

**Summary of the Fall 2011 Meeting of the
UMRCC Water Quality Technical Section
October 25-26, 2011**

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Fairport, Iowa

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The fall meeting was held on the afternoon of October 25 and morning of Oct 26, 2011 at LACMRERS. We had 17 individuals representing local, state and federal agencies, 2 NGOs and 1 University. There was no state agency representation from Missouri or Minnesota. A listing of attendees is provided at the end of this summary.

State/Agency Reports

Iowa DNR – John Olson described the current status of Iowa's 303(d) Impaired Waters Listing. U.S. EPA approved their 2010 list in June and Iowa is now updating their WQ assessments for the 2012. John indicated they have new impairments for cadmium/aquatic life for the river reach from Lock and Dam 11 to 13 and the reach from the Iowa River to the Des Moines River. Fish tissue monitoring samples were collected from three locations of the Mississippi River near Harpers Ferry, Princeton and Huron Slough in 2011. This years collection involved the collection of tissue plugs from predator fish species for mercury analysis. [Iowa's only fish advisory](#) for the Mississippi River is for predatory fish in Pool 12. Draft [nutrient-related recreational criteria for Iowa Lakes](#) have been prepared and use Secchi disk transparency and chlorophyll-a as response variables. The rule making process for these criteria is in progress. Nutrient criteria development for rivers/streams has started and they are considering the impacts of chlorophyll-a and DO on biological integrity values (IBIs). Iowa is also exploring the possibility of developing and implementing a nutrient reduction strategy following an approach taken by the State of Kansas and suggested in EPA's March 2011 memo from Nancy Stoner. This strategy would set nutrient reduction goals for point source discharges independent of numeric nutrient targets. John mentioned that state legislative bills from both House and Senate to move the responsibilities (and money) for Section 319 programs, ambient WQ monitoring, and CWA reporting (305b) and listing (303d) from the IDNR to the Iowa Dept of Agriculture and Land Stewardship but none of these passed. It is unknown if these issues will arise during the 2012 legislative session.

Illinois EPA – Matt Short. Illinois EPA continues to conduct ambient water quality monitoring at 146 sites in Illinois with 11 located on the Mississippi River. The later sites are sampled 4 times/year. For 2011, the IEPA is participating in a one year sampling program for perfluorinated chemicals PFCs in fish tissue and water samples. The initial project plan was for 24 sites on rivers, including three sites on the Mississippi River, and 16 lakes. The sites were a mix of rural and urban sites. The fish tissue will be subsampled from a composite of fillets from a site with the water sample collected the same time or proximate to the fish tissue sample. Sample analysis is being provided by the USEPA National Exposure Research Laboratory located in Research Triangle Park, North Carolina. The Illinois 2008 Section 303(d) list has been in a state of partial approval for the last 2 years. The 2010 Section 303(d) list, based on the 2008 methodology, has been in a final draft status pending resolution of issues in the previous report. Illinois and USEPA Region V have been meeting to clarify differences and future directions for the reporting process. The 2008 and 2010 Impaired Waters reports will likely be finalized at the same time.

Wisconsin DNR – John Sullivan briefly discussed status of Wisconsin's 303(d) Impaired Waters Listing as it applied to the Mississippi River. A probable change to the listing would include adding nutrients (phosphorus) to the impaired water list for the St. Croix to Chippewa River reach. The Region had proposed extending this impairment to the Wisconsin River, but the basis for this listing was not supported since it didn't follow the impaired water listing guidance, which required

the identification of biological impairment (fish or invertebrate IBIs). It is anticipated that there will be many new listings for nutrient-impaired waters in our state with the adoption of the new phosphorus criteria for lakes and streams. The draft listing will be out for public review later this year or early next year. Ambient water quality monitoring is ongoing at Lock and Dams (LD) 3, 4, 8 and 9. Heavy metals are sampled quarterly at LD 3 and 4 and contaminant analysis of sediment traps occurs seasonally at these dams. Summer light penetration measurements are conducted at LD 8 and 9 and monthly water chemistry sampling occurs at LD 9. Additional water quality measurements (mainly field measurements) are collected below LDs 2 to 9 during summer zebra mussel veliger sampling. Special studies were underway this summer to evaluate metaphyton development and growth in nutrient poor backwaters this summer. Proposed hydropower projects at Lock and Dams and Water Quality Certifications for planned habitat projects and LD 3 renovation project have created additional work loads for staff working on the Mississippi.

Metropolitan Council Environmental Services (MCES) – Kent Johnson described their stream and rivers [monitoring network](#) in the Twin Cities Metropolitan Area (TCMA). Monitoring is ongoing at 22 river sites which includes 4 automatic monitoring stations. They also have established an automated monitoring at 24 [stream monitoring locations](#) for measuring pollutant loadings. MCES conducts biological sampling of periphyton, phytoplankton, zooplankton and invertebrates during the summer at 16 major river sites located on the Mississippi, Minnesota or St. Croix river. They have 200 citizen volunteers who collect water quality measurements from lakes within the TCMA. Kent mentioned they are working with MPCA in evaluating chloride in surface water and groundwater throughout the 7 county region as part of Impaired Waters/TMDL evaluations.

