

*45th Meeting of the Illinois Chapter of the
American Fisheries Society*

Eagle Creek Resort, Lake Shelbyville, Illinois

February 27, 2007 – March 1, 2007

Bud Fischer, President

Jim Garvey, President-Elect

Ann Holtrop, Secretary-Treasurer

Steve Pallo, Past-President

Meeting Schedule:

Tuesday, February 27

10:00 AM -12:00 PM

Executive Committee Meeting

1:00 PM- 5:00 PM

Registration

1:00 PM – 4:40 PM

Welcome & Platform Presentations

5:00 PM – 7:00 PM

Fisheries Social

Wednesday, February 28

8:00 AM – 5:00 PM

Registration

8:30 AM – 10:00 AM

Welcome & Platform Presentations

10:00 AM - 10:20 AM

BREAK

10:20 AM - 12 PM

Platform Presentations

12:00 PM - 1:30 PM

LUNCH

1:30 PM – 3:00 PM

Platform Presentations

3:00 PM - 3:30 PM

BREAK

3:30 PM -5:00 PM

Business Meeting

6:30 PM

Banquet & Poster Viewing

Thursday, March 1

8:30 AM – 11:00 AM

Welcome & Platform Presentations

11:00 AM

Final Words and Meeting Adjourn

Platform Presentations at a Glance

Tuesday		
1:00-1:20	Moderator Welcome	
1:20:1:40	Robert Fischer and Vincent Gutowski	The effects of streambank stabilization structures on stream channel morphology and fish community structure
1:40-2:00	Jeffrey A. Stein and David P. Phillip	Modeling largemouth bass (<i>Micropterus salmoides</i>) recruitment dynamics: effects of catch and release angling of brood-guarding parental males.
2:00-2:20	Stephen M. Pescitelli and Robert C. Rung	Preliminary evaluation of fish passage structures on Big Rock Creek with observations on life history characteristics of migratory Catastomids.
2:20-2:40	Herb Dreier	The Central Illinois Urban Fishing Program —What Works
2:40-3:00	Chad R. Dolan, James T. Lamer, and John H. Chick	Swan Lake habitat rehabilitation and enhancement project (HREP): post-project biological and physical response monitoring.
BREAK		
3:20-3:40	Kevin S. Irons, Greg G. Sass, Michael A. McClelland, and Joshua D. Stafford	Reduced condition factor of two native fish species coincident with invasion of non-native Asian carp in the Illinois River: Evidence for competition and reduced fitness?
3:40-4:00	Adam M. Lohmeyer, and James E. Garvey.	Larval Asian Carp in the Upper and Middle Mississippi River: an index of establishment and dispersal potential
4:00-4:20	Michael A. McClelland and Greg G. Sass	Trends in largemouth bass and bluegill populations among the upper and lower Illinois River, 1957-2006
4:20-4:40	Timothy M. O'Hara, Michael A. McClelland, Kevin S. Irons, Thad R. Cook, and Greg G. Sass	The effect of a recently completed Habitat Rehabilitation and Enhancement Project (HREP) on fish abundances in the La Grange Reach of the Illinois River using Long Term Resource Monitoring Program (LTRMP) data.
5:00-7:00	Social	
Wednesday		
8:30-8:40	Moderator Welcome	
8:40-9:00	Ben J. Lubinski, Eric N. Ratcliff, Lori S. Gittinger, and John H. Chick	The effects of drought-like conditions on fish and water quality parameters in Pool 26 of the Mississippi River
9:00-9:20	Greg G. Sass, Kevin S. Irons, Matt T. O'Hara, Thad R. Cook, Michael A. McClelland, Nerissa N. Michaels, Melissa L. Smith, and Matt R. Stroub	Active versus passive management of common and grass carp for backwater lake native fish restoration: a case study from the Nature Conservancy's Emiquon Preserve
9:20-9:40	Jennifer A. Bartlett	Site Fidelity in <i>Lepomis macrochirus</i> : Tracking Nesting Behavior in Bluegill Sunfish

9:40-10:00	Randall W. Oplinger and David H. Wahl	Influence of Largemouth Bass on the Growth and Age of Maturation of Bluegill Sunfish
BREAK		
10:20-10:40	Jeremy S. Tiemann	Refining the River Continuum Concept - Solving the Riddle of Adventitious Streams
10:40-11:00	Sara J. Tripp, Ronald C. Brooks, Michael Hill, Matthew Mangan, Timothy Spier, David Herzog, Robert Hrabik, and James E. Garvey	Fish movement in the Mississippi River
11:00-11:20	James E. Garvey and Robert E. Colombo	Comparative fish stock assessments in the Wabash and Mississippi Rivers
11:20-11:40	Catherine E. Ciak, Robert U. Fischer, Charles L. Pederson, and James M. Novak	The Response of Benthic Macroinvertebrate Community Structure to an Extreme Hydrological Event
11:40-12:00	John H. Chick, Lori A. Soeken-Gittinger, Eric N. Ratcliff, Eric J. Gittinger, and Benjamin J. Lubinski.	Relationship between community structure of YOY fishes and water quality variables from pool 26 of the Upper Mississippi River
LUNCH		
1:30-1:40	Moderator Welcome	
1:40-2:00	Matthew J. Afflerbaugh, Timothy W. Spier, and Marcus L. Miller	Sturgeon TBA
2:00-2:20	Ann Holtrop	Illinois' Wildlife Action Plan: Defining a Vision for Conservation Success
2:20-2:40	Diane K. Shasteen	Distribution, Abundance, and Habitat Requirements of the Threatened Least Brook Lamprey, <i>Lampetra aepyptera</i> , in the Shawnee National Forest
2:40-3:00	Stephen M. Pescitelli and Robert C. Rung	Expanded sub-watershed monitoring of stream communities in Northeastern Illinois.
BREAK		
3:30	Business meeting	
6:30	Banquet	
Thursday		
8:30-8:40	Moderator Welcome	
8:40-9:00	Curtis P. Wagner, Adam B. Scimone, Lisa M. Einfalt, David H. Wahl, Martin J. Jennings, and Jeffrey M. Kampa	Marking fingerling muskellunge: the effects of PIT tagging and fin-clipping on growth, survival, and foraging behavior
9:00-9:20	Greg Snellen, Travis Moore, Brian Todd, Timothy Spier, & Marcus Miller	Habitat Use and Movement of Adult Lake Sturgeon In Pool 24 of the Mississippi River
9:20-9:40	Mark W. Carter, John M. Dettmers and David	Summer movement of black basses <i>Micropterus</i> spp. in southwestern Lake

	H. Wahl	Michigan
9:40-10:00	James T. Lamer, Chad R. Dolan, John H. Chick, and John M. Epifanio	Hybridization between silver and bighead carp in the Mississippi and Illinois Rivers.
10:00-10:20	Andrew Claxton and Jeffrey Laursen	Impact of coalmine effluent on helminth community structure parasitizing <i>Lepomis</i> spp.
10:20-10:40	Laura L. Canny, Mike Bozek, and Jen Hauxwell	Response of aquatic macrophytes to human perturbation and water chemistry in Wisconsin lakes
10:40-11:00	Leslie Bol, Ann Holtrop, and Leon Hinz	Updating Illinois stream ratings and identifying biologically significant streams based on measures of biotic integrity and biodiversity
FINAL WORDS		

