

# Iowa Chapter Report

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Iowa DNR Fisheries Research

## **Biomonitoring**

The Iowa DNR TMDL and Water Quality Assessment Section released the report entitled “Biological Assessment of Iowa’s Wadeable Streams” [weblink to report pdf: <http://www.iowadnr.com/water/tmdlwqa/wqa/streambio/index.html>].

The report describes the main components of the bioassessment framework including ecoregions, reference sites, standard sampling procedures, and biological indices (fish and benthic macroinvertebrates).

Staff of the Iowa DNR TMDL and Water Quality Assessment Section and the University Hygienic Laboratory Limnology Section continue gathering benthic macroinvertebrate and fish assemblage data that are used to assess the biological condition of Iowa’s rivers and streams. The bioassessment program has three main focus areas: 1) status and trend monitoring; 2) reference (benchmark) biological criteria development and maintenance; 3) impaired (TMDL) waterbody assessment. Plans for 2005 include sampling at 45 random sites for the statewide perennial river and stream survey scheduled to be completed in 2006. The reference biological sampling focus this year is headwater perennial creeks and non-wadeable rivers and streams where sampling method and biotic index refinements are needed. Stream bioassessments of several 303(d) impaired stream segments will also be done in conjunction with water quality monitoring for TMDL development. Following U.S. EPA guidance, Stressor Identification (SI) was completed for four stream segments where the causes of aquatic life impairment were unknown. The SI process is designed to evaluate the degree to which various water quality and habitat related stressors contribute to impairment of aquatic communities. Additional stressor identification work is planned for 2005. Contact: Tom Wilton, (515) 281-8867, [tom.wilton@dnr.state.ia.us](mailto:tom.wilton@dnr.state.ia.us).

## **Stream Surveys**

Iowa Fisheries Management Teams are in the process of embarking upon an expanded fish and habitat monitoring effort on a statewide scale. The intention is to coordinate this Fisheries effort with efforts being conducted by Iowa DNR’s Water Quality Bureau, so more areas are sampled and duplication of effort is minimized. This effort began with an effort by SW Iowa Management Teams monitoring southwest Iowa streams in 2002. During 2004, SW Iowa Management Teams sampled 19 sites in 10 streams for fish population and habitat status using the Habitat Evaluation Procedures for Wadeable Streams and Rivers of Iowa protocol developed by Tom Wilton, ESD Water Quality Bureau. Assessments of available stream fish habitat and fish populations were conducted in conjunction with development of a long-term database. Fish collection data from Iowa streams dating back to 1854 is already available online via the Iowa Rivers Information System (IRIS), <http://maps.gis.iastate.edu/iris/>. Soon, habitat and other parameters collected in the field will also be available via this website. Plans are in place to commence data entry into the IRIS system over the internet for future monitoring efforts. Historic data collections are also being used to plan future monitoring efforts. Historic collection location data have been entered into a GIS and overlaid on a statewide HUC 12 coverage to determine watersheds that have not been recently sampled. HUC 12 watersheds are presently being used as the “filter” for

determining areas in need of sampling. Contact: Jeff Kopaska, (515) 432-2823, [jeff.kopaska@dnr.state.ia.us](mailto:jeff.kopaska@dnr.state.ia.us).

### **Southwest Iowa Fish Passage**

Riverbanks and beds in the 22 county loess region of southwestern Iowa are highly susceptible to erosion. Streambed stabilization structures have been widely used to protect the infrastructure of bridges and roads in this region. During the last 10 years over 400 streambed stabilization structures have been constructed in Missouri River tributary streams located in western and southern Iowa. Additional structures are proposed or currently under construction on approximately 400 other susceptible bridges. A vast majority of these structures are of one design, involving a sheet piling dam and a 1:4 downstream slope constructed of rock rip-rap. These potential blockages to fish migration raised concerns and prompted regional fisheries personnel to investigate possible impacts to stream fishes.

In 2004 the Cold Springs management team continued to work in conjunction with Iowa State University in a joint study on the impacts of weirs on fish movement in Turkey Creek (Cass County) that began in 2001. During the first three years of the study on Walnut Creek (Montgomery County), biologist determined that targeted fish species showed significantly more movement over experimental 20:1 down sloped weirs vs. traditional 4:1 sloped weirs. Following the results of the Walnut Creek study stakeholders wanted biologists to study fish movement over 15:1 down sloped weirs, so in the fall of 2004 two 4:1 weirs were modified to 15:1 down slope in Turkey Creek. The six weirs in the study area on Turkey Creek are all four feet in height and the lower two have an experimental 15:1 downstream rock slope. The other four weirs on Turkey Creek are also four feet in height, but have a traditional 4:1 downstream rock slope. Biologists studying fish movement over the two weir designs sampled nine separate sites covering 20 stream miles on Turkey Creek. Targeted species were channel catfish, bullhead, flathead chub, and creek chub. These species were captured using baited hoop nets, minnow traps, and electrofishing. Captured fish were marked with site-specific fin clips or numbered tags throughout the period from May 20th to August 9th, 2004.

In Turkey Creek 424 channel catfish were captured and marked. One-hundred one were subsequently recaptured, with < 99% exhibiting any longitudinal movement over 4:1 weirs. One-hundred thirty four yellow bullheads were marked. Fifty were subsequently recaptured, with < 99% exhibiting any longitudinal movement over 4:1 weirs. Two-hundred eighty-five creek chubs were captured and marked. Ninety six were recaptured with 100% exhibiting no movement over 4:1 weirs. Over the four year study, significantly more recaptured fish exhibited movement over the 20:1 designed weirs than 4:1 designs. In 2004 comparisons of fish movement over experimental 15:1 and traditional 4:1 down slope weirs will be monitored in Turkey Creek.

Two grant proposals, intended for studying fish movement patterns following weir modification were written. One grant to the FWS for fish passage construction monies and one to the USGS for monitoring monies. Both proposals were approved for funding in 2004 and 2005. In total the department will receive \$25,000 from FWS and \$35,000 from USGS. This will be a joint project between IDNR, Iowa State University Fish & Wildlife Coop Unit, Cass County Engineers Office, and the Hungry Canyon's Alliance. Contact: Chris Larson, (712) 769-2440, [chris.larson@dnr.state.ia.us](mailto:chris.larson@dnr.state.ia.us).

### **Pike Run Creek**

The Nature Conservancy in Iowa has received a generous \$390,000 gift from the Monsanto Fund to support a Pike Run Watershed project in the Lower Cedar River Valley. The goal of the project is to sustain agricultural production and freshwater ecosystems in a healthy working landscape. Pike Run Creek is a slow moving stream that is lined by a dense growth of aquatic vegetation and provides habitat for many rare species of fish, amphibians, reptiles, and plants. The Iowa Department of Natural Resources (Iowa DNR) and Natural Resource Conservation Service (NRCS) confirmed that the stream is suffering from nutrient and organic enrichment from crop fertilizer run-off. The Nature Conservancy is working with the Iowa DNR, NRCS, Muscatine Soil and Water Conservation District and agricultural groups to promote programs that reduce the amount of nutrients and sediment entering the stream and monitor improvement resulting from the project.

### **Aquatic Nuisance Species (ANS)**

The U.S. Army Corps of Engineers, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Illinois Department of Natural Resources, and Iowa Department of Natural Resources collected zebra mussel veliger samples from the Upper Mississippi River and major tributaries during July, August, and September 2004. In Iowa, DNR staff collected samples below Lock and Dam 10 through 19 and from the Wapsipicon, Iowa, and Cedar Rivers. No tributaries in Iowa are known to be infested with zebra mussels. The three tributaries sampled are being stocked with fish inoculated with Higgins' eye pearl mussel (*Lampsilis higginsii*) glochidia. It is essential that we identify any zebra mussels in these tributaries to protect the endangered Higgins' eye pearl mussel.

Boat accesses on Iowa's lakes and rivers were targeted for watercraft inspections between 28 May and 28 August 2004. Seasonal employees discussed inspecting watercraft for ANS with the operators and collected information on ANS presence, watercraft type and state of registration, number of people, last and next waterbody visited, and operator familiarity with Eurasian watermilfoil, zebra mussels, and Iowa's Eurasian watermilfoil law.

The Missouri River Aquatic Nuisance Species Working Group formed as part of the 100<sup>th</sup> Meridian Initiative to develop a plan for preventing the westward spread of zebra mussels during the Lewis and Clark Bicentennial. The public awareness campaign in 2004 utilized traveler information systems (TIS), uniform signs along the entire length of the Missouri River, and information at marinas to alert water recreationists to the threat of ANS and how to prevent their spread. The Iowa DNR ANS Program participated by posting all water accesses on the Missouri River with the new signs and hosting a TIS on Interstate 29 near Sergeant Bluff.

Data on silver and bighead carp in Iowa was evaluated to determine statewide trends in distribution and abundance. In 2004, bighead carp were reported throughout southern Iowa below dams on small tributaries of the Mississippi and Missouri Rivers. Silver carp have only been sampled in the Mississippi and Des Moines Rivers in Iowa but are expected to follow the expansion of the bighead carp. Contact: Kim Bogenschutz (515) 432-2823, kim.bogenschutz@dnr.state.ia.us.

### **Mississippi River Long Term Resource Monitoring Program Activities**

The Iowa DNR Mississippi River Monitoring Station collected fisheries, macroinvertebrate, vegetation, and water quality samples in 2004 as part of the Long Term Resource Monitoring

Program (LTRMP). Collection effort in 2004 was comparable to historic levels (1993-2002), following reduced monitoring effort in 2003.

The Bellevue Monitoring Station collected fisheries, invertebrate, plankton, riparian habitat, sediment, vegetation, and water quality data from nine sites in UMR Pools 10-15 as part of the Environmental Monitoring and Assessment Program for Great River Ecosystems (EMAP-GRE). EMAP-GRE was initiated by the US-EPA in the Mississippi, Missouri, and Ohio Rivers to assess the ecosystem health of large rivers in the US Central Basin.

The Bellevue Monitoring Station was contracted by the US Army Corp of Engineers to research the impacts of dredge spoil placement on fish communities. In 2004, a combination of electrofishing, mini-fyke netting, aquatic habitat mapping, and sediment analysis were used to assess impacts of sand placement on Island 241 in lower Pool 12. A final report will be completed in May 2005. Contact: Dan Kirby, (563) 872-5495, [daniel.kirby@dnr.state.ia.us](mailto:daniel.kirby@dnr.state.ia.us)

### **Mississippi River Fisheries Management**

Mississippi River fisheries management personnel are initiating a new study in Pools 13 and 16 on Shovelnose Sturgeon population dynamics, including tagging fish, determining harvest exploitation and egg (roe) harvest. This will compliment shovelnose sturgeon work that WI, IL and MO are doing on their portions of the UMR. Contact: John Pitlo, (563) 872-4976, [John.Pitlo@dnr.state.ia.us](mailto:John.Pitlo@dnr.state.ia.us)

### **Coldwater Stream Classification**

Iowa DNR has completed the process of modifying the current surface water use classification for coldwaters, Class B(CW), into two different classifications. The Class B(CW1) defines waters that exhibit flow and temperature characteristics needed to support a coldwater fish population. Class B(CW2) is for small channeled streams, headwaters and spring runs that meet water temperature criterion but do not normally exhibit flow volume needed to sustain a coldwater fish population. The formal coldwater protocol has been finalized and also completed the Iowa Administrative Rule process and only awaits US-EPA approval. Specific chemical criteria are already in place for B(CW1) waters, but still needs to be developed for Class B(CW2). Contact: Dave Moeller (563) 927-3276, [Dave.Moeller@dnr.state.ia.us](mailto:Dave.Moeller@dnr.state.ia.us).

### **Iowa Stream Management Workshop**

The Iowa DNR continues to host the Iowa Stream Management Workshop. The workshop is modeled after the Missouri Department of Conservation's Stream Management Workshop, and has been adapted to Iowa. Natural resource professionals from Iowa DNR Fisheries, Water Quality, Information & Education and Geological Survey Bureaus; Iowa State University Forestry Dept.; and the Iowa Dept. of Ag and Land Stewardship present the workshop. The workshop addresses stream dynamics from a watershed perspective and stresses the interaction of the physical sciences (hydrology, hydraulics, geomorphology) and their relationship with the stream's biota. The target audience is field staff from all agencies in Iowa that are involved in the management or restoration of stream systems. The goal of the workshop is to provide participants with a common understanding of: stream and watershed processes; relationships of streams with their floodplains, riparian zones, and watersheds; impacts of human activities on stream equilibrium; and what may or may not be attainable for stream restoration. This year's

workshop will be held July 12-14. More information can be found at <http://www.iowadnr.com/education/resrcpro.html>.

### **Water Quality**

Iowa DNR fisheries personnel continue to be heavily involved in multidisciplinary watershed projects partnering with local communities and landowners, USEPA, NRCS, Iowa Department of Agriculture and Land Stewardship, and other groups.

The Geological Survey Bureau and Environmental Protection Division of the DNR have been very active in expanding and improving its Ambient Water Quality Monitoring Program over the last several years. Information about the program can be found at <http://wqm.igsb.uiowa.edu/>.

The IOWATER program continues to expand. Volunteers are collecting baseline water quality data across the state. This information can be found at <http://www.iowater.net>.

### **Effect of Best Management Practices on Water Quality in Tributary Streams of Rathbun Lake, Iowa.**

Land management practices, if monitored at all, tend to deal primarily with soil and nutrient losses and to a lesser degree with the impact on water quality. Accurate, analytical assessments of various chemical and biotic components are rare. Plans are being put in place for Best Management Practices (BMPs) through a 206 Program that will be implemented at strategic areas within the Rathbun Lake, Iowa watershed. Biological components of such assessments, however, are nearly lacking. A more holistic, ecosystem approach is required to measure the impact of BMPs on the quality of runoff water, stream benthos and stream fishes, which in turn, impact the water quality and sport fishery enjoyed by those using Rathbun Lake. The two-fold objectives of this investigation are first, to determine the impact of BMP's on water quality and nutrient and sediment delivery associated with selected sub-watersheds above Rathbun Lake. Second, measure changes in stream biota and lake water quality and sport fisheries supported by the streams and Rathbun Lake. These findings will be used to address water quality issues of the remaining sub-watersheds above Rathbun Lake.

