2016 Iowa – Iowa AFS Meeting – Moravia, IA

Tuesday, March 1st

					Room
Noon	**2:00 PM**	**Registration $80 ($40 Undergraduates/AmeriCorps) Lunch is included with your registration**			**Lobby**
12:50 PM	1:00 PM	Welcome - Chapter President, Lewis Bruce			Ballroom A & B
		Afternoon session moderator: Jeff Kopaska	**Presenter**	**Affiliation**	
1:00 PM	1:45 PM	Plenary Presentation: Current and Impending Threats to Iowa Water Quality	Dr. Rick Cruse	Professor, Iowa State University	Ballroom A & B
1:45 PM	2:05 PM	Effects of Angling on a Largemouth Bass Population in an Iowa Reservoir with High Fishing Pressure	Andrea Sylvia	Iowa State University	Ballroom A & B
2:05 PM	2:25 PM	Potential effects of jaw deformities on largemouth bass populations	Tyler Froman	Iowa State University	Ballroom A & B
2:25 PM	2:45 PM	Detectability and Longevity of Hook Wounds in Largemouth Bass for Use as an Indicator of Angling Pressure	Savannah Fernholz	Iowa State University	Ballroom A & B
2:45 PM	**3:00 PM**	**Break with Refreshments**	**---**	**---**	**Lobby**
3:00 PM	3:20 PM	An Evaluation of Seasonal Movement and Habitat Selection of Northern Pike in Pools 10 and 13 in the Upper Mississippi River	Royce Bowman	Iowa DNR	Ballroom A & B
3:20 PM	3:40 PM	Natal Origin and Movement Patterns of Paddlefish within the Mississippi River Basin	Ryan Hupfeld	Iowa DNR	Ballroom A & B
3:40 PM	4:00 PM	Incidental By-Catch Mortality on the Upper Mississippi River Lake Sturgeon Population: Effects on Restoration Efforts	Kyle R. Bales	South Dakota GF&P	Ballroom A & B
4:00 PM	**5:00 PM**	**Iowa AFS Chapter Business Meeting, Awards Presentation**	**Lewis Bruce**	**Iowa DNR**	Ballroom A & B
5:00 PM	**5:30 PM**	**Break**	**---**	**---**	**Lobby**
5:30 PM	**6:30 PM**	**Poster Social**			**Lobby**
6:30 PM	**7:30 PM**	**Dinner (provided in registration)**			Ballroom A & B
7:30 PM	**---**	**Social, Raffle Drawing, Auction**			Ballroom A & B

Wednesday, March 2nd

					Room
6:45 AM	**7:45 AM**	**Breakfast – included with your registration**			**Lobby**
8:00 AM	**10:00 AM**	**Last Minute Registration $80 ($40 Undergraduates/AmeriCorps)**			**Lobby**
		Early Morning Session Moderator: Lewis Bruce	**Presenter**	**Affiliation**	
8:00 AM	8:20 AM	Cascading Effects of a Temperate Bass Die-off	Jonathan R. Meerbeek	Iowa DNR	Ballroom A & B
8:20 AM	8:40 AM	Using Food Web Modeling to Determine Effects of Increased Exploitation on Invasive Carps in the Middle Mississippi River	Nicholas W. Kramer	Southeast Missouri State University	Ballroom A & B
8:40 AM	9:00 AM	Asian carp expansion in the Mississippi River: Focusing on the leading edge of the stronghold	Wes Sleeper	Southeast Missouri State University	Ballroom A & B
9:00 AM	9:20 AM	First evidence of Bighead, Silver, and Grass carp reproduction in Southeastern Iowa tributaries	Carlos Camacho	Iowa State University	Ballroom A & B
9:20 AM	9:40 AM	Longitudinal variation in life-history traits of Silver Carp in the Des Moines River	Christopher Sullivan	Iowa State University	Ballroom A & B
9:40 AM	10:00 AM	Changes in wetland condition following drought-induced elimination of fish populations	Michael D. Sundberg	Iowa State University	Ballroom A & B
10:00 AM	**10:20 AM**	**Break**			**Lobby**
		Late Morning Session Moderator: Ryan Hupfeld			
10:20 AM	10:40 AM	Assessing post-stocking predation on fingerling walleye Sander vitreus	Emily Ball	Iowa State University	Ballroom A & B
10:40 AM	11:00 AM	Intra- and inter-river differences in fish mercury accumulation rates for six Iowa interior rivers	Nathan Mills	Iowa State University	Ballroom A & B
11:00 AM	11:20 AM	Gear- and Season-Specific Catch Rates of Age-0 Walleye and Age-0 White Bass in Harlan County Reservoir, Nebraska	Brett T. Miller	University of Nebraska, Kearney	Ballroom A & B
11:20 AM	11:40 AM	Influence of sieve mesh size on wetland macroinvertebrate diversity values and relationships with ecosystem condition indicators	Ryan Baldwin	Iowa State University	Ballroom A & B
11:40 AM	12:00 PM	Upper Mississippi River Asian Carp Acoustic Telemetry	Kyle Mosel	USFWS	Ballroom A & B
12:00 PM		**Dismiss**			

Oral Presentation Abstracts

Effects of Angling on a Largemouth Bass Population in an Iowa Reservoir with High Fishing Pressure

Andrea Sylvia and Michael J. Weber
Iowa State University, Natural Resource Ecology and Management