Poster Presentations at a Glance

Michael A. McClelland, Kevin S. Irons and Thad R. Cook	Fish assemblages within the Great Rivers of the United States
Jay P. Gerber, Charles L. Pederson, and Robert U. Fischer	Reservoir and sanitary district discharges may alter stream community metabolism
Nerissa N. Michaels, Greg G. Sass, and Kevin S. Irons,	Sportfish trends in the La Grange reach of the Illinois River, 1994-2006
Marcus L. Miller,	Lake Sturgeon Sampling Techniques on the Upper Mississippi River
Eric J. Gittinger, Robert J. Cosgriff, Lori A. Gittinger, Ben J. Lubinski, Eric N. Ratcliff, John K. Tucker, and John H. Chick	The Great Rivers Field Station: Past, Present and Future Highlights from Over a Decade of Monitoring Pool 26 of the Mississippi River
Matt R. Stroub, Greg G. Sass, and Kevin S. Irons	Fish population dynamics of an annually-flooded seasonally-isolated backwater lake of the Illinois River
Jeremy S. Tiemann	Fish Porn II: Reproductive behavior of <i>Pimephales</i>
Quinton E. Phelps, Robert E. Colombo, James E. Garvey, and Roy C. Heidinger	Gear-Specific Population Demographics of Channel Catfish in a Large Midwestern River
Jessica Rasmussen and Charles Pederson	A Lakes and Reservoirs Phytoplankton Index of Biotic Integrity: Examining the Response of Phytoplankton Assemblages to Regional Differences

Paper Abstracts (In Order of Presentation)

1. The effects of streambank stabilization structures on stream channel morphology and fish community structure

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Gutowski, Vincent P. Department of Geology-Geography, Eastern Illinois University, Charleston, IL, 61920; 217-581-3825, vpgutowski@eiu.edu

The Embarras River is a relatively large river, draining 2,440 square miles in east-central Illinois. Because of severe streambank erosion on the river, near Toledo, Illinois, streambank stabilization structures, known as bendway weirs, were installed on a half-mile segment containing two meander bends. Changes in both stream morphology and biotic integrity that occurred in response to the structures were monitored from 1999 through 2002 and then again in 2005. Surveys indicate that streambank erosion continues, but has slowed from approximately 6 feet per year to less than 3 feet per year. In the segment containing the weir network, the riverbed has aggraded up to 6 feet at some points and degraded up to 4 feet at other points. In response to stream morphology changes, a significant negative linear relationship was observed for both species richness and diversity over the monitoring period. Species richness and diversity declined from 18 species and a diversity score of 3.6 being present during the pre-construction phase of the project to a low of 8 species present and a diversity score of 1.4 six years after construction. A total of 10 species have been lost over the monitoring period, with the major species lost being the golden redhorse, shorthead redhorse and the quillback. Overall, the weirs have reduced streambank erosion rates, but have not mitigated the problem completely. Unexpected problems, such as scour pool aggradations and loss of biotic integrity have arisen and need to be monitored and addressed in the future.

2. Modeling largemouth bass (*Micropterus salmoides*) recruitment dynamics: effects of catch and release angling of brood-guarding parental males.

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Largemouth bass are a highly popular sport fish throughout North America that supports an economically important recreational fishery and a booming interest in competitive angling. Catch and release angling has become a common tactic among anglers of many game fish species striving to utilize and preserve the resource. Studies focused on black bass have examined physiological effects of the angling event and individual reproductive success, but no research has quantified the effect of catch and release angling of brood-guarding largemouth bass on recruitment dynamics. Changes in recruitment driven by decreases in reproductive success during catch and release events potentially change population size and may disrupt the sustainability of an important

resource. A dynamic biological model was developed to predict changes in largemouth bass recruitment under varying levels of catch and release angling during the reproductive season. The model incorporates various biotic and abiotic factors known to influence recruitment, and successfully represents known population fluctuations over time. The model was used to test the sensitivity of recruitment to changes in several key parameters thought to influence juvenile survival, including reductions in parental care, supplemental stocking, and variability in the proportion of adults reproducing in a given season. The model was also used to determine the effect of supplemental stocking on overall population size, and to test the effects of angling regulations on recruitment.

3. Preliminary evaluation of fish passage structures on Big Rock Creek with observations on life history characteristics of migratory Catostomids.

Stephen M. Pescitelli and Robert C. Rung
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Big Rock Creek is a large, high quality tributary to the Fox River, located in Kane and Kendall Counties in Northeastern Illinois. In 2005, fish passage structures were installed at two mainstem dams, with funds from USFWS. Two different structures were installed, a full width ramp, and a bypass channel. In the spring of 2006, as part of the fishery evaluation efforts for the projects, we sampled and observed spawning runs of large-bodied suckers and other selected species in Big Rock Creek. We marked a total of 537 fish with hole punches in various fins, and then sampled throughout the target area of the stream. A trap net was also set at the upstream end of the bypass channel during May and June to capture upstream migrants. Only two recaptures of marked fish were made during subsequent sampling, possibly indicating the presence of a large spawning population. However, spawning groups of shorthead redhorse and other species were found upstream of the full width ramp, located farthest downstream. Fish have also been found residing throughout the entire length of this structure. A total of 13 species were found in the bypass channel capture net, including weaker swimming species, such as sunfish, darters, and minnows; however, overall usage of the bypass channel was low, and no suckers were observed in the net. During spring sampling we had the opportunity to make various life history observations on spawning suckers, particularly shorthead redhorse which are discussed in relation to fish passage considerations.

4. The Central Illinois Urban Fishing Program —What Works

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Introduced in 1985 in the parks of Chicago, the Illinois Urban Fishing Program strives to teach individuals of all ages how to fish, to provide better local fishing opportunities, and to give participants a greater understanding and appreciation for natural resources. In 1994, "Fish Illinois" allowed an expansion of the Illinois Urban Fishing Program. At this time we have three coordinators who manage summer fishing clinics at 22 sites. At each of these sites catchable-sized fish are stocked and free fishing clinics are offered twice

daily Monday through Friday. The coordinators also hold school fishing programs, fishing programs for scouts and 4-H clubs, and promote and teach volunteer organizations and individuals to hold their own fishing programs. Recently the central Illinois school fishing programs and volunteer programs have had an increasing number of attendees and these programs often seem to be higher quality programs. School and volunteer programs are better because family members (parents/grandparents) often accompany the kids and help them fish. These events are “special” for both the kids and the adults, and allowing them to have that experience together makes it more likely they will go fishing again on their own. Individuals or members of organizations can be trained to hold fishing programs. IDNR can provide training along with fishing clinic necessities such as educational posters, fishing poles, tackle boxes, literature, etc. Fishing can be an outdoor family activity that might lead to a lifelong hobby.

5. Swan Lake habitat rehabilitation and enhancement project (HREP): post-project biological and physical response monitoring.

Chad R. Dolan¹, James T. Lamer¹, and John H. Chick¹.

