 3). Conversely, relative weight values were significantly higher at Belzoni Cutoff for both Largemouth Bass and crappie over the same time period, and relative weight values at Little Eagle were higher for Largemouth Bass and similar for crappie (Table 1).

Lake	Species	Avg. Wr Before	Avg. Wr After	P-value	N
Bee	LMB	98	94	0.02	172
Wolf	LMB	95	90	0.06	256
Little Eagle	LMB	96	101	0.008	85
Belzoni Cutoff	LMB	91	94	0.02	126
Bee	Crappie	106	89	0.002	143
Wolf	Crappie	103	91	> 0.001	380
Little Eagle	Crappie	96	97	0.50	29

Table 1. Paired T-Tests show significant declines ($\alpha = 0.10$) in mean relative weight values for Largemouth Bass and crappie since 2011 in lakes where Silver Carp were introduced and either significant increases or no change in relative weight values in lakes were Silver Carp were not introduced.

Finally, we compared mean length at age values for crappie (aged by otoliths and predicted by Von Bertalanffy growth curves) from Bee Lake from 2010 and 2014 and found slower growth rates following Silver Carp introductions (Figure 4). Average predicted length for an age 2.5 crappie declined from 11.4 inches to 9.5 inches, and average predicted length at age 3.5 fell from 13.3 inches to 11.1 inches. In 2014, it took fish two months longer to reach quality length, 9 months longer to reach preferred length, and 16 months longer to reach memorable length than it did in 2010.

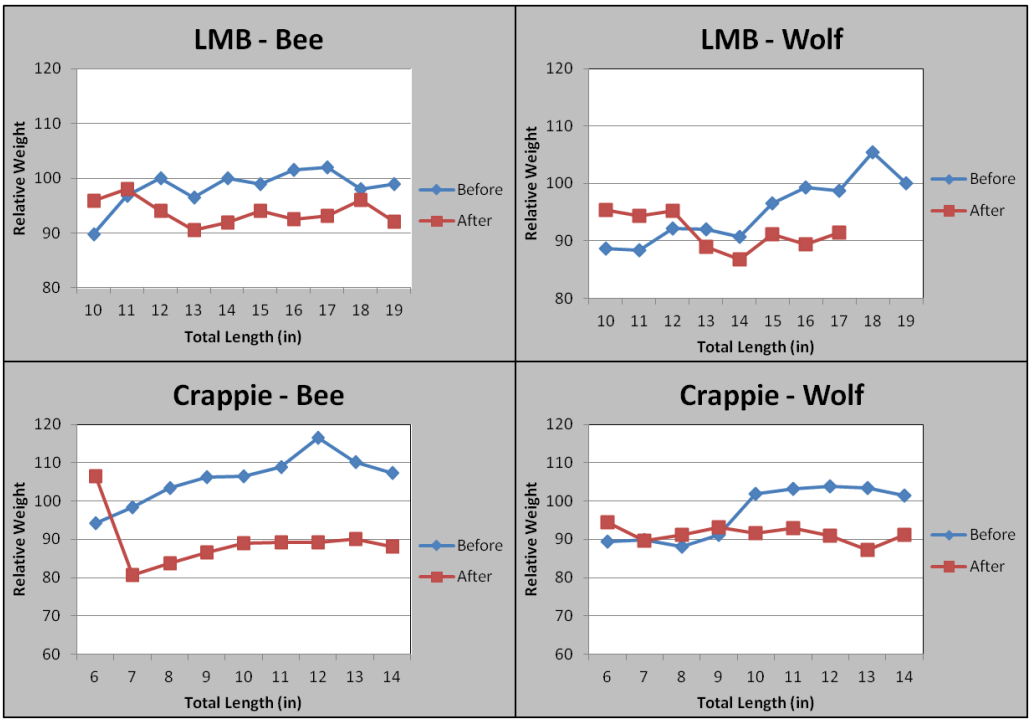


Figure 3. Mean relative weight values for Largemouth Bass and crappie in Bee and Wolf Lakes before and after the introduction of Silver Carp.