Effects of angling on largemouth bass (*Micropterus salmoides*) at the individual-level (e.g., bed fishing, tournament stress and mortality, etc.) have been widely investigated and are well-understood. However, population-level effects have received little attention but are important to understand. Increased popularity of bass catch and release and tournament angling over the past decade has resulted in increased potential for these activities to induce population level effects. Brushy Creek is a relatively new, 280 ha reservoir located in Webster County, Iowa, that experiences a large amount of recreational angling pressure and up to 45 bass tournaments annually. We initiated a mark-recapture study on largemouth bass in Brushy Creek, spring 2015 to evaluate potential effects of angling on bass populations. Largemouth bass are being captured with electrofishing and tournament anglers and tagged using individually numbered metal jaw tags. A total of 2,087 bass were tagged during 2015: 657 bass were captured and tagged during 44.6 electrofishing hours and 1,430 bass were tagged at 41 bass tournaments captured during ~7,000 tournament angler hours. Initial mortality of tournament bass was 2.9% during 2015: 41 bass were observed dead following tournaments. To date, 156 bass have been recaptured by electrofishing (7.5%), 289 bass were recaptured and weighed in by tournament anglers (13.8%), and 131 bass were recaptured and reported by recreational anglers (6.3%). Bass recaptures by tournament anglers increased from April to May, peaked in June, and steadily decreased the remainder of the season. Recaptures were positively correlated with the number of tournaments each month. Of the total 226 bass that were initially caught and subsequently recaptured by recreational and tournament anglers, 182 bass were recaptured once, 38 bass were recaptured twice, and six bass were recaptured three times. Only 14 tagged bass (<1%) were reported as harvested by recreational anglers, suggesting low exploitation or low reporting rates. In addition to jaw tags, 50 bass have been implanted with radio transmitters to track movement and improve detection and survival estimates. As of November 2015, three telemetry bass (15%) have been captured, released, and reported by recreational anglers, two bass have been captured at tournaments, and one bass is assumed harvested. Continued tagging and sampling of largemouth bass in Brushy Creek will provide useful estimates of seasonal movement, growth, and survival.

Potential effects of jaw deformities on largemouth bass populations

Tyler Froman, Andrea Sylvia and Michael J. Weber
Iowa State University, Natural Resource Ecology and Management

Public interest in sport fishing in addition to a current motivation for the conservation of sport fishes has led to growing popularity of catch and release angling. While catch and release angling can reduce harvest mortality, sub-lethal angling effects on reproductive success, movement rates, and physiological parameters have raised concerns about individual-level effects of angling. These factors may also have important population-level impacts. Recent observations indicate that angling can result in high jaw wounding rates that, depending upon the severity of the wound, can develop into physical jaw deformities. Jaw deformities may affect fish behaviors, including foraging ability and capture success, which may have implications for condition, growth, and survival. Yet, population-level effects of jaw deformities have not been evaluated. To evaluate the effects of jaw deformities on fish populations, largemouth bass were captured by anglers at 41 bass tournaments at Brushy Creek, Iowa between April and October 2015. A total of 87 of 1,121 bass (7.7%) captured by tournament anglers exhibited a jaw deformity. Angling recapture rates of tagged bass with (20.7%) and without (18.7%) jaw deformities were similar. Despite a high prevalence of jaw deformities, condition and mortality of bass with and without jaw deformities were similar. Growth of bass was highest in the spring and declined throughout summer and fall, growth increased with days tagged bass were at large, and bass with jaw deformities tended to grow slower than fish without deformities. Our results indicate that jaw deformities can be

prevalent in some populations, likely indicative of high angling pressure. Deformities appear to have little negative effect on bass condition, survival, or angling vulnerability but may result in reduced growth rates.

Detectability and Longevity of Hook Wounds in Largemouth Bass for Use as an Indicator of Angling Pressure

Savannah Fernholz, Andrea Sylvia and Michael J Weber
Natural Resource Ecology and Management, Iowa State University

Largemouth bass (*Micropterus salmoides*) are a popular species primarily targeted for catch-and-release angling. Information regarding angling pressure for this species is valuable for the management of their populations and that is often collected through angler surveys or mark-recapture techniques. However, these approaches are time-intensive and expensive, making them impractical in many situations. Alternatively, naturally occurring marks occurring during the process of angling (i.e., hook wounds) may provide similar information regarding angling pressure, but information regarding mark detection and longevity are needed before they can be used. We conducted an experimental evaluation to determine the detectability and longevity of hook wounds in largemouth bass angled with two different lure types (crankbait versus worm hook) in two separate months (May and July). Next, we evaluated proportion of tournament angled bass displaying hook wounds and the frequency of hook wound occurrence in five mouth locations. Finally, we evaluated seasonal trends in the proportion of bass captured that displayed hook wounds to demonstrate the application for this technique. During the experiment, hook wounds were correctly identified in 100% of bass that were angled on the day of capture, lowest detection occurred on the third day of holding (73%), and wounds were correctly identified in 91% of bass on the seventh day. However, lure type and day did not affect hook wound detection. Healing rates were faster in May (51% healed at day 7) compared to July (12% healed at day 6), but healing rates were not related to lure type, fish length, or initial wound size. In the field, hook wounds were identified in 35.8- 88.6% of tournament captured bass, with percentages increasing from April to August. Most hook wounds were located in the roof of mouth (35%), followed by left jaw (31%), right jaw (27%), gill/operculum/other wounds (24%), and broken/split jaws (5%). Electrofishing data indicated that 4.1- 40.0% of bass captured in Brushy Creek throughout the summer displayed hook wounds, with wound prevalence increasing from April to August. Overall, our results suggest hook wounds may be useful short-term indicators of largemouth bass angling pressure.

An Evaluation of Seasonal Movement and Habitat Selection of Northern Pike in Pools 10 and 13 in the Upper Mississippi River

Royce Bowman, Gene Jones and Kirk Hansen
Iowa Department of Natural Resources, Bellevue Fish Management Station

Northern Pike *Esox luscious* provide a relatively important recreational fishery for Upper Mississippi River (UMR) anglers. Habitat use by Northern Pike in lakes has been well documented although little or no information exists on movement and seasonal habitat selection of Northern Pike in the UMR. In October of 2011 and 2012, 60 northern pike were collected using a combination of standard fyke nets and electrofishing from backwater complexes in Pool 10 and Pool 13 in the UMR. Northern pike were surgically implanted with radio transmitters. Northern Pike occupied 3 habitat strata, backwater lakes, side channels and the main channel border of the UMR. All Northern Pike in Pool 10 overwintered in habitat consistent with that observed for Centrarchid species. In Pool 13, many backwater lakes are too shallow and degraded by sedimentation for overwintering fish. In Pool 13, some radio tagged Northern Pike overwintered in side channel habitats and sought out areas of much lower flow than was utilized during open water portions of the year. This research will help guide future backwater habitat restoration projects on the UMR.