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Sedimentation of backwater lakes in the Mississippi and Illinois River systems is an ongoing problem. Swan Lake is a 1,150 ha backwater lake of the Illinois River in which an HREP was implemented in 1993 to improve conditions. It was divided into three distinct units (upper, middle, and lower), and stop-log gates were installed to manipulate water levels. Goals were to reduce sedimentation rates and consolidate sediments to promote the growth of aquatic vegetation and improve habitat for fish and wildlife. Pre-project monitoring was executed in 1992 to collect baseline data on water quality, sediment, aquatic vegetation, macroinvertebrates, and fishes. Post-project monitoring began in 2004, two years after completion of HREP construction, and concluded in 2006. Sites with consolidated sediments (penetrometer depths < 20 cm) increased due to draw-downs, but areas that remained wet were more flocculent than in 1992. Gross sedimentation rate was 798-1320 g dry wt./m²/day, and was similar to 1992. Reduced turbidity was observed in the middle unit only, likely a reflection of increased sediment compaction. Submersed aquatics were absent throughout the lake during the post-project except in the upper unit, and substantial growth of emergent vegetation was observed in the middle and upper units. Chironomids were the dominate macroinvertebrate during both project phases. More fish species were collected in the pre- (n=40) versus the post-project (n=30). Fish community changes include the addition of Asian carp, and a reduction in buffalo. Post-project objectives were 1) to compile data on the same abiotic and biotic variables as in 1992, and 2) to compare pre- and post-project data to assess Swan Lake HREP successes.

6. Reduced condition factor of two native fish species coincident with invasion of non-native Asian carp in the Illinois River: Evidence for competition and reduced fitness?

Irons, Kevin .S.¹, Greg G. Sass¹, Michael A. McClelland¹, and Joshua D. Stafford²

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Non-native, Asian bighead *Hypophthalmichthys nobilis* and silver carp *H. molitrix*, have been present in the Illinois River since the early 1990's. The U.S. Army Corps of Engineers' Long Term Resource Monitoring Program (LTRMP) has collected bighead and silver carp during routine monitoring of the La Grange Reach, Illinois River since 1995 and 1998, respectively. Annual recruitment of bighead and silver carp has been variable, but carp biomass in the La Grange Reach has increased exponentially since 2000 and these exotics now dominate the fish community. Previous research suggests that dietary overlap exists between both Asian carp species and two native Illinois River fishes; gizzard shad *Dorosoma cepedianum* and bigmouth buffalo *Ictiobus cyprinellus*. We used length and weight data collected during 2000-2005 from over 2,400 fish to evaluate body condition of shad and buffalo since Asian carp establishment. We evaluated body condition to assess potential competitive interactions and consequences to fitness due to these exotic species. We identified significant declines in body condition of shad and buffalo following Asian carp invasion. We observed statistically significant decreases in shad condition between 2002 and 2005 ($p < 0.001$), while buffalo condition decreased between 2000 and all subsequent years analyzed ($p < 0.003$). To our knowledge, the LTRMP provides the first correlative evidence of direct negative competitive interactions between bighead and silver carp and native fish species. We caution that reductions in shad and buffalo body condition may lead to reduced fitness, thereby potentially accelerating biotic homogenization of Asian carp in the Illinois River and causing further disruptions of the native food web and fish community.

7. Larval Asian Carp in the Upper and Middle Mississippi River: an index of establishment and dispersal potential

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Two Asian carp species, the bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*H. molitrix*), have invaded much of the Mississippi River basin. However, it is unclear whether these species are able to successfully reproduce in navigation pools of the Upper Mississippi River (UMR) relative to the unpooled lower reaches. We compared the reproductive output of Asian carps between the pooled UMR and unpooled Middle Mississippi River (MMR) by quantifying larval densities and survival to the juvenile

stage. During May through August of 2005 and 2006, larvae were sampled between river kilometer (RKM) 584 and RKM 175 using a neuston net. UMR pools 20, 22, 24, and 26 contained an upstream and a downstream site about 1.5 km from each lock and dam. Larval sampling in the MMR occurred at Chester, IL (RKM 175). During July through September of 2005 and 2006, juveniles were sampled with seining in backwater sites at each of the UMR pools and in the MMR. Larval Asian carp occurred in the MMR and above lock and dam (LD) 26 in the UMR, peaking during the first week of June in both years. Asian carp larvae never occurred in the other UMR pools. During 2006, peak densities were greater in the MMR (14.9 larvae/m³) than above LD 26 in the UMR (2.2 larvae/m³). Juveniles occurred in the MMR backwaters for both years and in Pool 26 for 2006 but not the other pools. Impoundments on the UMR may limit reproduction of Asian carps.

8. Trends in largemouth bass and bluegill populations among the upper and lower Illinois River, 1957-2006

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Fish collections from the Long-Term Illinois River Fish Population Monitoring Program suggest a potential decline in largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) catches in the lower reaches of the Illinois River. We used this data to test for spatial and temporal differences in largemouth bass and bluegill populations among six reaches of the Illinois River. Prior analyses have indicated spatial differences among upper (Starved Rock, Marseilles, and Dresden) and lower (Peoria, La Grange, and Alton) river reaches and temporal changes between early (1957-1981) and late (1982-2006) years of the program. We used these spatial and temporal breaks to compare catches, growth (length/weight relationships), and recruitment. Electrofishing CPUE showed an increasing trend over all years for bluegill and largemouth bass in the upper river. Bluegill catches increased in the lower river, while largemouth bass catches declined. No differences were observed in bluegill and largemouth bass growth among reaches and time periods. Recruitment assessments of bluegill show increasing numbers of fish at and above stock length in both the upper and lower river while largemouth bass collections show increasing numbers of fish at and above stock length in the upper river only. Largemouth bass recruitment assessments revealed a decreasing trend of fish above stock length with little increase in fish of stock length in the lower river. Increases in largemouth bass and bluegill abundances in the upper river may be due to higher water clarity, the presence of aquatic vegetation, less variable hydrologic conditions, and improvements in treatment of wastewater.

9. The effect of a recently completed Habitat Rehabilitation and Enhancement Project (HREP) on fish abundances in the La Grange Reach of the Illinois River using Long Term Resource Monitoring Program (LTRMP) data.

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The Long Term Resource Monitoring Program (LTRMP) fish component monitors fish communities to test for changes in abundances and species composition in six regional trend areas of the Upper Mississippi River System (UMRS). Using this data, we evaluated the ability of the LTRMP to detect changes in the fish community as a consequence of a HREP in the La Grange Reach. In 1996, an estimated 46 million fish were produced and discharged from the south cell of Lake Chautauqua. While this response may indicate that the south cell serves as a spawning and nursery area for many fish species, no studies have tested for recruitment to the river fish community. At three spatial scales (local 1 river mile (rm), regional ~10 rm and reach wide 80 rm), we assessed fish catch-per-unit-effort (CPUE) data collected from mini-fyke net and day electrofishing among pre- (1993-1995) and post-HREP (1996-2005) periods. Our results may indicate that: (1) the LTRMP sampling design lacked sufficient statistical power to detect effects of the HREP; (2) the LTRMP sampling design lacked the spatial and temporal resolution to detect effects; (3) the Lake Chautauqua HREP has not been established long enough to detect long-term trends in fish production; and/or (4) the HREP had no effect on fish recruitment to the Illinois River. Our results suggest that an intensive study at defined temporal and spatial scales may be required to detect changes in the fish community in the La Grange Reach as a consequence of HREP's.