Stream sampling in the Rathbun watershed during 2004 collected 28 fish species. Mean Index of Biotic Integrity (IBI) was 21.9 (SD = 10.5). Mayflies, particularly Heptageniidae, were the most dominant benthic invertebrate, composing more than 50% of the 30 macroinvertebrate taxa identified. Macroinvertebrate Biotic Index (MBI) ranged from 4.1 to 7.8 in the streams. Channelization had the greatest affect on stream habitat scores, second in importance was instream cover. Contact: Randy Schultz, (641) 774-2958, [randy.schultz@dnr.state.ia.us](mailto:randy.schultz@dnr.state.ia.us).

### **An Evaluation of Fingerling Walleye Stockings in Tributary Streams of Rathbun Lake, Iowa.**

Approximately 50,000 two-inch walleye fingerlings marked with OTC have been stocked at ten sites in the Rathbun Lake, Iowa, watershed annually. Recent research in small northeast Iowa streams demonstrated good survival and growth of small fingerling walleye stocked during periods of low to moderate discharge. Streams in the Rathbun Lake watershed contain abundant minnow populations and few predators, a habitat ideal for growth and survival of walleye fingerlings. Successful stockings could become an important management strategy for the walleye populations at Rathbun Lake and other large reservoirs. Fall sampling (October

electrofishing) is being used to collect young-of-year walleye, which will be checked for OTC marks. Contact: Randy Schultz, (641) 774-2958, [randy.schultz@dnr.state.ia.us](mailto:randy.schultz@dnr.state.ia.us).

### **Interior Rivers Research**

Contact: Greg Gelwicks, (563) 927-3276, [gregory.gelwicks@dnr.state.ia.us](mailto:gregory.gelwicks@dnr.state.ia.us)

#### *Interior River Habitat and Fish Community Assessment*

We are continuing to inventory and evaluate interior river and stream habitat conditions and fish communities. Data collected for this project is being used to help build the Iowa River Information System (IRIS), a statewide GIS database that will integrate existing and future information related to rivers and streams in the state.

#### *Evaluation of the Status, Distribution, and Habitats of Flathead Catfish in Iowa's Rivers*

Greg Gelwicks and John Pitlo developed a coordinated statewide research project to evaluate flathead catfish populations in Iowa. Work on the five-year project began in July 2003. The study is designed to build on knowledge obtained from management investigations conducted on the Mississippi River by Gene Jones, Bernie Schonhoff and Kevin Hanson, and on interior rivers of southeast Iowa by Don Kline. The project will evaluate methods used to sample flathead catfish, assess populations, evaluate their distributions and movements, determine relationships between populations and habitats, and evaluate the fishery. Flathead populations were sampled from 10 sites on the Iowa, Cedar, and North Raccoon rivers in early summer and late summer 2004. We are also evaluating the relative effectiveness of low-frequency electrofishing, hoop nets, bank poles, and trot lines for sampling flathead catfish in the Iowa River. A radio-telemetry study of flathead catfish movement was started in fall 2004 in the Iowa River. Fifteen fish were radio-tagged between the lowermost dam at Iowa City and Wapello, Iowa. Additional fish will radio-tagged in May and June 2005.

### **Mississippi River Research**

Contact: Mike Steuck, (563) 872-4976, [mike.steuck@dnr.state.ia.us](mailto:mike.steuck@dnr.state.ia.us)

A study of walleye/sauger population parameters is being conducted in tailwaters of Lock and Dam 10 and 12 at Guttenberg and Bellevue. The study includes creel surveys and estimates of exploitation of these species. Fall 2002 tailwater fish surveys at Guttenberg and Bellevue indicated 1998 and 1999 year classes of walleyes were below average. The good news is that strong 2000 and 2001 year classes of walleye and sauger should carry the fishery for the next several years. The 2001 year class is two to three fold stronger than any other year class we have documented during the 1992-2002 study period. However the 2002 year class for both walleye and sauger were the lowest we have documented for the 1992-2002 period at Bellevue and somewhat below average for both species at Guttenberg.

A telemetry study is being conducted in Pool 13 to document habitat selection and spawning movements of adult walleye. The greatest amount of movement occurs in the late winter and early spring when fish are moving to spawning areas. Annual movements of twenty to forty-five miles are common as adult fish move from winter habitats to spawning habitats and then return to summer areas. Three spawning areas have been documented in Pool 13; all have characteristic rock-rubble, gravel, or mussel bed substrates. Additional monitoring of radio tagged fish during the winter period will be undertaken during the next several years to document any changes in winter habitat that may result from changes in wing dam and closing dam construction in lower Pool 13.

Channel catfish population relative abundances and reproductive success are being evaluated in Pools 9, 11, 16, and 18. Channel catfish populations in the Upper Mississippi River continue to show

improvement and stability after the regulation change in 1985 that increased the length limit for commercially harvested catfish from 13 to 15 inches. Today the commercial harvest is the highest since the 1960's. Channel catfish also continue to contribute significantly to the creel of sport anglers. During the summer surveys of anglers fishing Pools 11 and 13 from 1994-2002, channel catfish ranked from second to fourth behind freshwater drum and bluegill as the most numerous species taken. The density of channel catfish in the Upper Mississippi River is the highest its been in 30 years and is expected to remain high due to strong 1995, 1997, 1999, and 2002 year classes.

Winter habitat selection of bluegill and black and white crappies is being determined by radio telemetry. This study is designed to identify overwinter habitats and value of backwater restoration. Early results show that no matter where in a backwater complex the fish were tagged, nearly all the fish moved to several small, protected backwater lakes to overwinter. There was no current in these backwater lakes and water temperature was around 35-37 °F (main channel water temperatures were always around 32 °F). This study will be continued in different backwater complexes and Mississippi River pools during future project segments, so this information can be used to help direct rehabilitation of backwater complexes through the Habitat Rehabilitation Program.

### **Iowa State University**

The following are river and stream related projects being conducted at Iowa State University.

#### **Relationships of fish communities and availability of deep-water habitat**

The purpose of this study is to examine relationships of fish communities and populations of channel catfish and smallmouth bass with availability of deep-water habitat. The objectives are to quantify quality deep-water gamefish habitat, fish community characteristics, and channel catfish and smallmouth bass population size and growth rates in the stream sections of interest; and to explore relationships of fish communities and gamefish characteristics with availability of deep-water habitat. In the summer of 2003, eight of 15 study reaches on 3 eastern Iowa rivers were surveyed for depth profile using a GPS/depth sonar. The collected data are being entered into ArcGIS for analysis. Fish community data from new collections and existing databases were compiled for 11 of the 15 study reaches. All fish community data have been entered into a database for further analysis. Smallmouth bass and channel catfish aging structures were collected from all study reaches. Structures have been cataloged and are being prepared for aging. Depth data will be used to create depth profiles and expressions of the availability of deep-water habitat for each study reach. Further analysis will explore relationships between the availability of deep-water habitat, channel slope and basins. The fish community data will be used to calculate summary statistics (i.e. fish IBI scores, species abundances, etc.) for each stream reach. The summary statistics will then be used to explore relationships with the availability of deep-water habitat. Smallmouth bass and channel catfish aging structures will be used to estimate age distributions and growth rates for each study reach. These estimates will be used to further explore relationships with the availability of deep-water habitat. Contact: Jennifer A. Weidner (515)294-6936, levanfuz@iastate.edu.

#### **Iowa Aquatic Gap Analysis Project**

Objectives of the project are:

1. To classify stream reaches in terms of habitat quality for aquatic species using information available in IRIS.
2. To define range extent and habitat affinity of aquatic species using existing collection data.
3. To develop models predicting presence of aquatic species.

4. To generate predicted distributions of aquatic species state-wide using models and IRIS data.
5. To guide conservation planning by evaluating regions of predicted species occurrence in relation to riparian land use and stewardship.

The biological collection database has been completed and contains 10,984 community fish samples dating from 1884-2002, with a total of 93,768 species occurrence records. Using this data, statewide distribution maps for each species were generated on a watershed by watershed basis, using 8-digit and 10-digit hydrologic units. The maps for all fish species have been sent out for professional review. Using pre-professional review biological data, the valley segment type variables to be used in the prediction models are being determined. Once comments from the professional review process have been incorporated into the biological collection database, the data will be used to finalize statewide range maps and develop models predicting presence of fish species. Models will be developed for each fish species based on aquatic subregion and/or at the statewide level using AnswerTree statistical software. Those species' models that cannot be developed using AnswerTree, will be developed using information gathered from existing species location data, from habitat affinity literature data and from contingency tables generated by a custom-designed Aquatic GAP SAS program (designed by Missouri Aquatic Gap and customized for Iowa Aquatic Gap). These models will then be used to generate predicted distributions of the fish species at the aquatic subregion and/or statewide. Contact: Clay L. Pierce (515) 294-3159, cpierce@iastate.edu.

### **Development and Use of the Iowa Rivers Information System (IRIS)**

The goal of this project is to develop the Iowa Rivers Information System (IRIS), integrating physical, chemical and biological information into a comprehensive, user-friendly, statewide information system for interior Iowa rivers. The Iowa Rivers Information System (IRIS) is envisioned as a widely accessible tool for both professionals and the public to obtain information about rivers and streams in Iowa and the diversity of natural resources they support. The ultimate goal is to provide a single entry to the world of information about Iowa rivers and streams. Data and research products are available through IRIS, as well as web links to many other sites containing a wealth of information. IRIS is based on GIS principles and most of the available information is geo-referenced for mapping and spatial analysis. Uses of IRIS are only limited by the imagination. From the fisheries biologist seeking information to evaluate a stream's potential as a smallmouth bass fishery, to the water quality analyst searching for clues to explain differences in stream nutrient levels, to the classroom teacher helping students understand stream ecosystems, IRIS will be an essential tool. The true power of IRIS will be in how it simultaneously provides users with maps to visualize spatial relationships, spatially referenced databases, links to numerous other databases, and tools to work with data from a variety of sources, all linked by their location. All of this is being developed within a state-of-the-art web interface, bringing the power of IRIS to anyone with a computer and internet access.

The database created within ArcView 3.2 containing variables describing certain physical features of stream reaches in Iowa is complete with a few exceptions. The current web interface for IRIS (<http://maps.gis.iastate.edu/iris/index.asp>) has been built using a variety of server-side technologies including ESRI's ArcIMS and SDE technology. The IRIS website includes introductory material for the IRIS project, information about the IRIS attributes and data layers. Additional data layers have been added as they become available and links to metadata or information about the different data layers now exist. Based on user input, a decision was made to create two web-mapping interfaces to access the IRIS data. Data within the IRIS Explorer interface will be placed into general subject groups, and will be displayed within the map table of



contents within these groups. A more detailed report is available at:

<http://www.cfwru.iastate.edu/assets/IRIS.pdf>

Future expansion of IRIS coverages and capabilities will be in response to user feedback. In addition, IRIS will be linked to the DNR Fisheries, Lake Survey, IOWATER, Watershed Atlas, and other databases. Contact: Kevin Kane (515)294-0526, [kkane@iastate.edu](mailto:kkane@iastate.edu).

### **Monitoring of Fish Movement Patterns Following Modification of Two Streambed Grade Control Structures in Turkey Creek, Cass County, Iowa.**

The objectives of this project are to determine if a 1:15 back slope design will allow migratory fishes bi-directional movement within the affected stream reaches, and to provide demonstration sites of successful structures to HCA members and other potential stakeholders involved in streambed stabilization projects. Riverbanks and beds in the 22 county loess region of southwestern Iowa are highly susceptible to erosion. Streambed stabilization structures have been widely used to protect the infrastructure of bridges and roads in this region. During the last 10 years over 400 streambed stabilization structures have been constructed in Missouri River tributary streams located in western and southern Iowa. Those structures have been primarily funded through the Hungry Canyons Alliance or Emergency Watershed Protection. Additional structures are proposed or currently under construction on approximately 400 other susceptible bridges. A vast majority of these structures are of one design, involving a sheet piling dam and a 1:4 downstream slope constructed of rock rip-rap. These potential blockages to fish migration raised concerns and prompted regional fisheries personnel to investigate possible impacts to stream fishes. Recent intensive sampling by the Iowa Department of Natural Resources in affected tributary streams has shown a precipitous decline in the number of important regional fish populations, specifically channel catfish, flathead chub a species of concern, and other riverine species.

In 2001 – 2003 a cooperative study was conducted by the Iowa Department of Natural Resources (IDNR) in conjunction with Iowa State University (ISU) Department of Natural Resource Ecology and Management, and the 22 County Hungry Canyons Alliance (HCA). This study evaluated the effectiveness of redesigning stream stabilization structures to assist with fish migration. Six of the lower most streambed stabilization structures on Walnut Creek, Montgomery County, Iowa, were modified during the winter of 2000. Downstream slopes of structures were modified from previous 1:4 back slopes to 1:20 back slopes. Pre and post modification studies carried out by IDNR & ISU on fish migration indicated that targeted species were better able to navigate the gentler 1:20 back slopes. HCA has agreed to work cooperatively with the IDNR in redesigning selected grade control structures and designing new structures to the more acceptable 1:20 back slope designs. HCA is concerned with the significantly higher cost associated with modification of existing 1:4 back slope structures and in the new construction of 1:20 back slope structures. HCA has requested that the IDNR study fish movement patterns on structures that have been modified to 1:15 back slope design. Proposal has been accepted and plans are underway for recruiting student investigator. Funds available in the first year are far short of request, so first year work plan will be scaled back accordingly. Contact: Clay L. Pierce (515) 294-3159, [cpierce@iastate.edu](mailto:cpierce@iastate.edu).