Natal Origin and Movement Patterns of Paddlefish within the Mississippi River Basin
Ryan Hupfeld, Quinton Phelps, Sara Tripp and Gregory Whitledge
Iowa Department of Natural Resources; Rathbun Fish Hatchery

Migration can be important to the growth and survival of fishes at different life stages and occur in many different environments and aquatic ecosystems. For instance, numerous freshwater fish species in large rivers make long distance migrations. Evidence exists that suggest Paddlefish have the ability to travel long distances, cross multiple state boundaries, and move among multiple rivers within the Mississippi River Basin. However, the relative importance of different river reaches as natal environments for Paddlefish in the Mississippi River Basin is unknown, and knowledge of the frequency of Paddlefish movement among these interconnected rivers is limited. We sought to evaluate inter-river movement patterns of Paddlefish and to determine natal environment of Paddlefish collected in the Upper Mississippi River, Middle Mississippi River, Lower Mississippi River, Missouri River, and Ohio River using lower dentary bone Sr:Ca. We documented that Paddlefish captured in the Mississippi River Basin may move throughout these interconnected large rivers at various life stages. This suggests movement patterns or environmental life history of Paddlefish must be taken into account to properly manage this species. Because of this, interjurisdictional cooperation will likely be needed to ensure the success of Paddlefish within the Mississippi River Basin.

Incidental By-Catch Mortality on the Upper Mississippi River Lake Sturgeon Population: Effects on Restoration Efforts
Kyle R. Bales, Quinton E. Phelps, Sara J. Tripp and David P. Herzog
South Dakota Game, Fish, and Parks

Lake Sturgeon populations have experienced substantial declines due to habitat degradation and commercial overexploitation. Because of these declines, many agencies have initiated recovery plans to recover Lake Sturgeon populations. Recent evidence suggests restoration efforts in the Upper Mississippi River have bolstered the Lake Sturgeon population with commercial and recreational fishers reporting more frequent encounters. Although the increases in sightings are encouraging, the potential influence of by-catch mortality of Lake Sturgeon is unknown. We sought to evaluate the current status of the Upper Mississippi River Lake Sturgeon population and investigate the relative influence of by-catch or incidental catch and release mortality on the population. Overall, our simulation modeling suggests that minimal by-catch mortality could exert considerable influence on the reproductive potential of this recovering Lake Sturgeon population. To this end, fisheries managers must recognize the potentially negative consequences associated with rehabilitating Lake Sturgeon populations in the presence of other well established fisheries.

Cascading Effects of a Temperate Bass Die-off
Jonathan R. Meerbeek
Iowa Department of Natural Resources, Spirit Lake, IA

Several large temperate bass die-offs have occurred recently in natural lakes, rivers, and impoundments across the Midwest and several southern states. The exact causes of these die-offs are largely unknown, but most state agencies associate the fish kills to a combination of bacteria and one or more physical stressor's (e.g., malnutrition, overpopulation, poor water quality, sudden changes in water temperature, or spawning). The standard response to the public regarding temperate bass die-offs is that although the impact on the overall population may be initially large, they recover quickly due to their high reproductive output. However, information regarding initial and long-term impacts to the fishery these large temperate bass die-off's have is lacking. In Iowa, there have been at least 10 recorded large-scale temperate bass die-offs since the early 2000s, of which, five occurred between the fall of 2012 and spring of 2013. In some of these systems, the temperate bass populations have started to recover. However, White Bass populations in the Iowa Great Lakes three years post die-off have shown no signs of recovery; whereas Yellow Bass populations have rebounded to pre die-off conditions in the Okoboji's. During this period, large-scale changes in fish community dynamics have also occurred. This presentation will review and compare changes in fish community structure in similar systems

that experienced large-scale White Bass die-offs in the Midwest. This information can be used to guide fisheries management and communication outreach in Iowa.

Using Food Web Modeling to Determine Effects of Increased Exploitation on Invasive Carps in the Middle Mississippi River

Nicholas W. Kramer, Quinton E. Phelps, Clay L. Pierce and Michael E. Colvin
Southeast Missouri State University

Beginning with the inception of fisheries management in North America, nonnative fish species have been introduced to new waters with the goal of enhancing existing populations. Many of these changes have led to unanticipated, deleterious consequences. This has led to large scale fish removal efforts to combat the negative impacts of invasive fishes such as the Common Carp, Grass Carp and Silver and Bighead Carps. The objective of this study was to determine the amount of harvest required to control these invasive carps in a large Midwestern U.S. river system and its impact on remaining fish groups. We developed a mass balance trophic model of the Middle Mississippi River near Cape Girardeau, MO using Ecopath with Ecosim software (EwE, v. 6.4). In doing so, we developed biomass, production, consumption and diet composition estimates for 35 fish groups using Long Term Research Monitoring Program data for this location. Using the Ecosim component of the software we then modeled increasing amounts of harvest of invasive carps from 5-100% of their initial biomass to determine whether the removal of these nuisance species would either benefit or hinder other species. Common Carp and Grass Carp were more susceptible to increased harvest with populations becoming nonexistent with increased exploitation however, twice as much effort is needed before Silver Carp and Bighead Carp showed signs of being overfished. The remaining fish groups exhibited increases in relative biomass with the varying amounts of carp harvest while others, such as the Gar spp. or Moronids, showed decreases in relative biomass due to the high composition of invasive carps in their diet. Ultimately, this information can be used by river managers and commercial fisheries coordinators to evaluate management policies promoting the removal of these species from our waters, resulting in enhanced populations of native fish species.