10. The effects of drought-like conditions on fish and water quality parameters in Pool 26 of the Mississippi River

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The Great Rivers Field Station has been monitoring fish populations and water quality parameters in Pool 26 of the Mississippi River since the early 1990's for the Long Term Resource Monitoring Program (LTRMP). The monitoring program identified significant changes in fish and water quality parameters during drought-like conditions experienced in 2005 and 2006. Fish sampling in 2006 revealed total catches of fish species including emerald shiner, skipjack herring, channel catfish, and smallmouth bass that were the highest since the program began. This documented increase in total catch occurred despite a 1/3 reduction in monitoring effort due to budget restrictions in 2005 and 2006. Water quality parameters such as Secchi depth, turbidity, chl-a, and suspended solids concentrations were also affected by the drought-like conditions and provide insight into factors driving the changes in fish populations.

11. Active versus passive management of common and grass carp for backwater lake native fish restoration: a case study from the Nature Conservancy's Emiquon Preserve

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Non-native common (*Cyprinus carpio*) and grass carp (*Ctenopharyngodon idella*) have been implicated for preventing the establishment of submersed aquatic vegetation and for negatively influencing the sustainability of native fish communities in backwater lake restoration efforts. The Nature Conservancy's Emiquon Preserve, a >2,833 hectare backwater lake restoration effort on the Illinois River, is faced with the dilemma of actively managing for common and grass carp with rotenone or allowing native/exotic species interactions to determine the success of the restoration effort. We sampled the fish populations of the Emiquon Preserve in 2001, and more recently in the winter of 2006. In 2001, common and grass carp comprised 20% of the fish sampled and represented 2 of the 5 fish species encountered. However, in 2006, we observed a fish community dominated by native Illinois River backwater fishes. Common carp comprised only 9% of the fish sampled and no grass carp were captured. Data from the Long Term Resource Monitoring Program suggests that the native fish species assemblage of the Emiquon Preserve is not reflective of the current mainstem Illinois River fishery. Therefore, the Nature Conservancy is faced with the trade-off of: 1) actively removing all fish from the preserve in order to establish an augmented native fish community; or 2) passively allowing the native and unique fish community to remain with carp present. Evidence from the Nature Conservancy's Spunky Bottoms Preserve suggests that passive management of carp may be achievable given certain native fish species assemblages and water level management.

12. Site Fidelity in *Lepomis macrochirus*: Tracking Nesting Behavior in Bluegill Sunfish

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We studied nest-site and social group fidelity in bluegill (*Lepomis macrochirus*) to determine if fidelity affects reproductive success. Quality nest sites, access to mates, age familiarity, and prior reproductive successes are all hypotheses to explain philopatry which is often associated with an increase in personal or population wide fitness. Preliminary observations indicate that bluegill return to the same general locations repeatedly to nest. We conducted a mark-and-recapture survey of a small lake in southern Ontario, Canada, capturing and tagging each nesting male during the breeding season (late May to early July). Over three breeding seasons, we captured and tagged 1212 individuals and recaptured 510 (42%). We found on average, 85% of males who re-nested, returned to the same general area of the lake. When observed across years, fidelity was lower (80%) compared to within a year (92%). We hypothesize that male bluegills garner a fitness benefit through fidelity to a breeding site, and fidelity is the result of prior

reproductive success. To test if fidelity was related to reproductive success, we experimentally simulated nest predation by removing fry from nests, and measured rates of renesting and distances between nest sites as a measure of site-fidelity. Using this data, we are able to estimate the role that reproductive success plays in reinforcing fidelity.

13. Influence of Largemouth Bass on the Growth and Age of Maturation of Bluegill Sunfish

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Bluegill sunfish are one of the most popular sport fish in North America. However, anglers are often concerned about the lack of large bluegill in their catch. Thus, there is interest in determining factors that influence the size structure of bluegill populations. We conducted two studies that examined the role that largemouth bass play in determining the growth rate and age of maturation of bluegill. In the first study, we stocked bluegill (75-100 mm) into ten experimental ponds. Half of the bluegill in each pond were from a historically stunted bluegill population while the other half were from a historically non-stunted population. Largemouth bass (250-260 mm) were then stocked into half of the experimental ponds. We compared the influence of largemouth bass on the growth, energy investment into gonad development, and timing of sexual maturation of the bluegill from each population. We found that in the presence of largemouth bass, bluegill grow faster and mature earlier. However, the energy investment into gonad development did not vary between the ponds with and without largemouth bass. Bluegill from the stunted population matured earlier and invested more energy into gonad development than those from the non-stunted population. In our second study, we performed an AIC analysis to determine the environmental factors that influence the size specific growth rate of bluegill from 16 reservoir populations across Illinois. We found that in natural systems that the influence of largemouth bass on the growth of bluegill is not as strong as other environmental factors such as gizzard shad density and the social structure of the bluegill population.

14. Refining the River Continuum Concept - Solving the Riddle of Adventitious Streams

Jeremy S. Tiemann

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Adventitious streams are small tributaries to larger streams that typically are of first to third order and differ in stream-order rank by at least three from the receiving streams. Because little data are available on the aquatic assemblage structure of these systems, I studied fish and freshwater mussel assemblages in four adventitious streams in Illinois [Sinsinawa River (Mississippi River tributary); Aux Sable Creek (Illinois River tributary); Sugar Creek (Wabash River tributary); and Mud Creek (Ohio River tributary)]. From 2003-2006, I collected data by conducting field surveys, inspecting museum collections, and examining literature reviews. The data suggested that the large change in stream order at the confluence areas resulted in abrupt assemblage differences and deviated from the RCC species richness curves. Specifically, the confluence areas between adventitious streams and their receiving streams had significant increases in species richness compared to upstream sites. The assemblage compositions at the confluence areas had "big river" species of fish and freshwater mussel assemblages, and were similar to those of the receiving stream. Species richness is affected by events that occur at larger spatial scales; therefore, riverine fishes probably moved into and out of these interface areas from the big rivers and dropped glochidia.

15. Fish Movement in the Mississippi River

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Fish biology and life cycles are very difficult to study for species inhabiting large river systems because of their propensity for long-range movements. For most species, we know little or nothing of seasonal distributions – even for critical periods such as pre-spawning, spawning, and post-spawning periods. Invasion of Asian carp species, the population decline of pallid sturgeon, increased harvest of shovelnose sturgeon and paddlefish for caviar, and the potential range-limiting effects of dams on all migratory fishes have induced interest in movement studies for these and other riverine fishes. Southern Illinois University (SIUC) has recently implemented several studies to examine long- and short-range movement of fishes in the Mississippi and Illinois Rivers. For example, we have studied movements of pallid sturgeon in the Middle Mississippi River and its tributaries in an effort to determine spawning periods and locations in addition to identifying migratory behavior. We also completed research investigating movement of Asian carp and paddlefish near the confluence of the Mississippi and Illinois Rivers. Currently, we are monitoring movement of several fishes between dams of the upper Mississippi River. Combined manual tracking and stationary receivers have provided insight about likely spawning areas and periods, and direct evidence about long-range movements. Stationary receivers also were instrumental in providing continuous surveillance of local areas, such as movement around a lowhead dam and through or around lock and dam complexes. We are expanding the current receiver array and urge all research groups interested in movement to use compatible transmitters. This array

will provide unprecedented information about the timing and extent of movement of freshwater species.