### **A Probabilistic Survey of Iowa's Stream Resources: Habitat**

The primary goal of this project is to design and initiate a survey that will accurately and objectively assess the health status of Iowa's perennial streams. Habitat assessment is one component of the Iowa REMAP (Regional Environmental Monitoring and Assessment Program) project. In 2002, the DNR received a grant and technical assistance from EPA to begin the

project. The state ambient monitoring program also contributes funding to support the project. The sampling design and some of the sampling methods are patterned after other REMAP projects in the Central Plains and across the U.S. This project will initiate an objective and statistically-powerful survey of Iowa's perennial streams and rivers. A stratified-random sampling framework will be used to obtain an unbiased sample population from which accurate statements about the status of Iowa's perennial streams can be extrapolated. The survey will measure several indicators of stream ecosystem health including: aquatic community integrity: fish tissue, sediment, and water contaminant levels; physical habitat quality; primary production and community respiration. Preliminary discussions are underway to finalize study plan. Contact: Clay L. Pierce (515) 294-3159, [cpierce@iastate.edu](mailto:cpierce@iastate.edu).

### **An Integrated Immunological-GIS Approach for Bio-monitoring of Ecological Impacts of Swine Manure Pollutants in Streams**

This research is predicated on the hypothesis that low levels of swine liquid manure slurry and anaerobic lagoon liquid released to open water cause changes in immunological response in fish and increase fish susceptibility to infection. The initial objectives, therefore, are 1) to evaluate this hypothesis through a series of laboratory immunological assays applied to the test organism, the fathead minnow (*Pimephales promelas*) and 2) to identify one or more assays for use as a bio-monitoring technique to detect ecological impact of manure pollution in nature. A subsequent task involves use of digital environmental databases that are maintained and managed by the USGS BRD Iowa Cooperative Fish and Wildlife Research Unit at Iowa State University. The objective is 3) to characterize a number of Iowa watersheds and stream systems according to their potential susceptibility to hog manure pollution and to use this information to design a water quality and fish sampling regime. Finally, water and fish collected at selected stream sites will be analyzed through a battery of chemical and immunological procedures with the objectives 4) to quantitatively measure ecological impact of manure pollution on the streams, and 5) to evaluate the utility of this approach as a biomonitoring tool for environmental protection agencies.

Fathead minnow colony was successfully established during 2003 and is producing sufficient numbers of fish needed for the experiments. We have developed and constructed the computer controlled flow through system with automated dosing pumps for controlled exposure of experimental fish to various agents and chemicals.

During 2003 we have developed the isolation technique for extracting leukocytes from fathead minnow kidney. In short, the kidneys are aseptically removed to Ca/Mg free media, grinded in a tissue grinder, centrifuged on a 1078 Histopaque discontinuous cell gradient, washed and resuspended in adequate volume of Fish physiological saline.

We did morphological and cytochemical characterization of prepared leukocytes and have determined the average content of the kidney cell isolate to be >75% neutrophils, <20% lymphocytes and thrombocytes and <5% of other cells. Cells were characterized using morphological similarities with their mammalian counterparts when stained with Diff Quick. Cells were stained with following staining kits/procedures: Peroxidase #391, Sudan Black B, Alkaline phosphatase, Periodic Acid Schiff and Alpha-naphtyl acetate esterase.

We have started developing functional characterisation assays for evaluating neutrophil function. We have developed and optimized assay for measuring production of reactive oxygen species in isolated neutrophils by cytochrom C reduction method. We are currently developing other assays for measuring neutrophil function.

During 2003 and 2004 we plan to continue development of neutrophil functional assays and to expand existing battery of assays with several others (degranulation of primary neutrophil granules, iodination assay, myeloperoxidase cell content, etc). We plan to test known

immunostimulative and immunosuppressive agents, to calibrate assays and to establish baseline values for fathead minnow neutrophil function. During 2004 we plan to start developing GIS/flow path analysis tools for determining possible manure/chemical loads within a designated watershed. Also, we plan to define locations of the sampling stations within a designated watershed based on the stream channel and flow characteristics. During summer 2004 we plan to do the field test trials of the sampling gear and neutrophil assays on designated watersheds. Contact: Clay L. Pierce (515) 294-3159, [cpierce@iastate.edu](mailto:cpierce@iastate.edu).

## **Michigan Chapter of AFS – Rivers and Streams Committee Update (2005)**

1. Kregg Smith and Neal Godby, MDNR fisheries management biologists, took over as co-chairs of the Rivers and Streams Committee for 2005.
2. State of Michigan travel restrictions continue, and the committee has still been somewhat inactive over the last year.
3. The Michigan Chapter has a river geomorphology class scheduled for June 2005 in Marquette, Michigan. The course will be taught by Luther Aadland, Ph.D., of the Minnesota Department of Natural Resources, and Sandy Verry Ph.D., of Ellen River Partners in Grand Rapids, Minnesota. Interest in the course among chapter members is great, and we are looking forward to this learning opportunity.
4. The Rivers and Streams Committee will continue to try to increase committee membership, and will comment on appropriate issues.
5. The Michigan Department of Natural Resources awarded applicants of the 2004 Inland Fisheries Grant program (IFG), which offers grants up to \$200,000 for local projects that enhance our state's aquatic resources. The IFG program is intended to foster citizen, community understanding, and appreciation of inland fisheries resources and to encourage participation and commitment to the improvement and protection of inland fishing opportunities, habitat, and fish communities. The management of dams is the focus area for the IFG program during 2004 and 2005. Examples of projects funded in 2004 included: the removal of a low head structure on the Grand River in Dimondale, MI that will allow fish passage to higher gradient portions of the river from the Moores Park Impoundment in Lansing, MI to the Smithville Project in Eaton Rapids, MI. Funding was also awarded to the removal of the Rice Creek dam in Marshall, MI that will open spawning access from the Ceresco dam on the Kalamazoo River to the headwaters of Rice Creek (a designated trout stream). Removal of the City of Charlotte dam that will allow for fish passage from the city of Bellevue upstream to headwater lakes on the Battle Creek River. This project also included restoration efforts based on Rosgen criteria for a section of the highly modified river channel. In addition, the grant funded one project to aid in preliminary engineering designs and cost estimates to be used to secure grant monies for the dam removal in the Muskegon River Watershed.
6. Previously, the Michigan Chapter was involved in lobbying house representatives regarding Michigan Drain Code Reform Bills (Senate Bill 0217 and House Bill 4552) that would amend the Michigan drain code of 1956. This bill was referred to a subcommittee in the legislature on agriculture, forestry, and tourism upon which the committee should participate when necessary. Under the bill; the definition of a drain would be changed to include all tributary streams, the MDNR would be excluded from the decision making processes, a drain could be established with just 25% of adjacent landowner signatures, the drain commissioner would have the authority to construct dams and remove all obstructions from streams including fish structures as well as provide for civil fines up to \$10,000 if a person refused to remove an obstruction in a drain, and exempt the drain projects from environmental permit review from the Michigan Department of Environmental Quality.
7. The first priority for the chapter during the upcoming year is to become involved and prepare letters of support regarding a proposal to eliminate the current DEQ budget for the Dam Safety

Program and the 2006 Budget proposal to amend the Dam Safety Act. The proposal under the 2006 Budget is to amend the Dam Safety Act to completely take DEQ out of the Act (or any other State Agency or Department for that matter). There will be no program that monitors inspections and compliance. Owners will still have to conduct inspections but these inspections will be filed with the local emergency planning authority. Under the Dam Safety Program, DEQ inspects about 75 to 80 dams a year. About 20 per year are for local units of government. The remaining dams inspected are state owned dams. There are 230 to 240 of these dams that require inspections under the Act and DEQ conducts approximately 60 inspections a year. If DEQ does not do these inspections, DNR would have to do them. If the Dam Safety Act is amended as proposed, dam owners would still have to do the inspections and they would file them with the local emergency action authority. There would be no monitoring to insure the inspections are done and in the case where the inspection requires remedial work, there would be no monitoring to insure the work is done or done right. DEQ would no longer be available to provide assistance or advice to the local units of government or the local emergency action authority. Most important the DEQ would have no authority to order remediation of unsafe dams. Under part 301 of the Natural Resource Environmental Protection Act 451, the issues would be just be a failure to get a permit. Under the Dam Safety Act, DEQ determines the level of hazard of an existing dam. Currently there are 79 dams classified as high hazard and 136 dams classified as significant hazard. Under the proposed amendment, there would be no agency to determine the hazard level of for that matter there would not be a classification program. The Dam Safety Act is a good Act and monitoring and compliance is a major part of what the dam safety program. The Michigan chapter is in favor of keeping this program together and will continue to support funding and become an involved organization during the upcoming year.

## 2005 MN Summary of Activities for the Annual NCD Rivers and Streams Technical Committee

Compiled by: Karl Koller, MN NCD Rep. (Karl.Koller@dnr.state.mn.us)

### Below is a summary of activities provided by Mark Ebbers, Fisheries Program Consultant – Cold Water

The MN DNR Section of Fisheries is currently revising its stream survey manual. Specifics of the general structure and protocol will be presented by Mark Ebbers at this meeting.

#### **Stream Survey Manual Schedule**

March 31, 2005 working draft sent to MN DNR area offices to review, test and provide feedback during the 2005 field season.

Fall-winter 2005 – committee will review comments and make final changes to the manual.

Late winter 2006 - final version of the manual will be printed and sent out.

#### **Stream Survey Database Schedule**

Spring 2005 – start designing the stream survey database.

Summer 2006 – begin the development of the database.

#### **Fisheries Management Planning Guide for Stream and River**

No starting date set yet, but like to start revising in 2006.

#### **SE Trout Stream Habitat Improvement Planning Guide**

Work on this planning guide started in the summer of 2004. This guide is scheduled to be completed during the summer of 2005.

#### **Trout Fishing Opportunities in Southern Minnesota**

This 48 page map book (2<sup>nd</sup> edition) will be available in April 2005. These maps will show the location of over 200 miles on fishing easements, public lands, special regulations, and streams open to winter angling.

## **Special regulations aimed at larger trout (2004-10-26)**

Following an extensive and valuable public input process, the Minnesota Department of Natural Resources (DNR) has announced changes to trout regulations for 22 streams in six southeast counties.

The changes are intended to improve fishing quality for larger trout while maintaining diverse fishing opportunities for anglers. The regulations take effect April 16, opening day of the 2005 stream trout season.

"Trout anglers want a variety of experiences. Some want larger fish. Others want more fish. For others, it's taking a few fish home to eat," said Jason Moeckel, DNR assistant regional fisheries manager in Rochester. "The new regulations represent a reasonable balance of these wants. As a result, anglers will have the ability to find an experience that suits their preference."

The DNR's original proposal, which was announced last winter, included special regulations on 181 miles of stream and prohibited the use of bait on 136 miles. Based on public input, Moeckel said the package was reduced to 128.7 miles with special regulations. Of those, 68.7 miles will allow only artificial lures and 60 miles will allow bait to be used.

"We learned during the public input process that some of those streams were very important to bait anglers and heavily used by families," Moeckel said.

Ninety-seven of the 128.7 stream miles are designated and actively managed trout water. About 31.7 miles are waters that hold large trout, but are not designated as trout water. The new package includes about 50 miles that were already under special regulations.

There are 680 miles of designated fishable trout water in southeast Minnesota.

According to more than 2,400 DNR fish population surveys, the trout population in southeastern Minnesota has tripled since 1970.

Bait fishing will be allowed on 10 of the 22 streams. Anglers will be required to release all trout 12 to 16 inches on 14 streams while seven streams will be catch-and-release fishing where no trout could be kept. On one stream, anglers will be required to release all brook trout under 12 inches, with a one-fish limit.

Based on DNR population data for brown trout, about one-third of southeast Minnesota's top 330 miles of trout water will be affected by the new regulations with catch-and-release regulations on just six percent, Moeckel said.

Initial reaction from anglers was mixed but generally positive. Jeff Hanson, a member of a citizen's group that advises the DNR on trout issues, was pleased that four streams slated for special regulations in the original proposal were dropped. However, he would have preferred further reductions in the special regulations package.

"The DNR is to be credited for proceeding with compromises to the expansive coverage of the initially proposed special regulations, and in making changes to allow bait fishing on seven of the streams which were initially designated for artificial only," Hanson said in written remarks provided to the DNR. "In my opinion, however, the DNR did not go far enough in reducing the mileage of streams covered by special regulations, particularly those located in Minnesota state parks."

Jeff Broberg, a St. Charles trout angler and member of the Minnesota Trout Association, said although the new regulations affect just 14 percent of actively managed trout water, they should improve fishing for anglers who are interested in pursuing larger fish.

"I'm delighted. The proposal allows most of our stream regulations to stay the same and also generates a more diverse sport fishery that takes advantage of the opportunity to manage some of our streams for populations of larger trout," Broberg said.

Gary Sobotta, vice president of the Hiawatha chapter of Trout Unlimited, said he's also pleased with the decision. "Our endorsement of the new regulation changes was supported by our belief if you have good angling opportunities more anglers and citizens will be willing to protect those cold water resources." Sobotta said. "We truly have some of the finest trout water in the entire country. While we did not get everything we wanted, we all must look beyond our personal wants and consider what is best for our kids and grandkids trout angling."

Special regulations, such as catch-and-release with artificial lures only, can be helpful in the right situation but are not a cure-all, Moeckel stressed. The long-range plan recently adopted by the DNR includes efforts to monitor trout populations, conduct angler surveys, improve trout habitat, and work with partners to improve watersheds and water quality.

The DNR will report annually on progress implementing the long-range plan. It may take several years before anglers' notice significant changes in the number or size of trout they catch, Moeckel said.

The following southeastern Minnesota streams that will be affected by the regulations. In some cases, regulations affect only portions of the streams. Maps that show the affected portions are available online at [www.dnr.state.mn.us](http://www.dnr.state.mn.us). The regulations will be posted on signs along affected streams.

#### AFFECTED WATER:

Trout Valley Creek (7.2 miles).