Effects of Silver Carp on Sport Fish in Mississippi - Continued

These data suggest that Silver Carp introductions can negatively affect Largemouth Bass and crappie populations in oxbow lakes. These lakes are dynamic systems with naturally variable fish communities, but we found that abundance, condition, and growth rates all decreased in lakes where Silver Carp were introduced while the same trends were not present in similar, nearby lakes where Silver Carp were not introduced. This suggests that Silver Carp are the primary factor driving these declines in sport fish population metrics. The exact mechanism(s) behind these declines is unknown, but it is likely a combination of factors. As highly efficient planktivores, Silver Carp directly compete with juvenile Largemouth Bass and crappie for food resources, which may limit sportfish growth and survivorship at early life stages (Conover et al. 2007, Garvey et al. 2007). Studies have also shown high dietary overlap between Silver Carp and both Bluegill and Gizzard Shad (Freedman et al. 2012, Sampson 2005), two species normally abundant in oxbows of the Yazoo River Basin that are primary prey species in these systems. Silver Carp are likely negatively affecting these two species, thereby decreasing prey availability for adult Largemouth Bass and crappie.

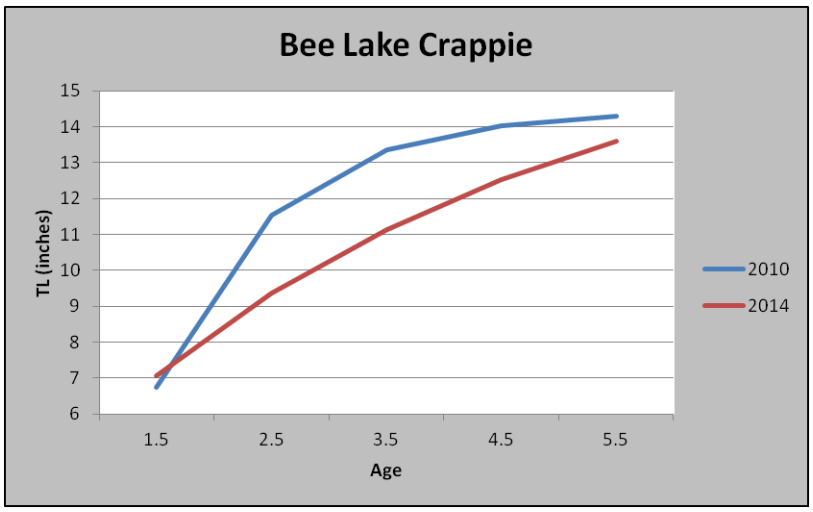


Figure 4. Growth rates for crappie in Bee Lake before and after Silver Carp colonized the lake.

To date, a sufficient management strategy has not been developed to mitigate against the impacts of Silver Carp on native fish communities. The Mississippi Department of Wildlife, Fisheries, and Parks is working to monitor the Asian carp population in our state and conduct research to better understand how these fish affect native fish and fisheries. We are also trying to educate the public about these fish in an effort to stop further expansion and working to encourage commercial harvest, including working with new businesses harvesting Asian carp in Mississippi for export to Asian markets. Asian carp populations will likely continue to expand their range throughout the United States and remain at the forefront of fisheries management activities in upcoming years. We as fisheries management biologists need to be aware of the substantial impacts these fish can have on our sport fisheries, be actively at work trying to slow and/or stop their expansion, and conduct research to determine the best management strategies to protect our fisheries once these nefarious fish are introduced.