Asian carp expansion in the Mississippi River: Focusing on the leading edge of the stronghold

Wes Sleeper, Sara Tripp and Quinton Phelps
Missouri Department of Conservation and Southeast Missouri State University

Asian carp have been expanding their range up the Mississippi River; however abundance is thought to be higher in the lower reaches which are in closer proximity to the Illinois River. However the Asian carp population has a stronghold in the Upper Mississippi River, with Lock and Dam 19 at Keokuk, IA being the only barrier to slow the expansion further up the Mississippi River. As Asian carp abundance increases below Lock and Dam 19, it is important to investigate potential means of control that will prevent or delay the complete invasion of the Mississippi River above Lock and Dam 19. Silver and bighead carp were collected below Lock and Dam 19 to determine population dynamics at the leading edge of the invasion. This information was then used to model the population and determine potential ways to control the Asian carp population and prevent continued expansion. Asian carp were also implanted with ultrasonic transmitters to evaluate rate of passage through the lock chamber at Lock and Dam 19. This information could be used to determine whether potential barriers need to be placed at the entrance of the lock chamber entrance to prevent Asian carp passage upstream into pool 19.

First evidence of Bighead, Silver, and Grass carp reproduction in Southeastern Iowa tributaries

Carlos A. Camacho, Christopher J. Sullivan, Michael J. Weber, and Clay L. Pierce
Department of Natural Resource Ecology and Management, Iowa State University

Bighead Carp (*Hypophthalmichthys nobilis*) and Silver Carp (*H. molitrix*), often called Bigheaded Carp, are invasive species that have been expanding their range throughout the Mississippi River basin. Grass Carp

(*Ctenopharyngodon idella*) are a closely related introduced species that have similar spawning requirements to Bigheaded Carp but have a broader distribution in Iowa. A lock and dam system has transformed the upper Mississippi River into a series of lentic habitats that may not support successful Bigheaded or Grass carp reproduction. However, free flowing tributaries to the upper Mississippi River may provide necessary habitat for reproduction, but reproduction in these systems has not been evaluated. Our objective was to evaluate Bigheaded and Grass carp reproduction in four southeastern Iowa tributaries compared to the Mississippi River. Ichthyoplankton samples were collected every ten days from April to October, 2014 from the Cedar, Iowa, Skunk, Des Moines, and Mississippi rivers to identify potential spawning locations and timing. Bigheaded and Grass carp eggs were observed in the Mississippi River from May 26th to June 18th and in the Iowa River on June 18th. Bigheaded Carp larvae were present in the Skunk, Iowa, and Mississippi rivers from May 26th to June 21st and Grass Carp larvae were found from May 27th to August 30th in the Skunk, Iowa, Des Moines, and Mississippi rivers. Peak densities of Bigheaded and Grass carp larvae were observed within and immediately downstream of tributaries near the confluence indicating reproduction is primarily occurring in the tributaries. If suitable spawning habitat is available to successfully reproduce in upper Mississippi River tributaries in Iowa, Bigheaded and Grass carp population abundance may increase rapidly despite inadequate reproductive habitat in impounded sections of the Mississippi River. Additional adult, egg, and larval sampling occurred in 2015 and are being processed to evaluate annual variation in reproductive patterns.

Longitudinal variation in life-history traits of Silver Carp in the Des Moines River
Christopher Sullivan, Carlos Camacho, Michael J. Weber and Clay L. Pierce
Department of Natural Resource Ecology and Management, Iowa State University

Downstream changes along a river's course are well documented, and these gradients can influence life-history traits of fish populations. Despite being essential to predicting species introductions, establishment, and longevity, such variations have received little attention. Since the 1970s, Silver Carp *Hypophthalmichthys molitrix* have spread throughout the Mississippi River basin and are currently expanding into interior Iowa rivers. The lack of information on spatial variation in life-history traits hinders the understanding and predictability of further invasions into Iowa rivers. Therefore, we evaluated Silver Carp life-history traits along the Des Moines River, the largest Mississippi River tributary within Iowa where Silver Carp have been present since the mid-1990s. Silver Carp were collected with daytime electrofishing from April – October 2014/2015 at five locations along the Des Moines River and at the Mississippi River confluence. Relative abundance ranged from 0 to 317.6 fish/hour (mean = 88.3 ± 29.1 SE) but was unrelated to longitudinal position. Sex ratios were skewed towards females at downstream sites (61% at Lock and Dam 19 [LD19] and 59% at the confluence) compared to upstream sites (43 % at Eddyville and 52% at Cliffland) but gonadosomatic index was unrelated to longitudinal position. Silver Carp length-at-age 3 was largest in the Mississippi River (445 mm ± 5 SE) and the confluence site (437 mm ± 3 SE) while length at age-3 was smaller at two upstream sites (Eddyville: 416.7 mm ± 3.1 SE; Cliffland: 406.5 mm ± 2.7 SE). Downstream location populations exhibited the highest relative weight (99 ± 1 SE at LD19 and 97 ± 1 SE at the confluence) while upstream populations had lower relative weight (91 ± 1 SE at Eddyville and 88 ± 1 SE at Cliffland). Age structure varied among sites as downstream populations exhibited an older age structure. Mortality was unrelated to longitudinal position as both upstream and downstream locations exhibited similar rates (A = 0.47– 0.71). Finally, adult age structure indicated recruitment was consistent at all sites (RVI: 0.16 – 0.91). Our results suggest that river longitudinal gradients play a marginal role in explaining life-history trait variation in Silver Carp in the Des Moines River.