#### REGULATION:

Brook trout under 12 inches must be released, bag limit of 1 (artificial lures or flies only).



**AFFECTED WATER:**

Camp Creek (2.7 miles), Kedron Creek (1.1 miles), South Fork Root River (7.7 miles), Middle Branch Whitewater River (9.2 miles).

**REGULATION:**

Catch-and-release for all trout (artificial lures or flies only). The new regulation on Camp Creek will not affect the annual kids' fishing event held during Preston Trout Days.

**AFFECTED WATER:**

Belle Creek (7.3 miles), Middle Branch Root River (12.5 miles), North Fork Zumbro River (11.9 miles).

**REGULATION:**

Catch-and-release for all trout (bait allowed).

**AFFECTED WATER:**

Canfield Creek (1.6 miles), Garvin Brook (5.0 miles), Gribben Creek (3.9 miles), Hay Creek (4.0 miles), Logan Creek (0.9 miles), Trout Run Creek (13.3 miles), North Branch Whitewater River (12.1 miles).

**REGULATION:**

Protected slot limit for trout 12 to 16 inches (artificial lures or flies only).

**AFFECTED WATER:**

East Beaver Creek (2.3 miles), Forestville Creek (2.6 miles), Mahoods Creek (0.2), South Branch Root River (4.8 miles), Spring Valley Creek (6.8 miles), West Indian Creek (3.0 miles), Wisel Creek (8.6 miles).

**REGULATION:**

Protected slot limit for trout 12 to 16 inches (bait allowed).

Streams dropped from original proposal include: Bee Creek, Cold Spring Brook, Money Creek, Winnebago Creek.

Below is the Introduction and Discussion of a 20 page report prepared to summarize the findings of this fish assessment submitted by the author.

## **St. Croix River Fish Sampling Study**

Status and critical habitat of threatened, special concern, and rare fish species in nonwadeable portions of the St. Croix River Basin.

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### Introduction

In 2004, a survey of the nonwadeable portions of the St. Croix River Basin was performed to document occurrences and critical habitats for fish species that are rare or categorized as threatened or special concern (Table 1). The majority of the survey sites were located on the mainstem St. Croix River with six on the Kettle and the Snake Rivers. Surveys were separated into two major categories based on methodology; standardized whole fish community assessments using pulsed DC current from a boat mounted electrofisher and non-standardized methods utilizing various fish capturing equipment.

### Discussion

Overall 14 out of 39 targeted fish species were sampled using all gear types during this survey period. Two out of the seven threatened and special concern species listed for the St. Croix were not sampled, which are the paddlefish and pallid shiner. The paddlefish is extremely rare in the St. Croix with the only records coming from Lake St. Croix by commercial fishers and the pallid shiner are assumed to be extirpated.

Standardized surveys were comparable to historical efforts and in terms of number and distribution; little has changed for rare, special concern fish species in the St. Croix. The IBI scores indicate a healthy system with impacts from populated areas and impoundments. The non-standardized surveys, especially the Missouri trawl, demonstrated its utility as a method for sampling small benthic fishes and have increased our knowledge of the distribution of these fishes.

To keep the St. Croix River basin a valuable resource to Minnesota and Wisconsin, additional and continued protection from adverse land uses, protection of fish habitat, and evaluation of future negative anthropogenic activities should continue. To assess these protection efforts, long term monitoring utilizing an IBI, should be completed at regular intervals.

Below is a bulleted summary of current work being conducted by the MN DNR Section of Ecological Services Stream Habitat Program

Two one week long workshops will be offered this year: Fluvial Geomorphology and Stream Classification in July (location to be determined) and Stream Restoration in August, Fergus Falls. Fluvial Geomorphology and Stream Classification and Stream Assessment and Monitoring are prerequisite courses for the Stream restoration course.

Healthy Rivers: A Water Course: this informational CD-ROM is getting rave reviews. A consultant has been hired to conduct six outreach meetings to 'train-the-trainer' to increase awareness and understanding of this tool's potential. Contact Karen Terry of the Stream Habitat Program with questions or to purchase a copy.

Crookston Dam removal project is on-going.

On the mainstem of the Red: we are still working on removal or modification of Christine, Hickson, and Drayton dams. All are in the discussion stage. The attempt is to restore connectivity of the Red River system to the extent possible. Lake Sturgeon spawning is a primary concern.

Lawndale Creek, Wilkin Co.: this is a designated (brook) trout stream that has been channelized; we are working to restore/construct a stable channel through a WMA.

An Otter Tail Power dam upstream of Crookston: discussions about removal are ongoing.

Dawson Dam: discussions about removal/conversion to a rapids are ongoing.

Below is a short summary of the evaluation of the effort to reintroduce slimy sculpin populations to streams in SE MN.

In 2003 we reintroduced 150 slimy sculpin into each of four streams (taken from three donor streams); fall of 2004 was our first chance for initial evaluations. As expected, there was no change in donor stream abundance attributable to our removals (paired t-test,  $P=0.53$ ). Abundance increased slightly at the removal locations of two donor streams but declined dramatically at the third stream. However, additional sampling determined that the decline in abundance at the third stream was a stream-wide effect, presumably due to several high water events. Size structure changed at all donor streams from 2003 to 2004 (Kolmogorov-Smirnov tests, all  $P<0.002$ ), but the lack of difference between control stations and removal stations ( $P>0.05$ ) suggests these were also stream-wide effects and not attributable to the removals. No surprise, removing a few hundred slimy sculpin doesn't appear to have caused any problems.

The main intent of evaluations was to see how the slimy sculpin were doing in the recipient streams, and results were mixed. Slimy sculpin were present in all four

recipient streams at the stocking locations, in densities up to 1,423/mile in the immediate area. However, densities dropped off quickly both upstream and downstream, similar to results from other studies, and apparent survival in the two well-sampled streams was 23% and 13%. Furthermore, only two young-of-year sculpin were sampled; overall survival and recruitment were presumably affected by several particularly high water events in early 2004. In 2005 we will get initial evaluations on the second set of four recipient streams, plus evaluations of the second year of stocking on the original four recipient streams. If apparent survival is low we will allocate more slimy sculpin to be stocked into fewer streams.

Submitted by Eric Mertin. See area office website for more details:

<http://www.dnr.state.mn.us/areas/fisheries/lanesboro/management.html>

The following is a summary of our Metro Trout Stream Programs Highlights, submitted by Brian Nerbonne, Coordinator

### **Recent Metro Trout Initiative Highlights**

- 1) Elko/New Market Wastewater Treatment expansion of discharge to Vermillion River
  - DNR staff worked a compromise with the PCA that incorporates thermal monitoring and modeling to be paid for by the cities into the discharge permit.
  - Phased discharge plan will be halted prior to reaching maximum permitted capacity if potential thermal impacts are indicated by modeling.
  - Monitoring will be incorporated into a much larger thermal monitoring and modeling effort for the designated trout stream portions of the Vermillion.
- 2) Increased angler access on the Vermillion River
  - Multiple partners including Dakota County, the Trust for Public Land, and DNR Fisheries and Wildlife will be purchasing a 460-acre tract of land with over a mile of frontage on the Vermillion River to be managed in part as an Aquatic Management Area and partially as a Wildlife Management Area.
  - Purchase will be completed in October 2005.
  - This section of the Vermillion has been ditched and straightened, meaning that in the future an extensive restoration project will be undertaken to create a more stable stream with better habitat.
- 3) Special Regulations for the Vermillion River
  - In order to protect the trophy brown trout population present in the Vermillion as angling pressure increases from improved access and publicity about the stream, catch and release regulations will be proposed this coming year.
  - Anglers will still be able to harvest rainbow trout stocked at catchable sizes each spring.

4) Habitat restoration

- Restoration of ditched channels to meandering streams will be complete in 2005 on a tributary to Old Mill Stream in William O'Brien State Park, on Middle Creek (Vermillion River tributary) on the grounds of an elementary school in Farmington, and on Valley Creek in Afton.

The following is a summary of the MN Pollution Control Agencies Biological Monitoring Program. Which is conducting assessments on streams throughout the state.

### **The MPCA Biological Monitoring Program**

For the past 9 years the MPCA biological monitoring program has had two main objectives; 1) the development of a statewide dataset for development of indices of biological integrity (IBI) and 2) the assessment of rivers and streams to support status and trend monitoring. Throughout this process, the Agency has also made use of the information to support the 305b and 303d (impaired waters) listing processes, NPDES permit review process, use class designations changes, and evaluation of point and non-point source impacts.

The program has used a consistent and standardized sampling approach throughout the state. Each sampling event includes an assessment of the fish and macroinvertebrate community, habitat, and basic water chemistry. Information regarding the MPCA sampling procedures may be found at <http://www.pca.state.mn.us/water/biomonitoring/index.html>.

For the IBI development process, stream reaches have been selected across a gradient of human disturbance from least impacted to severely impacted. To date, the MPCA has completed sampling for IBI development in 8 of Minnesota's 10 major basins. Only the Red and Rainy River basins remain and these basins will be sampled in the summer of 2005. All types of streams from 1<sup>st</sup> order headwater streams to large unwadeable rivers and warmwater streams to coldwater streams are included in this process. Over 500 IBI development sites have been sampled thus far. Basin specific fish IBI's have been developed for the Minnesota, Red, St. Croix, and Upper Mississippi River basins. Basin specific macroinvertebrate IBI's have been developed for the St. Croix and Upper Mississippi River basins. The guidance documents for each of these IBI's can be found at the website listed above.

The MPCA sampling design to assess the status and trends in stream water quality follows guidance developed by the US Environmental Protection Agencies (USEPA), Environmental Monitoring and Assessment Program (EMAP). The EMAP sampling protocols were designed to provide statistically valid assessments of water quality using a variety of different measuring tools to give a more complete picture of the water resource. The design calls for sampling in about 50 randomly selected sites within each major basin. Like the IBI development sites, the EMAP sites encompass all stream types

and sizes. Over 400 sites have been sampled thus far. In 2005, the MPCA will conduct the EMAP sampling in the Red and Rainy River basins, thus completing the first round of assessments throughout Minnesota.

The MPCA anticipates that the sampling activities for IBI development will be greatly reduced after 2005 allowing for the adoption of other sampling designs that will better support other Agency priorities including the burgeoning TMDL program. One of the sampling designs that we are considering at this time is an intensive watershed sampling design that has been used by Ohio EPA to support their TMDL program. This progressive sampling design would place a large number of sampling sites within a relatively small watershed (USGS, 8 digit HUC) to better identify the extent of impairment and sources of stress on the aquatic community.

For more information about the MPCA Biological Monitoring Program contact:

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Below is a summary of a proposal for a project in SE MN to restore native brook trout populations through the exclusion of brown trout: Submitted by Jeff Weiss

### **A Proposal for the Experimental Reintroduction of Brook Trout in Duschee Creek**

The reestablishment of wild brook trout populations was identified as a management priority in the *Long Range Plan for Trout Stream Resource Management in Southeast Minnesota* in 2003. A key component of the plan is to evaluate the removal of brown trout from sympatric populations and design an effective barrier(s) which prevents further brown trout immigration. The headwaters reach of Duschee Creek presents an excellent opportunity to:

Design, install, and test the effectiveness of a barrier to prevent brown trout immigration.  
Learn how much effort is required to remove brown trout by electrofishing.  
Monitor the establishment of a brook trout population in the absence of competition with brown trout.  
Evaluate the suitability of "traditional" habitat improvements for brook trout.  
Evaluate brook trout growth by stocking marked fingerlings of a known age.

The experimental reach would be an 1,800 ft-long section of the stream located near the Lanesboro Area Fisheries headquarters. Brook trout have historically been present in this reach, however only a remnant population persists. Through observation, brown trout abundance appears to be quite high. A habitat improvement project was completed in this reach in 2001 and included the installation of overhead cover structures and one drop structure. A continuously recording temperature monitor was also installed in December 2004.

The project has been divided into four phases:

Phase 1: Construct a barrier to prevent the re-immigration of brown trout into the experimental reach of Duschee Creek.

Timetable: Spring 2005

Cost: less than \$5000

Responsibility: Lanesboro Area Fisheries Staff/Habitat Improvement Personnel

Equipment Needs: Backhoe; Dump Truck

Phase 2: Remove all brown trout from the experimental reach by electrofishing.

Timetable: Spring 2005 after barrier construction

Cost: Hourly wages for two fisheries specialists (6L) and one technician

Responsibility: Fisheries Specialist is the project leader.

Equipment Needs: None other than typical electrofishing equipment.

Phase 3: Stock 1,500 marked fingerling brook trout immediately after brown trout are removed in 2005. Continue annual stocking of marked fish for three years (through 2007).

Timetable: after Phase 2 is completed.

Cost: Fish which are available at Crystal Springs Hatchery

Responsibility: Fisheries Specialist/Technician

Equipment Needs: None.

Phase 4: Monitor survival and growth of stocked brook trout.

Timetable: Annual late summer electrofishing 2006 to 2010.

Cost: Hourly wages for two specialists (6L) and one technician.

Responsibility: Fisheries Specialist

Below is a summary of actions approved by the MN Streams and Rivers Committee at the 2005 annual meeting.

1. *Ditch Buffer Bill* - There is a bill in the state legislature that clarifies the width of the buffers around new and improved ditches in the state. The Chapter prepared a resolution in support of the bill, although the impacts of the ditch obviously outweigh the benefits of the buffer.
2. *Support for ACOE funding* - The US Army Corp has supported large projects through their Ecosystem Restoration program that were likely too large to find funding at the state and local level. Funding for this program is in danger of being dramatically reduced. A letter will be drafted that either the Stream and River Committee or the Chapter will send to U. S. Legislators in support of funding for this program. The Committee also strongly encourages the Rivers and Streams Technical Committee to consider a similar action. The MN letter will contain a list of projects that are ready to be completed, and only need funding to implement.
3. *Wood removal from streams (snagging) position paper* - The committee agreed to begin drafting a position paper from the Chapter to discourage the practice of removing wood from streams. The paper would focus on educating current practitioners of the benefit of wood in streams and take the position that MN AFS does not support the activity, other than those situations spelled out as acceptable in the AFS guidelines.
4. *OHV impacts to streams* – There is a great deal of debate in MN currently about the extent that Off Highway Vehicles (OHV) will be allowed to use state parks. The Committee will explore options (position paper, etc.) to discourage allowing OHVs to traverse streams.