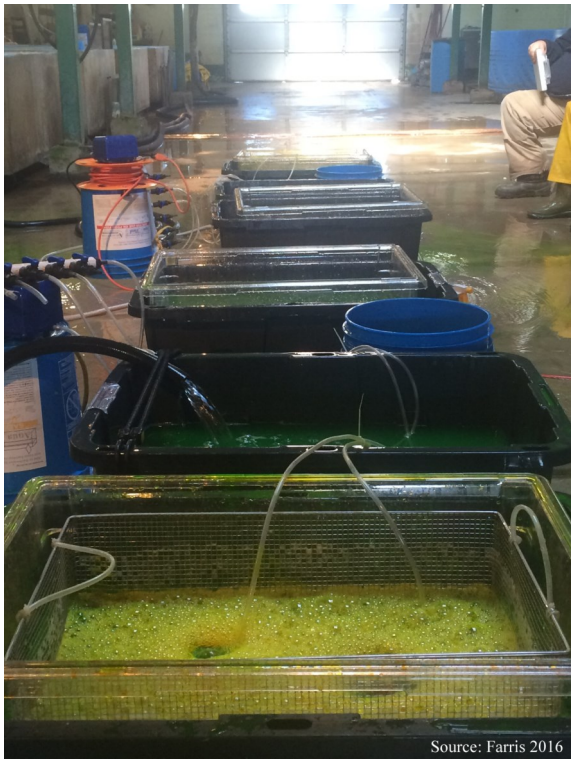
Nathan Aycock, Delta Fisheries Project Manager
Mississippi Department of Wildlife, Fisheries, and Parks

Use of Calcein for Determining Stocking Success in Arkansas

Chemical marks have been used in stock enhancement research for decades. Oxytetracycline hydrochloride (OTC) is labeled for fish marking and produces fluorescent marks on calcified structures of fishes. Fish are generally sacrificed to extract hard parts and determine the specimen's origin, which requires laboratory work, and does not allow for real-time determination of provenance. Calcein, another flourochrome dye, produces visible fluorescent marks under appropriate light. However, calcein marks may be viewed non-lethally in the field, which allows for near real-time estimates of stocking success.

Calcein may be applied as a low-dosage, static immersion bath (500 mg/L for 3-6 h), or as a rapid batch mark at a higher concentration (5 g/L for 7 min). Unlike OTC, calcein is not approved for use on food fish by the U.S. Food and Drug Administration. Use of calcein is controlled by the U.S. Fish and Wildlife Service (FWS), Investigational New Animal Drug Approval Partnership (INAD) under INAD 10-987. To purchase and use calcein, investigators must submit an experimental protocol, pay a yearly participation fee, and be accepted into the FWS calcein INAD program.

The INAD 10-987 protocol includes osmotic induction prior to calcein immersion, and requires the investigator to determine an acceptable salinity prior to marking. We conducted salinity tolerance trials for Black Crappie and White Crappie, which consisted of a 3.5-min immersion of five fish in 1 L of salt solution at salinities ranging from <1 to 50 ppt. Immediate and 24-h mortalities were 0% and 0%—13%, respectively for Black Crappie. Similarly, immediate and 24-h mortalities were 0% and 0%—27%, respectively for White Crappie. Fish are crowded during the marking process, and different fish tolerate crowding to different degrees. Therefore, we examined tolerance to crowding through marking density (kg of fish/L) trials. Fish were confined at densities ranging from 0.016-0.250 kg/L in 1 L of water for 7 min. Immediate and 24-h mortalities were 0% and 0%—3%, respectively for Black Crappie and 4%—23% and 8%—23%, respectively for White Crappie.



The two stations set up in parallel for marking White Crappie in the fall of 2015.

The results of our salinity tolerance and marking density trials were scaled up to hatchery production levels. Unmarked fish were held in concrete vats. Batches of fish were weighed in a custom-made 53 cm long x 33 cm wide x 20 cm deep, 304-guage stainless steel basket with 0.68-cm openings (Three M Tool, Inc., York, PA), which rested in a 56 cm long x 36 cm wide x 37 cm deep lexan pan, filled with 24 L of water, on an electronic balance.