Changes in wetland condition following drought-induced elimination of fish populations
Michael D. Sundberg, Ryan C. Baldwin, Timothy W. Stewart, Michael J. Weber, and Gabriel O. Demuth
Department of Natural Resource Ecology and Management, Iowa State University

Landscape alterations associated with agriculture have contributed to increased fish diversity and abundance in prairie pothole region (PPR) wetlands. Invasive wetland fishes (e.g., Black Bullhead *Ameirus melas*, Common Carp *Cyprinus carpio*) may contribute to wetland degradation by increasing turbidity and reducing the abundance and diversity of indigenous organisms. In 2012, a drought resulted in declines in central Iowa PPR wetland water volume and reduced fish abundance in some systems. The objective of this study was to evaluate if reduced fish abundance resulted in changes in wetland condition. We compared several parameters indicative of wetland condition (Tiger Salamander *Ambystoma tigrinum* biomass and numerical abundance, water clarity, plant cover and taxon richness) from 29 Iowa PPR wetlands in 2010-2011 (pre-drought) and 2014-2015 (post-drought). Pre and post-drought values were compared among wetlands where 1) large-bodied benthivorous (primarily Black Bullhead), pelagic (Cyprinids, Centrarchids), and total fish abundance was reduced, 2) where fish abundance was not reduced, and 3) where fishes were never detected. Water clarity increased where total and large-bodied benthivorous fish abundance was reduced. Plant cover increased in wetlands where large-bodied benthivorous fish abundance was reduced, likely due to reduced bioturbation. Similarly, plant taxon richness increased where total and large-bodied benthivorous fish abundance was reduced. Numerical abundance of Tiger Salamanders increased where total fish abundance was reduced, possibly due to less predation. However, Tiger Salamander biomass remained unchanged across comparisons. Our results suggest wetland condition generally improves following reductions in fish abundance through increases in water clarity, plant cover, plant taxon richness, and Tiger Salamander numerical abundance. While wetlands may be negatively affected by fish, they appear to have the capacity to recover when fish abundance declines.

Assessing post-stocking predation on fingerling walleye *Sander vitreus*
Emily E. Ball and Michael J. Weber
Iowa State University, Department of Natural Resource Ecology and Management

Stocking fry and fingerling walleye *Sander vitreus* is a common practice to sustain populations throughout North America. However, predation of stocked fishes may have negative effects on stocking success. The objective of this study is to assess post-stocking predation on fingerling walleye in two Iowa lakes. Largemouth bass *Micropterus salmoides*, smallmouth bass *M. dolomieu*, northern pike *Esox lucius*, adult walleye *Sander vitreus*, and muskellunge *E. masquinongy* were collected using pulsed DC electrofishing and experimental gill nets from September 15 to November 20, 2015 before and after three stocking events on East and West Okoboji lakes. A total of 185 predators were collected from East and 193 predators were collected from West Okoboji and stomach contents were removed via pulsed gastric lavage. Across all sampling events, 51% of predators collected in East Okoboji and 60% of predators collected in West Okoboji contained prey in their stomachs. No fingerling walleye were recovered from predator stomachs prior to the stocking. Post-stocking, 45 fingerling walleye were found in predator stomachs, 80% of fingerling walleye consumed within five days of stocking and fingerlings were found in predator stomachs up to nine days after the most recent stocking date. Fingerling walleye were recovered from eight predator stomachs (4%) in East Okoboji (1 largemouth bass, 5 northern pike, 2 adult walleye) and 28 predator stomachs (15%) in West Okoboji (3 largemouth bass, 3 muskellunge, 19 northern pike, 2 smallmouth bass, 1 adult walleye). Northern pike consumed the largest proportion of fingerling walleye (68% of walleye identified in diets) followed by muskellunge (8%), largemouth bass (8%), walleye (6%), and smallmouth bass (4%). Predatory species ingested different size ranges of fingerling walleye (largemouth bass: 137-218 mm; muskellunge: 140-185 mm; northern pike: 78-295 mm; smallmouth bass: 95-202 mm; and walleye: 94-171 mm). Additional diet analysis will take place during fall 2016 to provide additional insights as to the prevalence of post-stocking predation on fingerling walleye.

Intra- and inter-river differences in fish mercury accumulation rates for six Iowa interior rivers

Nathan Mills, Darcy Cashatt, Michael J. Weber and Clay Pierce
Department of Natural Resource Ecology and Management, Iowa State University

Mercury contamination in aquatic ecosystems is a global concern due to the health risks of consuming contaminated aquatic organisms, particularly fish. Mercury concentrations in fishes are highly variable and are influenced by a range of biotic and abiotic variables. Fish mercury accumulation can differ significantly among river systems. However, it is unknown whether species-specific fish mercury accumulation can differ among reaches within river systems. Smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), and northern pike (*Esox lucius*) were collected from an upstream and a downstream reach separated by at least one major dam (>3m) from the Des Moines, Iowa, Cedar, Wapsipinicon, Maquoketa, and Upper Iowa rivers during 2014-2015. Between 7-22 individuals of each species were collected with pulsed DC boat electrofishing at each sampling location. We tested differences in mercury accumulation between upstream and downstream locations and among rivers for each species using analysis of covariance (ANCOVA). Differences in mercury accumulation between upstream and downstream reaches were found for smallmouth bass on the Iowa River and Upper Iowa River, walleye on the Cedar, Des Moines River, Iowa River, and Wapsipinicon River, and channel catfish on the Maquoketa River. Flathead catfish and northern pike mercury accumulation rates were similar across all sampling reaches, with concentrations reaching the consumption advisory limit of 0.30 mg/kg at a length of 780 mm and 1170 mm, respectively. The highest smallmouth bass mercury accumulation rate was found in the downstream reach of the Upper Iowa River, with concentrations reaching the consumption advisory limit at a length of 305 mm. The highest walleye mercury accumulation rates were found in both reaches of the Upper Iowa River, the upstream reach of the Wapsipinicon River, and the downstream reach of the Cedar River, with concentrations reaching the advisory limit at a length of 440 mm. The highest channel catfish mercury accumulation rate was found in the upstream reach of the Iowa River, with concentrations reaching the advisory limit at a length of 620 mm. Differences between upstream and downstream mercury accumulation may be due to environmental factors or fish diets which are still under investigation. Results of this study may have implications for river, reach, and length-specific consumption advisories.