In addition to these action items, several people shared details of projects being done throughout the state.



Below is a summary of activities of the Arrowhead Regional Stream Team

### **Arrowhead Regional (NE MN) Stream Team**

Providing hydrologic and geomorphologic technical assistance and training in the Lake Superior and Rainy River Basins.

The Arrowhead Regional Stream Team is an interagency group with Federal, State and County representation whose goal is to increase awareness of stream issues and to promote a more holistic approach to stream management, especially through the increased use and understanding of geomorphic principles. Two issues that are at the forefront are:

1. Advancing the concept of requiring mitigation for stream degradation similar to current wetland practices. Additionally, to look at ways to allow stream restoration in lieu of wetland mitigation in areas where there are no opportunities for wetland mitigation within the effected watershed.
2. Advance the use of geomorphic principles in stream crossing design. This is primarily being done through modification of the Department of Transportations General Permit for stream crossings. Only one change to the permit is necessary to meet the minimum requirements for a stable stream, matching the width of the culvert/bridge to the bankfull width of the stream.
3. The Stream Team has begun to explore the possibility of commencing a study to determine the impacts of the changes in hydrology on streams caused by iron ore mine pit dewatering.

For more information, contact Karl Koller ( [karl.koller@dnr.state.mn.us](mailto:karl.koller@dnr.state.mn.us) )

Duane, once again congratulations on your appointment as President of the Missouri Chapter. The following brief report is the final thing I need to do to complete my duties as Missouri Chapter Chair of the Rivers and Streams Technical Committee. I served as Chair for 2003 and 2004. I plan to continue my involvement in this committee as well as my new duties as Legislative Affairs Chair. My personal thanks to Mark Van Patten (who served as Secretary for 2003-2004) as well as the gift of a custom fly rod to the Chapter for the membership drive.

Tom, I will be sending you one additional hard copy file ASAP.

Rivers and Streams Technical Committee 2004 report

The Missouri Chapter of the American Fisheries Society conducted two committee meetings during 2004. The summer meeting held at Bennett Spring State Park Lodge and the winter meeting held at Tan Tar A Osage Beach, MO.

During 2004, the committee discussed the issues of membership in the state chapter and the committee, sand and gravel, glass container, no-more-trash, and waste tire legislation. Additional topics include invasive species, dam removal, the Stream Guide, and alternative stream bank stabilization.

Several members of this committee played critical roles participating in discussions around the sand and gravel guidelines and rule making process in 2004. Letters, phone calls, and selected personal visits were made to provide fact based, scientific information so legislators could make informed decisions. The extra effort and personal sacrifice paid off (to some degree) as we now have some rules we can live with.

Many members of this committee are also involved in or presented at the Missouri Natural Resources Conference, the NCD RSTC Meeting, the Missouri River Natural Resources Conference, the Midwest, the Southeastern, and the Parent society meeting.

The Stream Guide sub-committee is chaired by Rob Pulliam and to date all chapters are in and under critical review by many in the committee.

The Watershed Poster needs to be reprinted (approximately 100 are around). Members of the committee will be working with MDC staff on an agreement for re-printing.

New officers for 2005-2007 include: Tom Priesendorf, Chair and Kenda Flores, Secretary.

This brief report respectfully submitted by Brian Canaday

Tom, I attached Paul Kanehl's e-mail below about the Spring meeting in Rock Island. Paul is a great guy and this is a great group. I hope you can attend. You should be able to pull the MO Chapter RSTC e-mail list off of the meeting announcement and agenda I forwarded prior to the MNRC. Please let me know if you need anything.

# Nebraska Rivers and Streams Chapter Report (2004)

## NDEQ SURFACE WATER ASSESSMENT PROGRAMS

The Surface Water Unit collects physical, chemical, and biological water quality samples from streams and lakes throughout the state in conjunction with a rotating basin monitoring strategy. This strategy targets surface water monitoring in two or three river basins each year. During a five-year cycle, all 13 river basins in the state are intensively monitored. These data are used to document existing water quality conditions, assess the support of beneficial uses (such as recreation, aquatic life, public drinking water supply), and prioritize water quality problems. The current five-year rotating monitoring cycle is listed here: 2004 — Lower Platte and Nemaha river basins; 2005 — Elkhorn and Missouri Tributaries river basins; 2006 — Middle Platte, North Platte, and South Platte river basins; 2007— Big Blue, Little Blue and Republican river basins; and 2008 — Loup, Niobrara, and White River-Hat Creek river basins

**Basin Rotation Monitoring Network** – A total of 25 streams and 15 lakes in the Lower Platte and Nemaha river basins were sampled weekly from April through September for traditional parameters, bacteria and pesticides to document existing water quality conditions and assess the support of beneficial uses. These data were used, in part, to assess suitability of water quality for primary contact recreational activities such as swimming, rafting, tubing, and canoeing. Assistance was also received from many of the Natural Resource Districts (NRDs) where an additional 22 lakes and 8 streams across the State were sampled and analyzed for bacteria using Colilert analysis equipment provided by DEQ through an EPA grant. During 2004, a total of 1,667 samples were collected and analyzed for this network.

**Ambient Stream Monitoring Network** – This network was initiated in 2000 with the primary objective of providing information on the status and trends of water quality in Nebraska streams, and linking assessments of status and trends with natural and human factors that affect water quality. This network also samples fish communities in coldwater streams to document existing or potential Coldwater Class A stream designations (streams capable of supporting a self-sustaining trout population). The network consists of 98 representative mainstem and tributary stream sites in all 13 river basins. Water samples are collected monthly and analyzed for traditional chemical and physical parameters. In addition, heavy metals are analyzed quarterly and fish communities are sampled once a year in coldwater streams. During 2004, a total of 1,908 water samples were collected for this program.

**Ambient Fish Tissue Monitoring Program** — Thirty-nine fish tissue samples were collected from 28 streams and lakes across Nebraska for analysis of toxic pollutants during 2004. This information is used to assess toxic pollutant trends, identify problem areas, and assess the suitability of fish for human consumption. The primary contaminants of concern in Nebraska fish are PCBs, mercury and dieldrin. Based on fish tissue information collected prior to 2004, fish consumption advisories will be issued or reissued for 40 sites in 2004, including 19 stream or canal segments and 21 lakes.

**Joint State Atrazine Monitoring Program** —an interstate cooperative effort between Nebraska and Kansas in the Big Blue River Basin to address public drinking water concerns about atrazine in Kansas surface waters. About two-thirds of the Big Blue River drainage is located in Nebraska; therefore, interstate cooperation is essential to the success of this program. In an effort to identify critical areas of runoff, Atrazine monitoring was initiated in 1997. Presently, 15 stream sites in Nebraska and 10 sites in Kansas are being monitored for the herbicides atrazine, alachlor, acetochlor, and metolachlor. In 2004, a total of 614 samples (345 samples in Nebraska) were collected during weekly grab sampling from April through September at 25 sites. Runoff samples were collected at eight of those sites during times of significant precipitation.

**Regional Environmental Monitoring and Assessment Program (R-EMAP)** — Program which involves a unique randomized sample design that allows water quality status and trend assessments to be made with a known level of confidence. This program, initiated in 1994, is used to evaluate the health of the aquatic life populations and involves the collection of water, sediment, habitat, fish and macroinvertebrate samples from wadeable streams in conjunction with the rotating basin monitoring strategy. During 2004 monitoring 42 sites were evaluated in the Nemaha and Lower Platte Basins.

**Nonpoint Source Monitoring** — Monitoring and assessment of surface water quality for nonpoint source pollution is performed to identify and prioritize nonpoint source problem areas, develop nonpoint source watershed management plans, and evaluate the effectiveness of measures implemented to control nonpoint source pollution. Eighteen lake inlet streams were sampled during periods of significant precipitation to provide information on nutrient and sediment loading to lakes during runoff events

**Fish Kill and Citizen Complaint Investigations** —Thirty-three fish kills were reported between July 1, 2003 and June 30, 2004. Most of these were attributed to low oxygen from winter and summer kill, low flows, temperature stress and disease/parasite. A total of 26 citizen complaints were also received by the Surface Water Unit during the same time period. On-site investigations were conducted, as needed, to document existing water quality conditions, surface water quality standards violations and identify pollution sources.

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**Statewide Stream Fisheries Inventory:** We are in the third year of this project to re-sample all of the localities visited by Raymond E. Johnson during his fieldwork for his PhD Dissertation (The Distribution of Nebraska Fishes). In addition to collecting fish and macroinvertebrates we are also measuring habitat conditions using a modification of the EPA: R-EMAP procedure. So far we have visited 131 sites during 2003 and 2004, and the remaining 77 sites will be visited in 2005. (This work is funded by the Nebraska Game and Parks Commission)

**Studies of pallid sturgeon and sturgeon chub in the lower Platte River:** We are just completing the final report for this project that started in 2000. This project has five objectives: Objective 1 was to document habitat use, relative habitat preference, and species assemblages associated with adult and juvenile pallid sturgeon and sturgeon chub in the lower Platte River. Objective 2 was to document the phenology, and relative abundance of larval recruitment for pallid sturgeon, sturgeon chub and associated species in the lower Platte River. Objective 3 was to determine how changes in river discharge influence habitat use by pallid sturgeon and sturgeon chub life history stages in the lower Platte River. Objective 4 was to document the catch of sturgeon by anglers in the lower Platte River. And objective 5 was to develop educational materials and management recommendations for the sturgeon fishery in the lower Platte River. Our schedule is to complete the final report by May 2005 and to have it ready for publication as a Nebraska Technical Series Report by November 2005.

**Other River and Stream related activities at UNL:** Ed Peters will retire from the School of Natural Resources after 30 years of teaching fisheries and ichthyology courses. His replacement, Dr. Mark Pegg, will start during the summer of 2005. The School of Natural Resources is also interviewing candidates for a stream ecology position and plans to fill this position by late summer 2005.

#### OTHER NEBRASKA NEWS

The drought in Nebraska and the central Rocky Mountains continues to cause problems for Nebraska rivers and streams. Below average snow-pack in the Rockies and continuing irrigation withdrawals have depleted reservoirs like Lake MacConaughy to historic low levels. The work of the three state cooperative agreement between Colorado, Wyoming, and Nebraska has proceeded slowly. This year the National Academies of Science, National Research Council study entitled, Endangered and Threatened Species of the Platte River, was published. This report gave new support to the management of Platte River discharges for the protection of endangered species. Meanwhile the Cooperative Hydrology Study (COHYST) is more clearly and quantitatively delineating the interaction between Platte River flows and ground water.

This year the Nebraska Department of Natural Resources is charged with setting up a plan to pay irrigators not to irrigate along the Platte and Republican Rivers. A total of 100,000 acres (50,000 each in the Republican and Platte basins) will be eligible for payments from Nebraska and Federal sources at a rate of \$125/ acre/ year. This, along with a moratorium on drilling of new irrigation wells may help to augment flows in these basins.

On the Missouri River crews from the Nebraska Game and Parks Commission, working with the USGS, US-EPA, and the US Army Corps of Engineers are conducting pallid sturgeon habitat use and population studies, large river EMAP studies, and shallow water habitat development projects. This work is part of that being done on the whole lower portion of the Missouri River basin and involves the cooperation of all the states bordering the Missouri River.

AFS NCD Rivers and Streams Technical Committee  
Wisconsin Chapter Report  
March 23, 2005

**Wisconsin Department of Natural Resources – SFR Reports**

1. Title: Effects of flow regulation and restriction of passage due to hydroelectric power operation on the structure of fish and invertebrate communities in Wisconsin's large river systems. Contact person: John Lyons, [John.Lyons@dnr.state.wi.us](mailto:John.Lyons@dnr.state.wi.us)

Study objectives: 1. Examine longitudinal trends in fish and invertebrate community structure and the discontinuities imposed by flow regulation and restriction of passage due to hydroelectric project operation, and compare fish and invertebrate communities between selected river segments with varying degrees of flow regulation and passage restriction (Phase I). 2. Compare fish and invertebrate communities in river reaches subjected to daily peaking flow regulation with the same communities in the same reaches after minimum flows have been increased on several reaches and run-of-the-river flow regulation has been restored on the other reaches (Phase II). 3. Develop preliminary biotic indices to assess ecosystem integrity in large warmwater rivers in the upper midwest.

Study Publications:

Piette, R. R. 2004. Effects of flow regulation due to hydroelectric project operation on the structure of fish communities in Wisconsin's large river systems. MS Thesis, University of Wisconsin – Stevens Point.

Lyons, J. 2004. Effects of flow regulation and restriction of passage due to hydroelectric project operation on the structure of fish and invertebrate communities in Wisconsin's large river systems. Phase II: Menominee River fish and habitat conditions prior to flow regulation changes. Wisconsin Department of Natural Resources, Madison, Sport Fish Restoration Fund Final Report.

Lyons, J., R. R. Piette, and K. W. Niermeyer. 2001. Development, validation, and application of a fish-based index of biotic integrity for Wisconsin's large warmwater rivers. Transactions of the American Fisheries Society 130:1077-1094.

2. Title: Rewrite the book *FISHES OF WISCONSIN*. Contact person: John Lyons, [John.Lyons@dnr.state.wi.us](mailto:John.Lyons@dnr.state.wi.us)

Study objectives: 1. Completely rewrite and update the book *Fishes of Wisconsin*, including all relevant information compiled on Wisconsin fishes since the 1970s. 2. Make available data from the book in electronic format, either via CD (or another electronic medium) or the web.