16. Comparative fish stock assessments in the Wabash and Mississippi Rivers

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Fisheries are complex entities involving interactions among socio-economic conditions, regulations, enforcement, politics, species, and ecosystem production. Although not permitted within state borders, commercial fisheries continue to persist and at times grow within interstate waters of the US. One interstate fishery focusing on catfish in the Wabash River and another revolving around shovelnose sturgeon in the Middle Mississippi River are likely to grow considerably. To ensure sustainability, we must look within the populations and the surrounding ecosystem to develop sound predictions and suggest policy. Demographics information is locked within the age structure of the population and can provide first approximations. Currently, the joint length regulations for commercial fishing of catfish in the Wabash River suggest room for fishery growth. Conversely, although harvest rates in the Middle Mississippi River are much lower than in the upper river, the shovelnose sturgeon population is showing signs of growth and recruitment overfishing. These are good first steps for providing policy guidance. However, deeper understanding of processes underlying growth and reproduction in a spatially explicit fashion are needed to forecast responses to harvest.

17. The Response of Benthic Macroinvertebrate Community Structure to an Extreme Hydrological Event

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Dams significantly influence exerted downstream biota, specifically macroinvertebrates by reducing seasonal flow variability and altering the timing or magnitude of extreme flow events. Macroinvertebrates often have been used as biomonitors because of their sensitivity to anthropogenically introduced changes in an aquatic environment. This study investigated the effect of altered hydrologic regime on benthic macroinvertebrate assemblages immediately downstream of an impoundment. The study was conducted in the stream reach of the Sangamon River in Decatur, Illinois starting below the Lake Decatur dam. Four sites were established and sampling took place at base flow conditions, before and after an extreme high flow (in excess of 2000 ft³/sec). The EPA 20 Jab Method was used to collect samples. Collections were taken back to the lab and were sorted and identified to family. ANOVA revealed significant differences in mean macroinvertebrate family richness and Shannon-Wiener diversity for all dates by sampling sites. There also was a significant difference in Shannon-Wiener diversity

between pre- and post-disturbance by sampling date. Response of aquatic macrophytes to human perturbation and water chemistry in Wisconsin lakes

18. Relationship between community structure of YOY fishes and water quality variables from pool 26 of the Upper Mississippi River.

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Data from the Long Term Resource Monitoring Program (LTRMP) water quality and fish components were combined in a cross-component analysis. Patterns of fish community structure for all size classes did not correlate with LTRMP water quality data or riverine discharge, but patterns of young-of-the-year (YOY) community structure were significantly correlated with spring Chl-a, spring discharge, and summer temperature. Significant positive relationships were found between CPUE of YOY black crappie, sauger, and smallmouth buffalo with discharge. We found multiple regression models with $R^2 > 0.50$ for YOY black and white crappie, channel catfish, largemouth bass, sauger, and common carp with combinations of these environmental factors and the abundance of stock-sized fishes (i.e., an index of parental abundance). Multivariate correlations for age-1 fishes with environmental factors during the spring and summer from the previous year support our findings for YOY fishes. The value of these analyses lies primarily in generating testable hypotheses, and with the possibility of repeating them as further data is collected over the coming years and decades.

19. Sturgeon: Title TBA

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The collapse of many foreign sturgeon markets has led to an increased pressure on North American sturgeon populations as a source for sturgeon products. A commercial fishery currently exists for shovelnose sturgeon in the Mississippi River. Presently, little is known about the population structure of shovelnose. Samples were taken throughout 2005 and 2006 for age, growth, and mortality estimates to help establish a baseline as new commercial fishing regulations are being implemented. Careful monitoring of sturgeon populations will be needed to prevent overfishing and possible collapse of the Mississippi River fishery.

20. Illinois' Wildlife Action Plan: Defining a Vision for Conservation Success

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In 2001, the U.S. Congress created the State Wildlife Grant program and charged states with developing proactive Wildlife Action Plans to conserve wildlife before they become more rare and more costly to protect. Illinois' Wildlife Action Plan (IWAP) outlines specific actions developed by scientists, sportsmen, conservationists, and community members to protect species in greatest conservation need and their associated habitats. There are 638 species identified in greatest conservation need; this count includes 80 fish species and 29 species of mussels. The Plan creates a series of issues campaigns to organize specific conservation actions, including forests, streams, farmland and prairie, wetlands, invasive species, land and water stewardship, and green cities. Actions are identified at the statewide level, a regional level (i.e., natural divisions), and at specific sites or conservation opportunity areas. The IWAP's implementation phase is now beginning with the formation of the Illinois Fish and Wildlife Action Team. This Action Team includes a group of key conservation partners, as well as state agencies and federal representatives, whom have been asked by the Illinois Department of Natural Resources to coordinate implementation of the IWAP. The Illinois Chapter of the American Fisheries Society is one of 23 core members of the Action Team. In addition to core members, the Action Team will be comprised of workgroups that will focus on specific actions identified in each campaign.

21. Distribution, Abundance, and Habitat Requirements of the Threatened Least Brook Lamprey, *Lampetra aepyptera*, in the Shawnee National Forest

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The Least Brook Lamprey, *Lampetra aepyptera* (Abbott 1860) has been considered a "Threatened" species in Illinois since 1989 due to its limited distribution. I investigated the distribution and abundance of this species in southern Illinois from June 2005 through June 2006. Distribution is confined to four stream drainages located in the Shawnee National Forest, (1) Lusk Creek, Pope County, (2) Bay Creek, Pope and Johnson County, (3) Big Creek, Hardin County, and (4) Big Grande Pierre Creek, Pope County. Spawning habitat, duration, and incubation rates were investigated. Least Brook Lamprey spawning occurs from the second week in March to the second week in April near the heads of clear water riffle areas. Approximately 1200 Least Brook Lampreys were reported from 118 different spawning sites located throughout the four stream drainages. Over 90% of the spawning sites reported in 2006 were in close proximity to sites reported in 2005. Incubation rate of Least Brook Lamprey eggs was 13 days at an average temperature of 14.92° C. The habitat requirements of the larval and spawning adult lampreys are very specific. Due to this fact, the greatest environmental threat to the Least Brook Lamprey in Illinois is habitat destruction or alteration. Considering this, it is imperative that the Shawnee National Forest Management Plan provides protection to the habitat of the Least Brook Lamprey.

22. Expanded sub-watershed monitoring of stream communities in Northeastern Illinois.

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Illinois DNR and EPA have a cooperative statewide stream monitoring program for all major river basins, providing valuable data for multiple users. However, the statewide sampling scale often includes only limited coverage for many tributaries. In the rapidly expanding urban areas of Northeastern Illinois, there is often need for increased stream sampling coverage due to high number of Army Corps Section 404 permit applications, as well as intense interest from numerous partnerships, watershed groups, and NGO's. In order to meet the increased demand for information, including public education needs, we have developed an intensive sub-watershed monitoring program (ISWP). Target watersheds are selected based on existence and activity level of partnerships, threats to the stream, existing or planned projects, and other criteria. The ISWP follows IDNR protocols for fish, habitat, mussel, and macroinvertebrate sampling. We use non-random site selection based on intensive reconnaissance, attempting to characterize all stream sizes, habitat types and stream conditions. The number of sampling stations ranges from 4 to 15, in watersheds ranging in size from 20-185 mi². So far, we have sampled 30 watersheds and a total of 158 sites including very high quality and severely degraded systems. IBI and species distribution information has been very valuable for permit review, management applications, and public education. The availability of comprehensive, recent data has helped in obtaining money for projects such as fish passage and dam removal, as well as, influencing permitting decisions and mitigation. Several specific examples of data usage will be discussed.