Gear- and Season-Specific Catch Rates of Age-0 Walleye and Age-0 White Bass in Harlan County Reservoir, Nebraska

Brett T. Miller, Casey W. Schoenebeck and Keith D. Koupal
Department of Biology, University of Nebraska at Kearney

The goal of this study was to develop a standardized sampling protocol for age-0 Walleye (*Sander vitreus*) and age-0 White Bass (*Morone chrysops*) by investigating the gear-and season specific catch rates from July to September using bag seines, boat electrofishing, and small-mesh gill nets. Significant differences for CPUE were found among reservoir zones for age-0 Walleye for bag seines ($KW = 9.674$, $P = 0.008$), boat electrofishing ($KW = 8.897$, $P = 0.012$), and small-mesh gill nets ($KW = 6.104$, $P = 0.047$). There were no significant differences among reservoir zones for age-0 White Bass. CPUE was not different among gears for age-0 Walleye. However, significant differences were found among gears in July ($KW = 10.754$, $P = 0.005$), August ($KW = 32.262$, $P < 0.001$), and September ($KW = 35.829$, $P < 0.001$) for age-0 White Bass. Age-0 Walleye catch rates were not different among months for each zone. Catch rates differed among months for age-0 White Bass for July ($KW = 13.775$, $P < 0.001$) and August ($KW = 23.218$, $P < 0.001$), however, September did not exhibit a significant difference ($KW = 4.169$, $P = 0.124$). We recommend using boat electrofishing in August as the most preferred method to capture age-0 Walleye and White Bass.

Influence of sieve mesh size on wetland macroinvertebrate diversity values and relationships with ecosystem condition indicators

Ryan Baldwin, Michael Sundberg, Timothy Stewart and Michael Weber
Department of Natural Resource Ecology and Management, Iowa State University

Although macroinvertebrates are important in food webs and sensitive to environmental change, they are often omitted from wetland condition monitoring programs because sample processing is time consuming and expensive. Identifying new methods of obtaining macroinvertebrate-based metrics could therefore contribute to improved wetland condition assessment and management. The objective of this study was to evaluate alternative methods of collecting wetland macroinvertebrate community data to identify a cost-effective method for obtaining wetland condition metrics. In 2014 and 2015, macroinvertebrates were collected from 27 prairie pothole wetlands using a stovepipe sampler. Material from the stovepipe was passed through a 500-µm mesh sieve, and macroinvertebrates and associated material retained on the sieve was preserved. In the laboratory, macroinvertebrates were removed from samples and divided into four size classes: invertebrates retained on a sieve with 6-mm mesh, all invertebrates retained on sieves with mesh sizes of 4-mm and 2-mm, and all invertebrates retained on the 500-µm mesh sieve (the conventional mesh size used to sample macroinvertebrates). Taxon richness values obtained for each macroinvertebrate size class were related to environmental variables previously determined to be indicative of wetland condition (turbidity, fish biomass, plant cover). Strength of relationships between macroinvertebrate taxon richness and environmental variables were of a similar magnitude when either a 2-mm sieve or 500-µm sieve were used to collect invertebrate data. Additionally, results suggest that use of a 2-mm sieve to collect macroinvertebrates would reduce sample processing time by approximately 60% relative to use of a 500-µm sieve. Consequently, use of the sieve with coarser mesh will generate cost savings in wetland monitoring while still producing data that accurately reflect wetland condition.

Upper Mississippi River Asian Carp Acoustic Telemetry

Kyle Mosel
US Fish and Wildlife Service, Onalaska, WI

Lock and Dam 19 has slowed the invasion of Asian carp in the Upper Mississippi River and currently serves as a bottleneck for fish passage. Our objective was to determine movement of the invasive bighead and silver carp in the Upper Mississippi River by using acoustic telemetry. To date, 155 Asian carp have been tagged in pools 16, 17, 18, 19, and 20. The number of stationary receivers monitoring movement has increased from 14 receivers in 2013 to 55 receivers in 2015. Nearly 3.5 million detections have been recorded by stationary receivers and manual tracking since the fall of 2013. Asian carp have been detected using the Skunk, Iowa, and Rock rivers with the majority of fish using the Iowa River. Passage events have occurred since 2013, with the majority events occurring in May, June, and October. Asian carp have not been detected moving in or out of the lock chambers (13-18). Several high-use areas have been detected in pools 16, 17, 18, and 19 which consist of several backwaters, tributaries, and above locks and dams. This is an ongoing project which will continue into 2018.

Poster Presentation Abstracts (Presenter Underlined)

Validating a diabetic glucose meter to assess Walleye *Sander vitreus* glucose concentrations

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Fisheries biologists and aquaculturists have long been interested in monitoring stress in fish by observing changes in glucose concentrations that are a product of the physiological secondary stress response. Diabetic glucose meters can be useful tools for quantitatively monitoring glucose concentrations in fishes. However, the production of previously validated meters has been discontinued, leaving few validated options. Our objective is evaluate the FreeStyle Lite diabetic glucose meter across a broad range of glucose concentrations exhibited by walleye fingerlings *Sander vitreus*. Eleven groups of five advanced walleye fingerlings were placed into individual five-gallon buckets. At the start of each trial, one randomly selected individual from each bucket was removed and a blood sample was collected. The remaining individuals were chased for ten minutes with a dip net and sequentially removed at approximately five minute intervals for blood samples collected from the caudal vein. Whole blood samples were analyzed immediately with a FreeStyle Lite diabetic glucose meter while the remaining blood was centrifuged at 3,500 rpm for ten minutes and plasma samples were analyzed colorimetrically in the laboratory. Glucose concentrations measured by the colorimetric laboratory methodology were higher than those reported by the diabetic glucose meter. Glucose concentrations measured by the diabetic glucose meter increased with values measured by colorimetric laboratory methods and the slope of the regression line did not differ from one. The cost of a diabetic glucose meter test strip is one sixth of the cost associated with submitting a sample to the laboratory and requires a smaller amount of blood, making it a more cost effective and ethical option. Preliminary results from this study suggest the FreeStyle Lite diabetic glucose meter can detect changes in glucose concentrations of advanced walleye fingerlings proportionally compared to traditional, more expensive, and time consuming colorimetric laboratory method.