Substantial progress has been made. An outline and format for the book has been developed, and a team has been assembled and has begun to write the various chapters. This team includes 15 people from within the Wisconsin DNR and from various universities and federal agencies. Drafts of 10 chapters are done and have been distributed to the team. Most of the workload in 2003-2004 has focused on completing a photographic-based fish identification system for the book and the internet. This is being done in cooperation with the University of Wisconsin Center for Limnology and the University of Wisconsin Sea Grant Program. The identification system will first be produced as a web-site and then will be converted to a cd or dvd format for inclusion in the book. All of the necessary photos have been taken and selected, and they are in the process of being attributed for the website. The web site is functional (<http://limnology.wisc.edu/> then click on "Research" and then "On-line system for identifying Wisconsin fishes"), but many photos remain to be added, and layout and graphic art changes will be made before the site is complete. An interactive mapping website (<http://infotrek.er.usgs.gov/fishmap>) has been developed in cooperation with the U.S. Geological Survey Wisconsin GAP Program that portrays the distribution of each species in the state. This website will allow rapid development of distribution maps for the book.

3. Title: Status and trends in sportfish populations of southwestern Wisconsin warmwater streams. Contact person: John Lyons, [John.Lyons@dnr.state.wi.us](mailto:John.Lyons@dnr.state.wi.us)

Study objectives: 1. Monitor sportfish abundance, reproductive success, size structure, and growth rate each year in seven streams in southwestern Wisconsin, continuing annual surveys begin in 1989. 2. Maintain a database containing information from 1.

Assess sportfish populations in seven southwestern Wisconsin streams: As scheduled, sportfish populations were monitored in late August-early September 2003 following standardized wading electrofishing procedures from single 950 to 1900-m-long stations on seven warmwater streams in southwestern Wisconsin. Although this study began in 2000, these seven stations have been sampled in the same manner as part of other studies since 1989-1991, depending on the station. The primary gamefish at each station is smallmouth bass; northern pike, channel catfish, bluegill, rock bass, and walleye are encountered at a few of the stations in generally low numbers. Smallmouth bass catch-per-100-m was relatively high in 2003 at all stations except Otter Creek (where young of year were absent) and Sinsinawa River (where it was moderate) for young of the year, reflecting a regional pattern of a strong year class.

4. Title: Status and trends in the fish community of the Lower Wisconsin River. Contact person: John Lyons, [John.Lyons@dnr.state.wi.us](mailto:John.Lyons@dnr.state.wi.us)

Study objectives: 1. Monitor long-term fish community dynamics each year over the entire Lower Wisconsin River. 2. Evaluate sportfish abundance, reproductive success, size structure, and growth rate each year for the Prairie du Sac Dam tailwater, continuing annual surveys begun in 1987. 3. Maintain a database containing information from 1) and 2)

Study publications:

Lyons, J. In press. Fish assemblage structure, composition, and biotic integrity of the Wisconsin River. Pages xxx-xxx in R. Calamusso, R. Hughes, and J. Rinne, editors. Historical changes in large river fish assemblages of North America. American Fisheries Society, Bethesda, Maryland.

Lyons, J. 2003. Recruitment patterns of walleye and sauger in the lower Wisconsin River. Pages 79-80 in T. P. Barry and J. A. Malison, editors. Proceedings of Percis III, the Third International Percid Fish Symposium, Madison, Wisconsin, July 20-24, 2003. University of Wisconsin Sea Grant Institute, Madison.

5. Title: Evaluation of the Wisconsin Priority Watershed Program for improving stream habitat and fish communities. Contact person: Brian Weigel, [Brian.Weigel@dnr.state.wi.us](mailto:Brian.Weigel@dnr.state.wi.us)

Study objectives: 1. Document the quantitative and qualitative short-term responses of stream habitat quality, fish community structure, sport fish populations, and ecosystem integrity to installation of specific individual Best Management Practices (BMPs) at selected sites within study watersheds. 2. Document the quantitative and qualitative long-term responses of stream habitat quality, fish community structure, sport fish populations, and ecosystem integrity to site-specific and watershed-wide implementation of multiple BMPs at selected sites and entire subwatersheds. 3. Develop conceptual and, if possible, quantitative ecological models that relate changes in watershed and riparian land use to physical, chemical, and biological responses in different types of stream ecosystems that occur in Wisconsin. 4. Make recommendations based on Objectives 1-3 as to how Priority Watershed activities could be made more effective at achieving aquatic resource goals. Provide specific guidance as to which BMPs work best for particular types of streams and types of non-point-source pollution problems.

Objective 1 has been met with the publication of Wang et al. (2002). For objective 2, field work has been completed for the Otter Creek Priority Watershed and a report has been prepared and is in internal review. Field work in the Waumandee Creek Priority Watershed was completed, and data summarization and analysis has begun. Field work in the Lincoln Creek/Milwaukee River Priority Watershed began again in 2004 after a hiatus of five years following implementation of significant urban BMPs in 2001-2003. This sampling will continue through 2006. For objective

3, a study of the effects of watershed urbanization has been published in Transactions of the American Fisheries Society. The reference and abstract are attached. Objective 4 is covered under the following Activity.

Study publications:

Lyons, J. 1996. Patterns in the species composition of fish assemblage among Wisconsin streams. *Environmental Biology of Fishes* 45:329-341.

Lyons, J., and P. Kanehl. 1993. A comparison of four electroshocking procedures for assessing the abundance of smallmouth bass in Wisconsin streams. General Technical Report NC-159. St. Paul, MN. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 35 pp.

Lyons, J., S. W. Trimble, and L. K. Paine. 2000. Grass versus trees: managing riparian areas to benefit streams of central North America. *Journal of the American Water Resources Association* 36:36:919-930.

Lyons, J, L. Wang, and T. D. Simonson. 1996. Development of and validation of an index of biotic integrity for coldwater streams in Wisconsin. *North American Journal of Fisheries Management* 16:241-256.

Simonson, T. D., and J. Lyons. 1995. Comparison of catch per effort and removal procedures for sampling stream fish assemblages. *North American Journal of Fisheries Management* 15:419-427.

Simonson, T. D., J. Lyons, and P. D. Kanehl. 1994a. Guidelines for evaluating fish habitat in Wisconsin streams. General Technical Report NC-164. St. Paul, MN. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 36 pp.

Simonson, T. D., J. Lyons, and P. D. Kanehl. 1994b. Quantifying fish habitat in streams: transect spacing, sample size, and a proposed framework. *North American Journal of Fisheries Management* 14:607-615.

Simonson, T. D. 1993. Correspondence and relative precision of stream habitat features estimated at two spatial scales. *Journal of Freshwater Ecology* 8:363-373.

Stepennuck, K. F., R. L. Crunkilton, M., A. Bozek, and L. Wang. In review. Comparison of macroinvertebrate assemblages and stream quality metrics between snags and riffles in southeastern Wisconsin streams. Submitted to *Journal of the North American Benthological Society*.

Stepennuck, K. F., R. L. Crunkilton, and L. Wang. 2002. Impacts of urban land use on macroinvertebrate communities in southeastern Wisconsin streams. *Journal of the American Water Resources Association* 38:1041-1051.

Stewart, J. S., D. D. Downes, L. Wang, J. A. Wierl, and R. Bannerman. 2000. Influences of riparian corridors on aquatic biota in agricultural watersheds. Pages 209-215 In Proceedings of the International Conference on Riparian Ecology and Management in Multi-Land Use Watersheds.

Stewart, J. S., L. Wang, J. Lyons, J. A. Wierl, and R. Bannerman. 2001. Influences of watershed, riparian-corridors, and reach-scale characteristics on aquatic biota in agricultural watersheds. *Journal of the American Water Resources Association* 37:1475-1487.

Wang, L. and J. Lyons. 2002. Fish and benthic macroinvertebrate assemblages as indicators of stream degradation in urbanizing watersheds. Pages 227-250 In T. P. Simon (editor), *Biological Response Signatures: Multimetric Index Patterns for Assessment of Freshwater Aquatic Assemblages*. CRC, Press, Boca Raton, FL.

Wang, L., J. Lyons, and P. Kanehl. 1998. Development and evaluation of a habitat rating system for low gradient Wisconsin streams. *North American Journal of Fisheries Management* 18: 775-785.



Wang, L., J. Lyons, and P. Kanehl. 2002. Effects of watershed best management practices on habitat and fishes in Wisconsin streams. *Journal of the American Water Resources Association* 38:663-680.

Wang, L., J. Lyons, and P. Kanehl. 2003. Impacts urban land use on trout streams in Wisconsin and Minnesota. *Transactions of American Fisheries Society* 132:825-839.

Wang, L., J. Lyons, P. Kanehl, and R. Bannerman. 2001. Impacts of urbanization on stream habitat and fish across multiple spatial scales. *Environmental Management* 28:255-266.

Wang, L., J. Lyons, P. Kanehl, R. Bannerman, and E. Emmons. 2000. Historical fish assemblage changes and watershed urban development in southeastern Wisconsin streams. *Journal of the American Water Resources Association* 36:1173-1189.

Wang, L., J. Lyons, P. Kanehl, and R. Gatti. 1997. Influences of watershed land use on habitat and fish in Wisconsin streams. *Fisheries* 22 (6): 6-12.

Wang, L., J. Lyons, P. Kanehl, D. Marshall, and M. Sorge. 2000. Responses of stream habitat, macroinvertebrate, and fish to watershed BMPs: Lessons from Wisconsin. *Proceedings of Water Environment Federation, Watershed 2000, July 8-12, 2000, Vancouver, Canada.*

Wang, L., T. D. Simonson, and J. Lyons. 1996. Accuracy and precision of selected stream habitat estimates. *North American Journal of Fisheries Management* 16: 340-347.

Wang, L., J. Lyons, and P. Kanehl. 2003. Impacts urban land use on trout streams in Wisconsin and Minnesota. *Transactions of American Fisheries Society* 132:825-839.

6. Title: Development and evaluation of watershed models for predicting stream fishery potential. Contact person: Matt Mitro, [Matthew.Mitro@dnr.state.wi.us](mailto:Matthew.Mitro@dnr.state.wi.us)

Study objectives: The primary goal of this project is to develop and evaluate watershed models that quantify the inherent fisheries potential of streams and predict how watershed land-use will influence the realization of this potential. Specific model-development objectives are: 1. Modify as necessary the Michigan models for predicting stream groundwater delivery, water temperature regime, and overall stream flow regime based on climate, surficial geology, topography, soils, vegetation, and land uses for various regions of Wisconsin. Test model predictions against observed temperatures and flows in stream reaches throughout the state. 2. Develop and test statistical models that relate observed stream temperatures and flows to observed fish community and fishery attributes in stream reaches throughout the state. 3. Link the models from 1) and 2) and classify and map Wisconsin stream reaches based on their actual and potential fisheries (coldwater, coolwater, warmwater-centrarchid, warmwater-esocid, etc.). Use current land-use data to estimate actual conditions and historical data to estimate potential. 4. For selected watersheds, use the models to explore how projected changes in land-use may affect stream fisheries.

GIS data layers for land use/cover, surficial geology, soil, bedrock type, bedrock depth, digital elevation model, precipitation, degree growing days, conductivity, slope, and ground water delivery potential are essentially complete for the entire state of Wisconsin. Some minor clean-up and calculation of new variables still needs to be done, but relatively little work remains. A model has been developed to predict site-specific stream flows from the GIS layers, and a similar model for predicting stream water temperatures is in development. A database on fish community, habitat, temperature, predicted flow, and GIS variables from 284 sites on 253 has been developed and is being used to develop models that predict fish community characteristics. We are in the process of developing a GIS layer of stream segment classification based on watershed landscape characteristics, watershed land use, stream size, stream channel morphology, and biological communities. A model has been developed to project the spatial pattern and extent of future urban growth in Wisconsin, and this model will be coupled with models from Activity # 3 to predict impacts of land-use change on stream fisheries.

## Wisconsin Department of Natural Resources – Various projects

Contact person: Brian Weigel, [Brian.Weigel@dnr.state.wi.us](mailto:Brian.Weigel@dnr.state.wi.us)

### Streams:

1. Incorporating macroinvertebrate IBI models into Baseline Monitoring – Wadeable Streams Program.

Goal: Promote the use of existing macroinvertebrate-based models to assess stream integrity, US EPA 303d and 305b listing, and management activities.

Status: Multimetric models (IBI) have been developed, validated, and published (Weigel 2003; JNABS). Currently, we are revising the DNRBUG Program to produce multimetric model scores

Collaborators: WDNR Water Division (WD) - Baseline Monitoring Program funds; UWSP - S. Szczytko, D. Mechenich, & J. Dimick

2. Identify characteristics of effective stream buffers as BMPs (habitat, fish and inverts)

Goal: Determine the key features of buffers that make them effective in preserving stream and biotic integrity.

Status: In response to WI Legislature request for research before including a buffer requirement in nonpoint pollution standards. Tasks include digitizing land cover for entire stream network within 250m of each stream bank for 90 sites (basin areas range 3 - 32 sq. mi.). Analyses include identifying linear relations or threshold values. Use multivariate direct gradient techniques to identify key environmental variables, and variance partitioning to determine relative importance of the key environmental variables. Fish, habitat, and macroinvertebrate data is ready for analysis, but half of the landscape analyses remain. Deadline 12/31/05.

Collaborators: WDNR Fisheries and Habitat Protection Bureau (FH) - R. Bannerman; USGS - J. Stewart; ISS - E. Emmons

3. Characterize macroinvertebrate assemblages sampled from snags and riffles for biomonitoring purposes.

Goal: Can we compare macroinvertebrate samples from riffle and snag samples? We compared metric scores for samples collected from riffles and snags within the same reach of stream and found that snags consistently rated sites lower. Ultimately we recommended that an IBI specific for low-gradient streams is developed.