23. Marking fingerling muskellunge: the effects of PIT tagging and fin-clipping on growth, survival, and foraging behavior

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Mark-recapture studies are an important component of fisheries research and management. Underlying assumptions of such studies include minimal tag or mark loss and negligible effects on the behavior, fitness, and survival of tagged or marked individuals. We assessed two common marking techniques, passive integrated transponder (PIT) tags that are becoming increasingly commonplace for individual recognition, and fin-clipping, one of the most commonly used methods of batch-marking fishes. We evaluated tag retention and the effects on survival and growth of marking age-0 muskellunge *Esox masquinongy* with PIT tags at two implantation sites, the peritoneal cavity and the dorsal musculature, during simultaneous trials in Illinois and Wisconsin. Tag retention rates were high over both the initial period (48 h: >99%) and the long term (approx. 180 d: >98%). No differences in survival, growth, or PIT tag retention were observed among the two implantation sites and a control group, suggesting that PIT tags are an acceptable method for marking age-0 muskellunge. The effects of five fin-clipping treatments (single pelvic, single pectoral, both pelvics, both pectorals, both pelvics and both pectorals) on the foraging behavior, growth, and food conversion efficiency of age-0 muskellunge were examined in 1.7 m experimental pools using video recording equipment and compared to controls; fin-clips did not influence capture efficiency and other foraging behaviors. Further, growth, prey consumption, and food conversion efficiency were similar among all fin-clipping treatments and a control group, indicating that the use of fin-clipping does not introduce sampling biases into muskellunge research and management programs.

24. Habitat Use and Movement of Adult Lake Sturgeon In Pool 24 of the Mississippi River

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Abstract: Lake Sturgeon (*Acipenser fulvescens*) was nearly extirpated from Missouri waters in the early 1900's. The Missouri Department of Conservation started restocking lake sturgeon in 1984 and as of 2005 approximately 261,000 were released in Mark Twain Lake, the Missouri River and the Upper Mississippi River. Some of these fish are nearing sexual maturity. Basic information needed to evaluate the current lake sturgeon population is lacking. The most critical information needed is related to adult lake sturgeon in regards to their movements and habitat use with special emphasis on identifying spawning sites. Determining if there is natural recruitment is important for determining future stocking needs. In the fall of 2004 thru fall of 2006, 25 lake sturgeon were captured and implanted with radio or sonic transmitters. Lake sturgeon locations were analyzed using ArcMap GIS to produce summaries of habitat usage. Summarized data was analyzed in the PREFER resource selection software to produce rankings based on amount of usage compared to available habitat. Kernel density estimates of home range were calculated and used to determine available habitat for individual fish. Lake sturgeon selected areas near lock and dam 22 but most fish used a variety of habitats with

side channels being the least selected habitat. Kernel density estimates of home range produced the same habitat selection rankings as the entire pool analysis. Seasonal habitat use analysis produced similar results to the overall analysis. Lake sturgeon did have different home ranges for different seasons. No lake sturgeon spawning was documented during the study period.

25. Summer movement of black basses *Micropterus* spp. in southwestern Lake Michigan

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Smallmouth bass *Micropterus dolomieu* and largemouth bass *M. salmoides* in southwestern Lake Michigan use shallow, warm harbors for spawning during spring. After the reproductive period has ended in summer, smallmouth bass catch (DC electrofishing) in harbors decreases considerably. Although not much information is known about how black basses use open-lake habitat in Lake Michigan, smallmouth bass are thought to leave harbors and inhabit the main lake whereas largemouth bass are thought to inhabit harbors year-round. We tracked smallmouth bass (N=15) using acoustic telemetry and largemouth bass (N=8) using radio telemetry during May – October, 2006 in and around North Point Marina, Winthrop Harbor, IL. Thermal loggers placed inside and outside of the harbor revealed a temperature gradient between the harbor and the open-lake for much of summer. Frequent cold-water upwellings generated substantial temperature swings in the main lake over a short time period. Smallmouth bass inhabited the harbor until the main lake temperature approached 21° C, at which time they occupied habitats in the open lake. Upwellings of cold water caused smallmouth bass to return to the harbor temporarily until the main lake approached 21° C again. As water cooled off during fall, smallmouth bass returned to the harbor. Comparatively, largemouth bass exhibited restricted movements during this timeframe, with movements rarely ranging outside of the harbor. Home range (mean ± se) calculated using the Minimum Convex Polygon method for smallmouth bass was 142.6 ± 25.1 ha and for largemouth bass was 12.3 ± 3.3 ha. Smallmouth bass moved in and out of the harbor based on water temperature whereas largemouth bass exhibited less movement by staying in the harbor.

26. Hybridization between silver and bighead carp in the Mississippi and Illinois Rivers.

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Bighead and silver carp can be differentiated from one another by a number of distinct morphological characteristics. Fish sharing morphological characteristics of both bighead and silver carp have been captured in Swan Lake, a contiguous backwater lake

located on river miles 5-12 along the Illinois River in Calhoun County, Illinois and at 3 locations on Pool 26 of the Mississippi River. A small biopsy of muscle, liver and eye were collected from these morphological intergrades and compared to field-identified bigheads and silvers at several enzymatic loci via starch gel allozyme electrophoresis. In addition to the morphological variants showing a high degree of genetic hybridization, some of the fish identified in the field as true bigheads and silvers also displayed hybrid genotypes, with few fish exhibiting pure bighead or silver genotypes. These data suggest a potential for a hybrid swarm between these two species. Replacement of pure bighead and silver carp by some degree of bighead X silver hybrid is a plausible concern. The impact of this hybrid condition, both ecologically and taxonomically, warrants further attention. Additional collections and analyses of fish from alternate sites along the Mississippi and Illinois Rivers are being conducted. The use of microsatellite and mtDNA markers will be implemented in future investigations.

27. Impact of coalmine effluent on helminth community structure parasitizing *Lepomis* spp.

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This study was conducted to assess the effect of coal mine effluent on the parasite composition of *Lepomis* spp. in impacted streams, and to determine the utility of helminth assemblages as biomonitors of habitat quality. Fish were collected, in spring and fall, at 6 sites (3 sites upstream, and 3 sites downstream, from a point source run off from a pre-remediation low coal mine) in the Saline River basin in Southern Illinois. To date, we have found 10 helminth genera (3 nematodes, 3 acanthocephalans, 2 trematodes, and 2 cestodes) in the digestive tracts. Of these, 1 nematode (*Spinitectus*) and 2 acanthocephalans (*Eocollis* and *Neoechinorhynchus*) were recovered in sufficient numbers to be considered for bio-monitoring. While there was high variability in prevalence between sites, *Spinitectus* prevalence was generally higher upstream ($p < 0.001$). In contrast *Eocollis* and *Neoechinorhynchus* both had higher prevalence downstream of coal mine input ($p = 0.021$). The Illinois EPA has documented variable Macroinvertebrate Biotic Index values at these sites due to toxicant exposure. The shift in parasite composition may be associated with changes in the community structure of macroinvertebrates which serve as intermediate hosts or changes in host immune response due to toxicant exposure.