Factors regulating bluegill populations in Iowa lakes

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Bluegill (*Lepomis macrochirus*) is a common inhabitant of freshwater systems across many parts of the world and is the most abundant member of the sunfish member in Iowa. Their broad geographical distribution and intermediate trophic level position expose bluegill to a range of conditions and allow populations to be influenced by a suite of biotic and abiotic factors. Although relationships among bluegill population characteristics and dynamics, community structure, and environmental conditions have been evaluated, some mechanisms of control remain poorly understood or debated. Fifty lakes and reservoirs across Iowa were sampled to investigate the relationships of bluegill relative abundance with size structure and condition. We also investigated biotic factors (food availability, predator abundance, and human pressure) and abiotic factors (water quality, lake morphometry, and watershed characteristics) that broadly influence bluegill populations. Bluegill size structure was positively related to relative abundance. Bluegill relative abundance increased and size structure shifted to larger individuals with increased largemouth bass relative abundance, whereas common carp relative abundance, largemouth bass size structure, land-use, lake morphometry, water quality, and county population were also important in explaining bluegill abundance and size structure. Bluegill condition was best explained by lake morphometry and water quality parameters and increased with lake productivity. We conclude that knowledge of factors associated with variation in bluegill populations among Iowa lakes provide insights into the autecology and broad provisions for management of these commonly caught, and highly sought after, species in Iowa.

How wide is too wide? Transect spacing for hydroacoustic surveys.
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Hydroacoustic surveys are routinely completed by state and federal agencies and private companies to produce maps and calculate morphometric parameters. Habitat and bathymetry maps are used by anglers to increase fishing success. Lake managers also use maps as well as lake morphometrics (e.g., volume, mean depth) in planning and evaluating management efforts. Deciding what information needs to be obtained is the first step to setting up a hydroacoustic survey. Is it a detailed map of the bottom or a volume figure? Detailed bathymetry maps require navigating a tighter transect spacing compared to calculating volume. Ideally transects should be adequately spaced to collect all data needed and avoid oversampling and maximize efficiency. Four natural lakes and eight impoundments ranging from 22 to 640 acres were surveyed between 2006 and 2013 using a 20 meter transect spacing. Transect data were removed from each survey to simulate 40, 60, 80, and 100 meter spacing. Morphometric parameters and detailed maps were compared for each transect spacing. Results were used to justify appropriate transect spacing of hydroacoustic surveys based on information need.

Using a Bayesian hierarchical approach to identify fish eggs
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Early life stages are of critical importance to understanding fish population ecology. However, most fish species do not resemble their adult form during early life stages nor do they have adequate descriptions for identification. Furthermore, eggs and larvae from recently invaded fishes may be improperly identified as native fishes and not detected on invasion fronts. To alleviate identification difficulties using traditional meristic and morphometric characteristics, genetic identification has become the preferred alternative. However, genetic identification is expensive and egg and larval sampling collections can have thousands of samples to identify leaving little choice but to use traditional methods. Our objective was to develop a Bayesian hierarchical model that uses a mixture of traditional and genetic techniques to identify fish eggs where small subsamples of genetically identified eggs help distinguish unique meristic and morphometric characteristics for each species. In 2014, 10,205 fish eggs were collected from the Upper Mississippi River and tributaries from southeast Iowa. A spatiotemporally stratified random sample of 1,300 eggs was subsampled, classified and measured for meristic and morphometric characteristics, and subsequently genetically identified. Initial models were able to identify Freshwater Drum (Aplodinotus grunniens) eggs from all other species using outer membrane size and embryo pigmentation with a 3.8% error rate. Freshwater Drum had a smaller mean outer membrane size (1.471 mm ±.007 SE) and higher percentage of embryos with pigmentation (78%) than the non-Freshwater Drum mean outer membrane size (2.319 mm ±.044 SE) and embryo pigmentation (6%). When applied to all eggs sampled, this model predicted approximately 33% of the 10,205 eggs collected in 2014 were Freshwater Drum. Additional genetic information and meristic and morphometric characteristics are being evaluated to revise the model to identify additional species.

Common Carp Population Characteristics in the Upper Mississippi River Basin
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Common Carp *Cyprinus carpio* were introduced to the United States from Europe. Introductions were to be utilized as an additional food source, but after flooding and subsequent connection with river systems, their numbers increased and range expanded. Common Carp are adaptable and can survive in a large array of environmental conditions. Additionally, Common Carp have the ability to impose negative effects on the benthic community. Despite this, Common Carp populations have been infrequently analyzed. Thus, the

objectives of this study were to evaluate the population characteristics and trends of Common Carp in the Upper Mississippi River Basin and assess the relative influence Common Carp pose on native fishes. Simulations to determine the amount of mortality required to collapse the population were conducted. Based on our results, Common Carp exhibit the greatest total overall biomass. However, based on Long Term Resource Monitoring Program sampling from 1993-2014, Common Carp populations have decreased across all pools sampled. The mechanism initiating population declines is unclear. Based on simulations, we determined that to initiate collapse Common Carp mortality must occur for fish of a wide size range of the population (i.e., ~17-22% of population at ≥200 mm, ~23-27% at ≥300 mm, or 40-45% at ≥400 mm). Despite declines and the possibility of collapse, given the relatively high biomass and long life span, the effects on the benthic community could be substantial. We suggest future research should evaluate resource overlap between Common Carp and native fishes. Also, identification of mechanism initiating population decline should be investigated to understand potential method of control to alleviate negative effects on native fish populations.