Status: ms in review (JAWRA)

Collaborators: MDNR - L. Wang (lead); ISS - P. Kanehl, USGS - K. Lohman

4. Develop macroinvertebrate-based IBI for low-gradient streams

Goal: incorporate monitoring and assessment methods for low-gradient streams into Baseline Monitoring - Wadeable Streams Program

Status: data formatted for analyses; linear plots viewed

Collaborators: MDNR - L. Wang; ISS - P. Kanehl, USGS - K. Lohman

### Large Rivers:

5. Develop and validate invert collection and assessment methods for Wisconsin's nonwadeable rivers using the index of biotic integrity (IBI) framework

Goal: incorporate IBI into Baseline Monitoring Program for biocriteria, EPA 303d and 305b listing, permitting, and assessment of fisheries management

Status: completed 2 of 3 field seasons (80 samples), presented preliminary results at NABS annual conference

Collaborators: WD Baseline Monitoring Program; WD Nutrient Study; UWSP - J. Dimick; US EPA - B. Johnson

6. Characterize nutrient - fish and macroinvertebrate relations in rivers

Goal: identify nutrient and biotic relations in large rivers for setting TMDL standards.

Status: all data is entered, needs formatting for analyses

Collaborators: FH - R. Bannerman; WDNR Bureau of Watershed Management (WT) - J. Bauman; USGS - D. Robertson, D. Graczyk, & others; ISS - P. Garrison, P. Rasmussen, MI DNR - L. Wang

7. Long-term effects of dam removal on Baraboo River

Goal: quantify changes in channel morphology, fish habitat, fish assemblage composition, fish migration, and macroinvertebrate assemblages post dam removal.

Status: 3 years post dam removal. Initial findings reported. Sample at 3 - 5 year intervals for ~20 yrs.  
Collaborators: ISS - M. Catalano, T. Pellett, E. Emmons; UWSP - M. Bozak; UW-M - E. Stanley

8. Identifying differences between navigational and side channel pairs on the Mississippi River, Wisconsin border pools 3-11.

Goal: investigate navigational influences on river fish habitat, fish, and macroinvertebrates.

Status: completed fish sampling (22 main - side pairs on Mississippi, 7 pairs on Wisconsin River - reference river). Entering data. 1 of 2 years of invert data collected (11 pairs).

Collaborators: WDNR Baseline Monitoring Program; ISS - J. Lyons, P. Rasmussen

9. Weigel, B.M., J. Lyons, P.W. Rasmussen, and L. Wang. 2005 (in press). Relative influence of factors at multiple spatial scales on fishes in Wisconsin's warmwater nonwadeable rivers. *In* Hughes, R.M., and L. Wang (editors), *Influences of Landscapes on Stream Habitats and Biological Communities*. American Fisheries Society, Bethesda, MD.

Goals:

- 1) Identify key environmental variables within the site, reach, and basin scales that affect river fish assemblages.
- 2) Identify relations among those key environmental variables and fish abundance, biomass, and assemblage metrics.
- 3) Quantify the relative influence of key environmental variables among multiple spatial scales on each fish data set.

Status: AFS conference proceedings due to be published in August, 2005.

Title: Flathead catfish movement and habitat use in the Fox and Wolf Rivers, Wisconsin, using radio telemetry.  
Contact person: Randal Piette, [Randal.Piette@dnr.state.wi.us](mailto:Randal.Piette@dnr.state.wi.us)

The Wisconsin Department of Natural Resources is conducting a study to determine flathead catfish (*Pylodictis olivaris*) movements and habitat associations in two large river systems in east-central Wisconsin. A total of 40 male flathead catfish were implanted with radio transmitters and followed over several years.

Flathead catfish in the Fox River, Wisconsin, were followed for two years (2002, 2003) using radio telemetry. Fish generally overwintered in Lake Butte des Morts, and began upriver spawning migrations in late April and May when water temperatures reached 15 degrees C. Movement stabilized in mid-June when water temperatures reached 20 degrees C. Downriver movement began in August and peaked through September when water temperatures declined from 25 to 20 degrees C. Flathead catfish in the Fox River were almost exclusively associated with large woody debris. Two current and two remnant dams in this area of the Fox River likely affect flathead catfish habits and movements. Specific spawning sites were located by boat in early summer, during boat tracking, exact locations were recorded and, with few exceptions, all flathead catfish in the Fox River were associated with large woody debris (downed trees, log jams) and the deepest areas of the river.

Wolf River: Spring and early summer sampling captured 329 flathead catfish in the Wolf River during June 2004, during pre-spawn, using hoop nets baited with female flathead catfish or limblines baited with black bullheads *Ictalurus melas*. Fish ranged from 17.6 to 46.2 inches (mean 31.2) in length and weighed from 3.8 to 58.0 lbs. (mean 16.2). Captured fish were externally tagged with a Floy tag and implanted with a PIT tag. Radio transmitters were surgically implanted in 18 male flathead catfish at three general locations (six at river mile (RM) 39-42, six at RM 60-62, and six at RM 85-87). Radio tagged fish were tracked daily by boat during netting operations and then weekly by aircraft and/or boat. Radio tagged fish are scheduled to be tracked weekly through 2005 to determine fish movement, spawning habitat, and over winter locations. Water temperatures from continuous recorders will be compared to peak movements during open water periods. The one fish radio-tagged on 14May2003 at RM 29.5 moved upstream to RM 114.0 by 9July2003 and remained in that area throughout the summer before returning to Lake Poygan in late summer to overwinter. This fish again returned to RM 101.0 by 14June2004. Initial radio tracking of fish tagged in the Wolf River in spring 2004 revealed that nearly all of male flatheads were associated with large woody debris located along deep cut banks during the spawning period. Many of the fish moved considerable distances both upstream and downstream, and into tributaries just prior to spawning indicating that fish were searching for suitable spawning locations.

Title: Development of a Mussel Sampling Protocol for Wadable Streams in Wisconsin. Contact person: Randal Piette, [Randal.Piette@dnr.state.wi.us](mailto:Randal.Piette@dnr.state.wi.us)

The WDNR is currently reviewing freshwater mussel sampling methodologies for wadable streams in Wisconsin. The goal of this document is to clarify mussel sampling objectives and to provide a set of standardized mussel sampling and reporting protocols for wadable rivers and streams and wadable portions of large rivers. Protocols within this document were designed to collect mussel community and mussel habitat data over a broad range of stream habitats to be used to assess spatial and temporal changes of mussel communities. Mussel sampling protocols presented within this document were designed to provide meaningful mussel data given the constraints of limited resources of time and manpower. While these protocols represent a minimum amount of effort that should be conducted for mussels at sites, they may not be sufficient for some experiment objectives and more detailed or extensive surveys may need to be conducted. The mussel sampling protocols established within this document are designed to answer three primary objectives associated with sampling mussel communities in wadable streams: 1) Are mussels present; 2) Which species are present; and 3) What is the density of mussels and habitat relationship. Three different sampling protocols were developed that can be used to answer the primary objectives. Protocol development was based on review of existing literature and our own research and experiences.

A historical record search should be conducted for a particular site or water basin to determine if mussels were present and to develop a species list prior to any fieldwork. If fieldwork is needed, mussel sampling should optimally be conducted during mid to late summer (mid June - late September) when stream levels are near base flows and water temperatures are near maximums. Initial searches are conducted to establish site locations and to determine if mussels are present. Initial sampling continues until mussels are found, or if no mussels are found, for one hour or until a maximum distance of 200 m is reached on streams < 7 meters mean stream width (MSW) and 300 m for streams > 7 meters MSW. If mussels are present at a site location, then more extensive qualitative sampling or quantitative sampling, or both is conducted. Qualitative (timed) search is conducted to establish species lists of mussels present at a site, but should not be used for mussel demographics. Qualitative searches continue for **two** hours (4 man-hours) or a maximum distance of 200 m for streams < 15 m MSW and for **four** hours (8 man-hours) or a distance of 300 m for streams  $\geq$  15 m MSW. Quantitative (quadrat) sampling is used to determine mussel demographics and habitat relationships. Quantitative sampling is conducted using a systematic random sampling design within defined grid areas, with sampling effort (area/m<sup>2</sup>) increasing with stream size. Each grid area is sub-sampled using smaller 0.25 m<sup>2</sup> quadrats. Small rope grids 2.5 x 2.5 m (6.25 m<sup>2</sup>) are used to sample streams < 7 m MSW, 14 grid areas are sampled with 8 sub-sample quadrats within each grid area. Large rope grids 5 x 5 m (25 m<sup>2</sup>) are used on streams  $\geq$  7 m MSW, with 25 - 0.25 m<sup>2</sup> quadrats sub-sampled. The number of grid areas sampled increases with stream size. Streams between 7-14 m MSW will have 10 grid areas sampled, streams between 15-24 m MSW will have 15 grid areas sampled, and streams 25 m MSW and greater will have 20 grid areas sampled. Habitat measurements of variables important to mussels are taken at each grid area location. The number of live mussels, live less than 3 years old, and dead shells is recorded for each quadrat sampled within the grid area. Live mussels are measured for length, aged, sexed and examined for shell wear. Mussel data is recorded on standardized data forms to facilitate uniform reporting mussel information.

Title: Smallmouth bass fishery in Lake Wisconsin/Wisconsin River – 2003-2004. Contact person: Tim Larson, [Tim.Larson@dnr.state.wi.us](mailto:Tim.Larson@dnr.state.wi.us)

Implementation of a 14" minimum size limit in 1989 is felt to be a major factor in the noticeable increase of smallmouth bass in both the lake (9,000 acres) and the 36 miles of river upstream to the Dells dam. Cooperation of the bass tournaments and anglers has allowed interesting information to be learned recently about this smallmouth fishery.

During 2003 and 2004 volunteer anglers recorded lengths on 799 SMB over 10" caught from the river, upstream from Lake Wisconsin to the Dells dam. Length composition was essentially similar between the less accessible 22 miles above Portage versus the 14 miles downstream to the lake. Approximately 40% of the bass exceeded 16" and 12% were over 18". Few bass over 20" were noted. Tournaments, which target larger fish, in 2003 registered 42% 14-15", 48% 16-17" and 10% 18"+. The 2004 values were 41% 14-15", 44% 16-17" and 15% 18"+.

Tagging of 196 SMB occurred at 4 tournaments. There were 12 recaptures during 2003, most within 20 days after tourney release. Of these 4 remained close to the release site (Tipperary Point), 4 moved down into the lake and 4 upriver (as far as Portage). During 2004 eight more reports have occurred, 1 from the tourney release site, 2 from the lake and 5 from upriver - 1 below I-90, 3 Baraboo R - Portage and 1 above Pine Island. Of the total recaptures on 2003 tourney released fish, 5 were near the release site, 6 moved down into the lake and 9 headed upriver. Through November 2004 there have been 47 recaptures of 363 SMB tagged at 6 of the 2004 tourneys. Of these 10 turned up in the lake, 2 came from the Tipperary Point release site and 35 headed upriver-6 between the release site and I-90, 17 from I-90 to Portage and 12 above Portage. The 2004 information, in particular, indicates upstream movement is occurring. More than 3:1 of the recaptures came from upriver vs. the lake. Unfortunately, it is not possible to know where the tournament anglers originally caught the fish. Certainly some of the fish came from the lake.

During June through September of 2003, 3 anglers tagged 317 SMB, 72% above Portage. Of 22 recapture events during 2003, most within 30 days, all but 2 came from the same area where tagged. Of 14 more recaptures on these fish in 2004, 11 were within the area tagged and two from adjacent areas. Most areas are from 5 to 9 miles in length. Many fishery studies recognize seasonal movements of river SMB from shallow areas during the summer to deeper water for overwintering. Assuming overwinter migration to deeper water upstream to below the Dells Dam or down into the lake, the 2004 information indicates that they are returning to the same area of the river the next summer. The exception being one fish originally tagged on 9/5/03 above Pine Island, caught upstream on 3/28/04 at Macasee Rapids below the Dells, caught again on 5/2/04 back at Pine Island and finally caught downstream on 5/10/04 between the Baraboo River and Portage by a Gander Mountain Tourney angler, then being released down at Tipperary Point. This fish has seen the entire 36 miles of river above the lake! It's said 10% of every fish population wanders. During 2004, 2 anglers tagged 175 SMB in the river. There were 21 recaptures of these fish, 50% within 10 days and all but one within 30 days. Seventeen were recaptured within the same area tagged. Three moved to an adjacent site and one moved from Pine Island down to the upper lake within 4 days. Years ago, one angler punched the tail of SMB each time and re-caught some of the same fish up to 7 times, fishing in the same location.

By keeping track of tagged versus untagged fish at the weigh-ins during 6 tournaments monitored from April 29-June 26 of 2004, the number of SMB >14" is determined to be 2,141 fish, with a 95% confidence interval of 1,860 - 2,522. This means if the estimate were redone 100 times, 95 of the 100 would find a PE between 1,860 and 2,522. Adding information from three tourneys occurring from July 31 - October 3, 2004, only 3 more recaptures were noted, thus the estimate increases to 3,769 with 95% CI of 2,288 to 5,825. Reasons why the estimate becomes higher include growth during the summer of "untagged" 13" fish recruited to over the 14" minimum size limit, tag loss and delayed tournament handling mortality. Any of these factors would reduce the number of unmarked fish in the population, resulting in a higher estimate. As no tagged fish were recaptured as far upstream as the Dells dam and tournament angling pressure was limited on the upper 6 miles below the Dells Dam, the estimate has to be qualified as not including the uppermost reach of the river. Using an approximate value of 3,000 legal fish (>14") and considering the PE applies to the area fished by tournament anglers, 21% of them (630) were handled by the 11 permitted tournaments during 2004. It is critical these fish are properly handled by the angler as well as the tournament sponsor.

Scale samples were collected from fish >14" at the April 26, 2004 tournament. Average length at age was determined and shown in the table. Ages 4 and 5 likely include fish less than 14", which were not included in the sample of only legal size fish, thus the average shown is higher than the true value. Wisconsin River SMB growth is very good, being about 1 year faster at length, through age 7, than the statewide average. The rapid growth allows for the good size distribution of the fishery. Growth typically slows as fish age with natural mortality continuing, thus limiting the buildup of 20"+ fish. Growth information is lacking for 19.5"+ fish.