28. Canny, Laura L., Mike Bozek, and Jen Hauxwell. Division of Ecology and Conservation Science, Illinois Natural History Survey, IL Department of Natural Resources, Springfield, Illinois, 62702; 217-558-6620, laura.canny@illinois.gov

A three-year study was conducted to determine the effect of human perturbation on species richness and relative occurrence of aquatic macrophytes and to quantify the tolerance levels of individual species to changes in water chemistry. Macrophytes and water chemistry were sampled in fifty-three Wisconsin lakes that spanned a gradient of development within the watershed and along lakeshores. Samples were collected from

fourteen random transects per lake: seven located at developed sites and seven at undeveloped sites. Along each transect, quadrats were sampled every 2 meters from shore to 12 meters and then every 3 meters out to a total distance of 45 meters from shore. These data were compared to urban and agricultural development at the watershed scale and to house density at the lakeshore scale. No significant linear relations were found between urban development in the watershed or on the lakeshore, indicating that agriculture may still be the driving force of eutrophication in Wisconsin lakes. Agricultural and lakeshore development were negatively related to the number of species within a lake. Species response to water chemistry gradients varied, therefore suggesting some plants may be indicative of declining water conditions. Further research on the effects of human perturbation on aquatic plant communities will facilitate management aimed at sustaining the quality of lakes in Wisconsin.

29. Updating Illinois stream ratings and identifying biologically significant streams based on measures of biotic integrity and biodiversity

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Stream quality ratings have previously been assigned to Illinois streams and were identified in the 1989 and 1992 Biological Stream Characterization publications. These ratings were based primarily on the fish index of biotic integrity (IBI). Biologically significant streams were also identified in a 1992 publication. These streams included the highest rated streams from the 1989 Biological Stream Characterization publication and streams with the presence of threatened and endangered species or high mussel diversity. There have been significant changes and contributions to the data that is now available to evaluate Illinois' stream biological resources. A new fish IBI has been developed as well as a macroinvertebrate IBI. A mussel resource index has been created and data has been collected statewide on the presence of Ephemeroptera, Plecoptera, and Trichoptera (EPT) species. We propose to use measures of both biotic integrity and biodiversity to first rate stream biological resources and then to identify a subset of these streams as biologically significant. Measures of biotic integrity will include the fish and macroinvertebrate IBIs, the mussel resource index and a measure of mussel intactness, the presence of EPT species and sensitive species from other taxonomic groups. Measures of biodiversity will include species richness of crayfish, fish, mussels, and threatened and endangered species. The project will be discussed in more detail with a particular focus on the initial analysis of mussel intactness and mussel species richness expectations according to drainage and stream size.

Poster Presentations

1. Fish assemblages within the Great Rivers of the United States

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The Environmental Monitoring and Assessment Program of Great River Ecosystems (EMAP-GRE) has monitored a wide range of biotic and abiotic criteria on three great rivers of the United States. Preliminary EMAP data from electrofishing surveys of 148 randomly selected sites on the Mississippi, Missouri, and Ohio rivers collected 60,586 fish in 2004. Mean catch per run was significantly higher for the Mississippi (305.8) and Ohio (227.6) rivers compared to the Missouri River (90.6; $P < 0.0001$), with no significant difference between the Mississippi and Ohio rivers ($P > 0.05$). However, the Missouri (12.6) and Mississippi (16.7) rivers had significantly higher diversity (numbers of taxa collected per run) than the Ohio River (11.8, $P < 0.001$), although differences were not significant between the Missouri and Mississippi rivers ($P > 0.05$). Analysis of Similarity showed that fish assemblages between rivers were similar ($R = 0.39$), however non-metric multi-dimensional scaling suggests fish assemblage differences between the Missouri and Ohio rivers. Fish assemblages from all three rivers were dominated by four common species, common carp *Cyprinus carpio*, emerald shiner *Notropis atherinoides*, gizzard shad *Dorosoma cepedianum*, and freshwater drum *Aplodinotus grunniens*. This large-scale, inter-river, multi-agency monitoring effort may likely provide further insight into large river fish population ecology.

2. Reservoir and sanitary district discharges may alter stream community metabolism

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We studied an urban reach of the Sangamon River extending downstream from the dam which impounds Lake Decatur. Based on macroinvertebrate and fish indices of biotic integrity, a significant improvement in stream habitat quality was observed in the Sangamon River downstream from the discharge of the Sanitary District of Decatur (SDD) when compared to that reach which extends upstream to the dam. Physical and chemical variables indicated that overall habitat quality may be improved by predictable instream flows derived from sanitary discharges when compared to the temporally variable habitat immediately downstream of the reservoir. Spatial variation of benthic algal assemblages also has been documented. Our premise is that sites downstream of SDD may have greater potential for instream net primary productivity as a result of nutrient loading while heterotrophic metabolism at upstream sites may be supported by suspended organic material including phytoplanktonic algae derived from the reservoir. We are utilizing three stream reaches, one above and one below the SDD discharge as well as one on Polecat Creek, a minimally impacted reference stream. Benthic algal standing crop, total heterotrophs, and community metabolism were found to be temporally and spatially variable. Evaluation of these results in the context of environmental heterogeneity will elucidate the relative role of instream nutrients, ambient light regime, and altered stream hydrology in determining the degree to which stream metabolism is dominated by heterotrophic and autotrophic processes.

3. Sportfish trends in the La Grange reach of the Illinois River, 1994-2006

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The Long Term Resource Monitoring Program (LTRMP) has sampled fish communities on the La Grange reach of the Illinois River since 1990. To date, we have collected 1,375,867 fish comprising 99 native and 12 exotic species. We used LTRMP data from 1994-2006 to test for abundance changes in six common sportfishes. In addition, we examined several abiotic and biotic variables to explain potential change. We used linear regression to test for changes in catch-per-unit effort (CPUE) of black crappie *Pomoxis nigromaculatus*, bluegill *Lepomis macrochirus*, channel catfish *Ictalurus punctatus*, largemouth bass *Micropterus salmoides*, white bass *Morone chrysops*, and white crappie *P. annularis* among three selected habitats (contiguous backwater-shoreline, main channel border, side channel border) across years. Our results indicated that all species CPUE from combined strata were below their respective means and were recently at their lowest, excluding bluegill, during the 13 year period. We observed significant decreases in black crappie and largemouth bass CPUE for all strata combined, while black crappie, bluegill, largemouth bass, and white crappie showed significant decreases in side channel border habitats. Channel catfish and white bass CPUE showed no consistent patterns among habitats and over time. Our results suggest that the centrarchid fish species assemblage may be decreasing due to changes in river conditions; specifically, variability in side channel border habitats. These unknown changes in habitat appear to have larger effects on fish species with nest-guarding life histories compared to alternative spawning strategists. The establishment of Asian carp may have additional negative effects on centrarchid abundances.