Shovelnose Sturgeon recruitment sources and inter-river movement of Shovelnose and Lake Sturgeons in pools 20-26 of the Upper Mississippi River: implications for sturgeon conservation

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Several sturgeon populations in North America, including those in the Mississippi River Basin, are at risk due to habitat degradation and overharvest. In the Upper Mississippi River, Lake Sturgeon are maintained by stocking, whereas Shovelnose Sturgeon are naturally reproducing and may be legally commercially harvested. Sturgeons that inhabit the Upper Mississippi River may also potentially use other interconnected river reaches during a portion of their lifetimes. However, the relative importance of different river reaches as natal environments for Shovelnose Sturgeon present in the Upper Mississippi River is unknown, and knowledge of the frequency of sturgeon movement among these interconnected rivers is limited. Thus, we sought to reconstruct inter-river movement patterns of stocked Lake Sturgeon and wild Shovelnose Sturgeon and to determine natal environment of Shovelnose Sturgeon collected from the Upper Mississippi River using fin ray Sr:Ca. Overall, we documented that the majority Shovelnose Sturgeon captured in the Upper Mississippi River originate from locations outside the UMR (Missouri River, Middle Mississippi River); whereas, Lake Sturgeon exhibit infrequent movement outside of the Upper Mississippi River, but may move throughout these interconnected large rivers at various life stages. Thus, interjurisdictional cooperation will likely be needed to ensure sustainability of the Shovelnose Sturgeon commercial fishery and the success of Lake Sturgeon reintroduction in the Upper Mississippi River.

Assessment of Grass Carp populations in southeastern Iowa rivers

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Originally introduced for aquatic vegetation biocontrol in the 1960s, Grass Carp *Ctenopharyngodon idella* are now commonplace throughout North America, especially the Upper Mississippi River (UMR) watershed. Despite their longstanding presence within the UMR, little is known about Grass Carp demographics and their reproductive characteristics in feral populations. Hence, gaining basic knowledge concerning their demographics is important for understanding their status within the UMR. The objective of this study is to evaluate Grass Carp population characteristics and dynamics in southeastern Iowa rivers. Grass Carp were sampled monthly (April – October 2014/2015) with boat electrofishing and trammel nets at five sites below Lock and Dam 19 (LD19) in the Mississippi and Des Moines rivers and at five sites above LD19 in the Mississippi, Skunk, Iowa, and Cedar rivers. In all, 202 Grass Carp were collected in which sites below LD19 accounted for 86% of all captures. Below LD19, electrofishing CPUE ranged from 0 to 22.6 (mean = 2.4 ± 0.5 SE) while trammel net CPUE ranged from 0 to 8.0 (mean = 0.8 ± 0.2 SE). Above LD19, electrofishing CPUE ranged from 0 to 12.1 (mean = 0.6 ± 0.2 SE) while trammel net CPUE ranged from 0 to 1.5 (mean = 0.03 ± 0.03). Sex ratios were male biased as females represented only 31% of all individuals captured above and 47% of all individuals captured below LD19. Grass Carp GSI values peaked during late spring and females with

developed gonads were present across all months. Grass Carp populations below LD19 were smaller, generally younger, and in lower condition than populations above LD19. Below LD19, a von Bertalanffy growth equation described growth as: $L_t = 910.9\ (1 - e^{-0.11\ (t-0)})$ while an insufficient amount of fish were aged above LD19 to analyze. Lastly, natural mortality rates were lower above LD19 ($A = 0.26 \pm 0.05$) compared to populations below LD19 ($A = 0.44 \pm 0.04$). Our results provides basic information on Grass Carp population characteristics and insights on their current population status in southeastern Iowa interior rivers.

Linkages among land use, chemical contaminants, invasive fishes, and plant and salamander communities in prairie pothole wetlands

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Prairie pothole wetlands provide many valuable ecosystem services. However, land use changes in the prairie pothole region (PPR) have increased contaminant loadings and facilitated invasions by fishes, leading to declines in biological diversity and wetland condition. Study objectives were to quantify direct and indirect relationships among land use, herbicides, chloride, invasive fishes, turbidity, the plant community, and Tiger Salamander *Ambystoma tigrinum* abundance, and to use quantified relationships to identify indicators of wetland condition. Data were collected from 45 permanently/semipermanently flooded Iowa wetlands, and multiple regression was used to quantify relationships among variables. Results suggested crop land and impervious surface coverage were related to elevated chloride concentration and increased wetland surface area, possibly due to increased surface runoff. While the abundance of fishes, primarily Fathead Minnow *Pimephales promelas* and Black Bullhead *Ameiurus melas*, was unrelated to wetland surface area, Tiger Salamander abundance declined and turbidity increased with increasing fish biomass. Additionally, plant cover declined with increasing turbidity and herbicide concentration. However, herbicide concentration was not related to surrounding land cover. These findings suggest that chloride is indicative of human land use, and turbidity, plant cover, and Tiger Salamander abundance are indicative of invasive fish abundance. Additionally, our results suggest that efforts to reduce herbicide use and fish abundance in wetlands would likely increase the abundance and diversity of wetland organisms.

White Bass populations characteristics in the Upper Mississippi River

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White Bass *Morone chrysops* are an important component of the Upper Mississippi River sport fishery. Because of the demand for a high quality fishery, fisheries professionals must evaluate White Bass population characteristics to effectively manage these populations. Despite the popularity among Mississippi River anglers, limited information on the White Bass populations in the Upper Mississippi River exists. We evaluated trends in White Bass relative abundance using historic (1993-2012) Long-Term-Resource-Monitoring-Program data. To acquire more fine scale White Bass information, we evaluated the population demographics of White Bass within two distinct reaches of the Upper Mississippi River. White Bass populations throughout the Upper Mississippi River Basin appear to have experienced slight declines between 1993-2012. In terms of more fine scale White Bass demographic information, growth was faster in the southernmost reach, while White Bass further upstream (pool 16) exhibited slower growth. Correspondingly, White Bass mortality rates in the southernmost reach were higher than those experienced upstream. While slight declines may exist throughout the Upper Mississippi River, latitudinal clines in White Bass populations may exist and should be incorporated into a basin-wide assessment. Ultimately, this information could be used by fishery managers to more effectively manage White Bass populations.