Use of Calcein for Determining Stocking Success in Arkansas - Continued

Marking density was 0.25 kg fish/L. Fish were lifted in the basket and placed in a second lexan pan (same dimensions) filled with 24 L of 40-ppt salt solution for 3.5 min. The second lexan pan rested inside of a 65 cm long x 44 cm wide x 34 cm deep black plastic container serving as a water bath (Centrex Plastics, Findlay, OH). Fish were lifted from the salt solution and rinsed (2-4 sec) in a second black plastic container of well water. Fish were then placed in a third lexan pan (same dimensions) with 24 L of a 5-g/L calcein solution (12-L of 1% calcein and 12-L of well water) for 7 min. Lastly, fish were lifted from the calcein solution, rinsed (2-4 sec) in the second black plastic container, and transferred to a separate concrete vat of marked fish. The third lexan pan, like the second lexan pan, resided in a water bath. Well water flowed through the three water baths throughout the marking process to maintain constant temperatures. One individual weighed fish and monitored water quality. One individual moved fish through the process. One individual timed osmotic induction and calcein immersion and recorded data.

Ninety-six thousand Black Crappie and eighty-six thousand White Crappie were marked during fall 2015. The average time to mark one batch was 12 min. Using only one marking station, it would have taken ~2 d to mark each species. Doubling the number of marking stations cut the work time to 1 d. However, doubling the number of stations increased the number of required individuals from three to five and doubled the amount of calcein required. Calcein was purchased from Western Chemical, Inc (Ferndale, WA) and cost ~US$100 per L. The process took 7 h for Black Crappie and 10 h for White Crappie. Hence, a total of 105 man-hours were required to mark fish.

A White Crappie displaying the brilliant green calcein mark when viewed with the NIGHTSEA BlueStar Flashlight and Model VG3 barrier filter glasses (NIGHTSEA, Lexington, MA).

Twenty-four hour survival of calcein-marked Black Crappie and White Crappie was 99.5% and 99.6%, respectively. Samples of marked and unmarked fish of each species were retained for estimation of mark longevity. These fish are being held at the fisheries research facility on the campus of the University of Arkansas at Pine Bluff. Estimates of mark longevity have been 100% for both Black Crappie (117-d post marking), and White Crappie (103 -d post marking). Mark intensity has been estimated per the CALC-3 Results Report Form under INAD 10-987, where various body parts are ranked from 0 = no mark, to 3 = readily visible bright green mark. Overall mark intensity has ranged from 2.55—3.00 for Black Crappie and 2.80 —3.00 for White Crappie. Our work with calcein was scalable to hatchery production levels. Osmotic induction pre-treatment coupled with high concentrations of calcein for short periods resulted in high quality persistent calcein marks on both crappies.

Greyson F. Farris and Steve Lochmann
University of Arkansas at Pine Bluff, Aquaculture/Fisheries Center

FISHERIES MANAGEMENT SECTION OF THE AMERICAN FISHERIES SOCIETY

http://fms.fisheries.org/

The Fisheries Management Section is composed of people who wish to develop, apply, and evaluate effective management concepts or techniques as well as programs in education and information to solve fisheries management challenges. The Section promotes the exchange of fisheries management information and the results of applied research among professionals, students, user groups, resource management agencies, and the general public who share interest in fish and the habitats supporting them. The Section sponsors workshops, symposia, topical sessions at professional meetings, and special projects to examine fishery management challenges. Section membership provides a credible voice for a wide range of fisheries management issues. The Section continues active involvement with legislative initiatives as well as governmental and private-sector activities which affect the quality and extent of all fisheries. Selection of activities for Section involvement results from individual member initiative.

Don't forget to register for the Annual AFS Meeting!

The Missouri Chapter and North Central Division of the American Fisheries Society invite you to attend the 146th AFS Annual Meeting in Kansas City, August 21-25, 2016. This year's theme is: ***Fisheries Conservation and Management: Making Connections and Building Partnerships.***

The 2016 Annual Meeting offers a chance to present your science to experts from around the world, enhance your job skills with hands-on Continuing Education Workshops, see the latest technology in the Trade Show, and network with colleagues old and new. This year's hotel and conference center are all under one roof at the Sheraton Kansas City at the Crown Center, giving you more free time to see presentations, meet with collaborators, and explore the city. And Kansas City's affordable, central location, combined with its thriving arts culture, nightlife, and stunning natural resources, means that there is something for everyone to enjoy in August 2016!

OFFICERS

President

Mark Porath
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