4. Lake Sturgeon Sampling Techniques on the Upper Mississippi River.

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Lake sturgeon (*Acipenser fulvescens*) have been stocked in the Mississippi River by the Missouri Department of Conservation since 1984. Conservation and management of this species in the pooled section of the river requires effective techniques for sampling a wide range of sizes with minimal effort. This project is designed to evaluate lake sturgeon sampling techniques in the pooled sections of the Mississippi River.

We utilized (300 ft.) gill nets (2" through 5" bar mesh) set overnight in winter and early spring when water temperatures were below 12.8 C (55° F) and gradually switched to 25 hook trot lines and 5 to 6 hour gill net sets through early summer as water temperatures rose. We also tried 2.5" mesh hoop nets and short trammel net drifts. As summer water temperatures rose above 23.9 C (75° F), 1-2 hour gill nets sets were used to minimize

stress and mortality. At each site we measured water temperature, discharge of river, GPS location, depth, and habitat type. All lake sturgeon were measured and PIT tagged before being released. We found a positive linear relationship between lake sturgeon size and gill net mesh size ($R^2 = 0.1659$). Our highest CPUE was at water temperatures around 15° C and discharges near 180,000 cfs. Earthworms were found to be the most effective bait for trotlines out of the baits we tried. Hoop-nets were not very efficient at capturing lake sturgeon. A combination of gill nets and trotlines used throughout the year was the most productive. The information from this project will aid in future studies of lake sturgeon in the pooled portion of the Mississippi River.

5. The Great Rivers Field Station: Past, Present and Future Highlights from Over a Decade of Monitoring Pool 26 of the Mississippi River

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Since 1991, the Illinois Natural History Survey has operated the Great Rivers Field Station, one of six field stations associated with the Long Term Resource Monitoring Program (LTRMP), to monitor the water quality (WQ), fish, plants, and invertebrates in Pool 26 of the Mississippi River. In addition to the LTRMP, several other projects have been conducted by the field station studying turtles, habitat rehabilitation projects, floodplain forests, and several student projects/theses. We have recorded several notable developments in the last 10 yrs. Our sampling shows an increase in water temperature in the main channel from 1994 to 2004, which matches an increase in the average air temperatures locally. This warming trend appears to have affected some biota such as changes in turtle nesting habits and sex ratios, and it may be one of the factors explaining our dramatic increase in blue catfish populations, which are more common in southern latitudes. LTRMP data were also useful for detecting the spread of exotic species into Pool 26, such as an increase in grass carp and the population explosion of bighead and silver carp. Conversely the common carp has significantly declined in numbers. We found the great flood of 1993 produced strong year classes for several species of fish. The flood also induced changes in forest community structure and composition, leaving a long-term imprint on the ecology of the Upper Mississippi River System. The purpose of this poster is to provide a brief description of the Great Rivers Field Station, highlight some of our findings from the last decade, and glimpse into the future of the field station.

6. Fish population dynamics of an annually-flooded seasonally-isolated backwater lake of the Illinois River

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Connectivity and isolation to/from rivers may be major drivers of fish community composition in backwater lakes. Matanzas Lake is a seasonally-isolated backwater lake of the La Grange reach of the Illinois River. Our goal is to test for annual fish community compositional changes as a consequence of flooding and isolation. We examined data from the Long Term Resource Monitoring Program (LTRMP) during 1995-2006 to establish baseline conditions of the fish community of Matanzas Lake. In the summer of 2007, we will use a multi-gear approach to test for changes in the fish community at shorter temporal resolutions. From 1995-2006, the fish community of Matanzas Lake has reflected the fish species composition of the Illinois River. Over time, trends in fish catches for the Illinois River have been consistent with changes in fish catches in Matanzas Lake. Total catch of black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), smallmouth buffalo (*Ictiobus bubalus*), and white crappie (*P. annularis*) declined significantly from 1995-2006 (linear regression; all $p < 0.019$). Our results suggest that seasonal flooding resets the fish community of Matanzas Lake. However, seasonal flooding may also introduce non-native fishes such as Asian carp, which may affect long-term fish community dynamics. In addition, increases in avian piscivore abundances and periodic commercial fishing may reduce native fish biodiversity and biomass on shorter time scales. Research in the summer of 2007 will attempt to determine shorter-scale mechanistic interactions leading to annual changes in the fish community of Matanzas Lake.

7. Fish Porn II: Reproductive behavior of *Pimephales*

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Pimephales spp. are among the most common eastern North American freshwater fishes and have been the subjects of numerous field and laboratory studies. The group of fishes serves as host fishes to many freshwater mussels and food sources to many animals. Some species are raised commercially and are thus important in the aquaculture and sport-fishing industry. I have been studying the reproductive behavior of the four species of *Pimephales* in artificial settings since 2000. Their reproductive strategy, known as the egg-clustering strategy, is among the most complex strategies known among North American freshwater fishes. I describe the acts the fishes go through from the onset of sexual maturity to the hatching of eggs. I also share some of their spawning statistics.

8. Gear-Specific Population Demographics of Channel Catfish in a Large Midwestern River

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We compared population demographics of Wabash River channel catfish *Ictalurus punctatus* sampled with baited 25-mm, 32-mm bar mesh hoop nets and three phase AC

electrofishing. Catch-per-unit-effort data indicated lower channel catfish relative abundance in 32-mm hoop nets compared to 25-mm hoop nets and AC electrofishing. All gear types sampled different length-frequency distributions (all comparisons, $P < 0.001$), and mean length of channel catfish increased progressively from 25-mm hoop nets, 32-mm hoop nets, and AC electrofishing. Similarly, age-frequency distributions differed among gears (all comparisons, $P < 0.001$). The 25-mm hoop nets truncated the age structure to younger individuals while both 32-mm hoop nets and AC electrofishing included older fish. Catch-curve analysis generated different mortality rates among the three gear types (all comparisons, $P < 0.001$) with the highest mortality rate (50%) in 25-mm hoop nets. Gear-specific size and age structure led to differences in von Bertalanffy statistics among the 25-mm hoop nets and AC electrofishing ($P < 0.01$), and uninterpretable results for 32-mm hoop nets. Therefore, different gears can lead to contradictory management practices. Given the differences in gear selectivity, biologists need to approach management cautiously until calibration to true size and age structure is conducted.

9. A Lakes and Reservoirs Phytoplankton Index of Biotic Integrity: Examining the Response of Phytoplankton Assemblages to Regional Differences

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The Illinois Environmental Protection Agency (IEPA) monitors approximately 50 lakes and reservoirs each year and has been doing so since 1977. Variables such as pH, total and phenolphthalein alkalinity, conductivity, temperature and oxygen profiles, volatile suspended solids, total and dissolved phosphorus, nitrate/nitrite nitrogen were determined. Additionally, collections have been made for enumeration and identification of phytoplankton. Since a limited number of biocriteria and bioassessment protocols have been developed for use in lakes and reservoirs, these data provide an opportunity for development and testing of a Lake and Reservoir Phytoplankton – Index of Biotic Integrity (LRP-IBI) for water quality evaluation. We are working to classify lakes and reservoirs along disturbance gradients and to evaluate the response of phytoplankton metrics which will accurately characterize lakes throughout the state. This project will generate specific recommendations for incorporation of the lake/reservoir classification system and the LRP-IBI into current IEPA monitoring and assessment protocols. It is also intended that Illinois lakes and reservoirs may be used as a model to support the development of a national lake assessment plan.