An angler opinion survey was included with a July 2004 interim report. It was distributed at four of the late season bass tourneys and at most bait shops and sports stores in the area. Response was poor with only 12 replies. The questionnaire stated there was no current management change being considered but polled the respondents on satisfaction with the current 14" size limit and 5 bag versus a higher size limit ie. 18-20". Responses were somewhat aligned into tournament and non-tournament angler groups. Of 7 tournament angler responses, 5 indicated their agreement with the 14" size limit and 6 opposed a higher size limit. Of 5 non-tournament anglers, 2

indicated satisfaction with the 14" size and 3 preferred a higher size limit. Comments received: Two tournament anglers commented the SMB fishery is better than ever today. One non-tourney angler feels the upriver fishery has declined in the past 5 years. Others, including one tourney angler, suggest tournaments be restricted to the lake, however lake residents over the years have indicated their dislike for tournaments, feeling they overcrowd the lake and cite inconsiderate operation of tourney boats.

The current quality (length frequency) of the river smallmouth bass, upstream from Lake Wisconsin is good. Of the 799 recorded angler caught fish (>10") during 2003 and 2004, 40% were larger than 16", with 12% greater than 18". Few (1%) were 20" or larger. There was no difference between size group composition in the less accessible 22 miles of river above Portage versus the lower 14 mile segment below Portage down to the lake. This indicates either the less accessible upper river fishery is being fished hard enough to cause it's fishery to be similar to the lower area or enough catch and release is occurring in both areas to allow for the documented quality to exist throughout the system. It would be interesting to compare the length frequency of the river fishery to that of the lake.

Some anglers would like to see even more larger fish and bigger fish. Currently a respectable 12% of the fishery is over 18", however only 1% is over 20". A high size limit or no-kill would essentially eliminate harvest and tournament fishing. How many additional larger fish would be present? Modeling could be done to investigate that question as well as noting characteristics of the size distribution of SMB fisheries that exist under a high size limit or no-kill. However the bottom line is anglers are split over the issue of higher size limits, thus it would be highly controversial. The value of this study is that it provides baseline information for evaluation of future change in the quality of the fishery or evaluation of a management change.

Tag recapture of tourney released fish shows that good redistribution within the system is occurring, especially in the upriver direction. A 3:1 ratio favoring upstream movement was noted by the 2004 tourney released fish, with 12 of the 23 that moved upstream having traveled at least 14 miles or about 1/2 way to the Dells dam.

Angler tagged fish almost exclusively stay within the river zone where originally tagged and also appear to reside in the same zone a year later. This would indicate a different regulation could biologically be applied to a portion of the upriver area.

## **MANAGEMENT RECOMMENDATIONS**

- 1) Volunteer angler diary information on length frequency of Lake Wisconsin SMB should be obtained for comparison to the river fishery.
- 2) Determine the rate of mortality. Collect scales from all sizes of SMB to obtain age growth and generate a catch curve from voluntary angler caught fish to determine total annual mortality. Conduct a system wide creel census to document actual harvest and determine the rate of angler mortality by relating harvest to a population estimate.
- 3) Impact of a higher size limit could be investigated by modeling. Information could be obtained from SMB fisheries which are currently managed with a high size or no-kill regulation to note their length frequency composition ie. Sylvania tract, Chequamegon Bay.
- 4) Monitoring of the SMB fishery should be repeated at future time intervals.

## **US Army (Fort McCoy and Joliet Training Area)**

Contact person: John Noble, [john.noble@emh2.mccoy.army.mil](mailto:john.noble@emh2.mccoy.army.mil)

1. Coldwater biomonitoring – fish IBI. On-going monitoring of Fort McCoy coldwater streams to determine fish community and habitat trends.
2. Surface water quality monitoring (rain event, quarterly monitoring, and continuous data loggers – using sonde and thermographs).

3. Continue trout redd evaluations in relation to groundwater up/down welling. Identify and document critical stream habitats.
4. Jackson Creek mussel survey (Joliet Training Area, Illinois). Presence/absence surveys.
5. Surface water quality monitoring (Jackson Creek quarterly nutrient monitoring at the Joliet Training Area, Illinois)
6. Stream enhancement projects. Trout stream habitat enhancements using coarse woody debris and brush bundling techniques, as well as some lunker work (install 12-16 lunkers in Tarr Creek). Maintain stream sediment traps and determine cost-effective means to obtain technology or devices to achieve continuous sediment removal.
7. NEPA Review: emphasis on watershed development projects, review of stormwater management plans and erosion control plans to include stormwater devices like detention basins to manage cantonment area stormwater (building/parking lot “urban runoff”) and watershed sediment loads. Initiating wetland creation as a process for wetland mitigation banking and stormwater management.
8. Swamp Pond restoration, an impoundment on Swamp Creek a class I trout stream. Dredge (hydraulic) project with goal to remove at least 10,000 cubic yards of sediment.
9. Upgrade (hopefully) Hazel Dell dam.
10. Evaluate special fishing regulations at the North Flowage (trophy bass), West Sandy (reduced panfish bag and minimum size limit) and Silver Creek (reduced trout bag, minimum length, and gear restriction).
11. Evaluate lake restoration projects, determine effects on stream characteristics. Develop water level management plans.
12. On-going participation with the Clear Creek Working Group – multi-agency effort to resolve water releases associated with a cranberry operation.
13. TMDL development, collaboration with EPA and WDNR to improve Squaw Creek (affects from an impoundment) and Stillwell Creek (affects from a cranberry operation).

#### **Inter-Fluve projects 2004**

Contact person: Marty Melchior, [mmelchior@interfluve.com](mailto:mmelchior@interfluve.com)

1. Little Menomonee River (Milwaukee) – Under contract with the WDNR in 2003, Inter-Fluve reviewed design plans restoration of Reaches 2 and 3, and developed alternatives to the proposed plans, incorporating meanders and large woody debris for fish habitat. Construction of over 2 miles of new stream channel began in April 2004 and Inter-Fluve provided oversight for the installation of fish habitat (LWD).
2. Whittlesey Creek engineered logjams (Ashland) – Sedimentation from bank erosion is a major concern in Whittlesey Creek. In December 2004, Inter-Fluve provided design and construction oversight for experimental log jams in the upper watershed. These jams are designed to demonstrate bank and bluff stabilization alternatives while creating fish habitat complexity. Both heavy equipment and draft horses were utilized to install over 130 logs (40 ft) in a 1000-foot segment of stream. The WDNR, USFWS and TU provided funding and support.
3. Lenawee Creek engineered logjams (Cornucopia) – Draft horses were used to transport logs to the site, thus minimizing disturbance. Horses were also used to maneuver logs into place using block and tackle. Inter-Fluve provided field design and oversight on the project, and Dave Lonzarich (UW Eau Claire) is monitoring the project for brook trout and salmon habitat usage.

4. Milwaukee County Fluvial Geomorphic Assessment – Inter-Fluve completed a geomorphic assessment of all Milwaukee County streams in 2003. A final report and GIS interface was submitted to the county along with a prioritized list of potential stream restoration projects. Recommendations include bank stabilization, channel relocation and floodplain reclamation.
5. Trout Creek fish habitat (Oneida) – In an ongoing watershed restoration effort with the Oneida Tribe of Wisconsin, Inter-Fluve provided field design and oversight for the installation of log structures for fish habitat on Trout Creek.
6. Deer Creek Bank Stabilization (Ashland) – Railroad and road construction has narrowed the Deer Creek floodplain to such a degree that the stream is undercutting a 90-foot high clay embankment. Mass failure of this bluff could damage the stream and cause the road to fail. Inter-Fluve completed borings and geotechnical engineering for this WISDOT project and is developing plans for stabilizing the bank. Construction is set to begin in 2005.

## **U.S. GEOLOGICAL SURVEY - WATER RESOURCES DIVISION, WI**

The Western Lake Michigan Drainages study unit of the USGS National Water Quality Assessment (NAWQA) program completed its third and final year of intensive sampling in 2004. Sampling for water quality, habitat, and stream biology was done at 4 trend sites sampled during the last cycle of intensive sampling in 1993-95. Additional national NAWQA studies for which sampling was completed in 2004 include (1) a study of the ecological effects of urbanization on streams, and (2) a study of bioaccumulation of mercury in stream ecosystems. The urbanization effects study sampled 30 streams in the Milwaukee and Green Bay areas for assessment of changes in water flow and chemistry, habitat, and communities of algae, benthic invertebrates, and fish. The mercury study focused on better understanding the effects of source strength, mercury cycling, and food-web interactions on bioaccumulation of mercury in riverine fish; three Wisconsin streams were included. Data review and interpretation are in progress. For more information, contact Barb Scudder (em: [bscudder@usgs.gov](mailto:bscudder@usgs.gov), ph: 608-821-3832) or visit <http://wi.water.usgs.gov/nawqa/index.html>

In 2004, the USGS WRD office continued a cooperative study with the Milwaukee Metropolitan Sewerage District (MMSD), the Wisconsin DNR, SE WI Regional Planning Commission, and local universities. In 2004, 15 sites on 9 Milwaukee area streams were sampled for water chemistry to provide a baseline to facilitate future impact evaluations. In addition, stream habitat and community composition of algae, benthic invertebrates, and fish were assessed in late summer/early fall 2004. A report is in progress for publication by early 2006. For more information contact Dave Graczyk (em: [dgraczyk@usgs.gov](mailto:dgraczyk@usgs.gov), ph: 608-821-3840 or Barb Scudder (em: [bscudder@usgs.gov](mailto:bscudder@usgs.gov), ph: 608-821-3832).

An Aquatic Gap Analysis project for the Great Lakes States began in 2001 as part of the USGS National Gap Analysis Program. Gap analysis is a program for identifying the degree to which native species and natural communities are represented in current conservation lands. Those areas where unique biological communities and conservation lands do not overlap constitute gaps in conservation efforts. A gap analysis is an approach for biodiversity planning using computer-based geographic information systems to map land cover, conservation areas, aquatic habitat, and species distributions. To accomplish this, the GAP program builds institutional cooperation at the state and regional level with projects conducted at the state level. Information from gap analysis may be used to identify and prioritize opportunities to conserve riverine biodiversity; identify information or data gaps; help design and plan sampling strategies for research and monitoring; assist in county, state, and regional planning; and assist with education and outreach. Great Lakes Aquatic Gap projects are currently underway in MI, OH, NY, and WI with plans to begin aquatic gap projects in the other GL States in the future. Electronic fish databases were compiled from stakeholders and a GIS-based habitat classification for streams is completed. A centralized Great Lakes GAP database was developed, and information is being linked to allow predictive modeling and identification of conservation gaps. The Great Lakes project is being coordinated by the USGS Water Resources Division in Middleton, WI. For more information contact Jana Stewart (em: [jsstewar@usgs.gov](mailto:jsstewar@usgs.gov), ph: 608-821-3855) or visit the web site at <http://wi.water.usgs.gov/public/gap/index.htm>.



## **USGS – Upper Midwest Environmental Sciences Center**

Contact person: Jennifer Sauer, [jsauer@usgs.gov](mailto:jsauer@usgs.gov)

Yin, Y., and H. A. Langrehr. 2005. Multiyear synthesis of the aquatic vegetation component from 1991 to 2002 for the Long Term Resource Monitoring Program. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. LTRMP 2005-T001. 29 pp. + Appendixes A–F.

Aquatic vegetation data were collected in the Upper Mississippi River System (UMRS) under the Long Term Resource Monitoring Program (LTRMP). From 1991 to 2002, five reaches were surveyed every year (key pools), and another five reaches were surveyed once (outpools). The study design changed from a protocol involving sampling along transects (1991–2000) to a protocol incorporating stratified random sampling (1998–2002) with concurrent sampling under both protocols in 1998–2000. The frequency of occurrence of plants revealed no synchronous trends among three key pools (Pools 4, 8, and 13) supporting sizable submersed aquatic vegetation beds. Submersed aquatic vegetation in upper Pool 4 declined steadily between 1991 and 2002. Submersed aquatic vegetation in lower Pool 4 declined between 1991 and 1996 and thereafter recovered moderately. Submersed aquatic vegetation in Pool 8 increased between 1991 and 1999, which probably was a recovery process from a reported sudden collapse after the 1987–1989 drought. Submersed aquatic vegetation in Pool 13 demonstrated a high degree of stability during the period of monitoring despite drastic fluctuations between spring and summer sampling in some years. Water turbidity and water level fluctuation were strongly correlated with the longitudinal pattern of submersed aquatic vegetation distribution in the UMRS. Pools with clearer water and less fluctuating water levels supported more submersed aquatic vegetation. The LTRMP key pools represented a wide spectrum of the UMRS habitats. The habitat rehabilitation and enhancement project (HREP) at Stoddard Bay in Pool 8 effectively stimulated colonization by aquatic vegetation.

Sauer, J. 2004. Multiyear synthesis of the macroinvertebrate component from 1992 to 2002 for the Long Term Resource Monitoring Program. Final report submitted to U.S. Army Corps of Engineers from the U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin, December 2004. Technical Report LTRMP 2004-T005. 31 pp. + Appendixes A–C

In 1992, macroinvertebrate sampling was begun in Pools 4, 8, 13, and 26; the Open River Reach of the Mississippi River; and La Grange Pool of the Illinois River as part of the Long Term Resource Monitoring Program. Long-term monitoring is needed to detect population trends and local changes in aquatic ecosystems. We selected mayflies (Ephemeroptera), fingernail clams (Pisidiidae), and the exotic *Corbicula* species for monitoring. Midges (Chironomidae) were added to the sampling design in 1993 and zebra mussels (*Dreissena polymorpha*) were added in 1995. Sampling was based on a stratified random design and conducted at approximately 125 sites per study area. Mean densities of taxa were weighted by strata for extrapolation. The poolwide estimated mean densities of mayflies, fingernail clams, and midges were all within the range of variation observed historically. Over the last 11 years of sampling, the northern study areas supported the highest densities of the target organisms.