USFWS – Mark Steingraeber described environmental DNA (eDNA) sampling that their agency has been doing on the Chicago waterways, St. Croix and Mississippi Rivers in 2011. Mark provided a map of sampling sites showing positive “hits” in the upper portion of Pool 2 including the mouth of the Minnesota River. Marc mentioned that federal Drug Enforcement Agency (DEA) was sponsoring a national prescription drug take back day on November 5th. This effort is important because it removes dangerous drugs from homes and helps reduce their potential release to surface waters through improper disposal in sanitary wastewater (flushing down the toilet).

USFWS – Mike Coffey discussed monitoring and assessment activities being undertaken by the refuge. The Refuge System Improvement Act directs the U.S. Fish and Wildlife Service to monitor the status and trends of fish, wildlife and plants on each wildlife refuge. In 2010, the Refuge System launched a national inventory and monitoring program to increase its collective ability to inventory and monitor wildlife and habitats and inform conservation. The Water Resources Inventory and Assessment program (WRIA) is a reconnaissance-level inventory and assessment of water rights, water quantity, water quality, water management, climate and other water resource issues for each National Wildlife Refuge. WRIs have been recognized as an important part of the National Wildlife Refuge System's Inventory and Monitoring (I&M) Program.

UMRBA - Dave Hokanson provided a summary of projects that the UMRBA Water Quality Task Force has spearheaded involving biological assessments, nutrients, and aquatic life use designation on the UMR. Detailed reports associated with the biological assessment and nutrient related projects are available from the UMRBA's [web site](#). A draft final report of aquatic life designated uses on the UMR is nearing completion. The next major effort will be to develop a Clean Water Act monitoring strategy for the UMR using these reports to help guide the way.

URMCC Coordinator's report: Scott Yess, USFWS provided a summary activities involving UMRCC members including:

- Completion of the Fish distribution report
- Pool 6 vegetation survey
- Teacher Education Workshop at Wyalusing State Park, Wisconsin
- Field Trip Grants to get kids on the river

Update the Water Quality Technical Section's Water Quality database
Support Mussel Symposium at upcoming Wildlife Conference

Scott mentioned that the Annual UMRCC meeting will be in Winona likely March 20-22, 2012. Section chairs are needed for the Wildlife and the Recreation Sections. Scott is seeking news items for the next and future newsletter.

Presentations

- Water and nutrient processing in a large Midwestern river floodplain. Keith Schilling, IDNR. Keith provided a very interesting discussion of his research involving water and nutrient processing in groundwater beneath the Swamp White Oak Preserve along the lower Cedar River in Iowa. Peter Jacobson, Grinnell College, was a co-author of this presentation. Groundwater monitoring revealed complex spatial variation that was related to floodplain elevation. The floodplain responded rapidly to process excessive water and nutrients during flood pulses. Diurnal DO swings were apparent in groundwater and related to evapotranspiration processes. Water uptake by the floodplain yielded an estimated annual flow of 300 gpm over the 150 ha area. Additional information can be found in an earlier [abstract](#) describing this work.
- Water quality and nutrients at an isolated complex of the UMR in west central Illinois Mike Coffey and Cathy Henry, USFWS. This presentation focused on nutrient studies in the Keithsburg Division of Port Louisa National Wildlife Refuge in Pool 18 of the UMR. High nitrogen and phosphorus levels are negatively impacting the quality of this backwater and contributing to low waterfowl use. The study evaluated the sources, concentrations and loadings of nutrient inflows to this isolated backwater. Future assessments may include plant biomass, seed production and benthic macroinvertebrate studies. They are also exploring the use of specific conductance to estimate nitrate concentrations of nutrient inflows.
- Nutrient studies in Pool 8 backwaters summer 2010. Shawn Giblin, WDNR. This study evaluated factors influencing metaphyton (filamentous algae and duckweeds) biomass, distribution and composition in Pool 8 backwaters during May to October. Excessive metaphyton production within UMR backwaters represents a localized eutrophication effect and has received considerable attention from the public and local press in recent years. Analysis of filamentous algae and duckweed tissue indicated tissue nutrient ratios suggestive of phosphorus limitation early in the growing season and nitrogen limitation later in the growing season. Thresholds resulting in increased metaphyton biomass were identified for water column phosphorus concentration, nitrogen concentration, water temperature, water velocity, water depth, and aquatic macrophyte cover. These thresholds can provide some indication of areas and conditions where excessive metaphyton can be a problem and provides some insight into nutrient concentration targets and habitat project design for future consideration.
- Linking Hydrodynamic models with water quality and biology on the Mississippi River. Doug Schnoebelen, [LACMRERS](#). Doug described their research activities at the center with a focus on hydrodynamic and nutrient modeling of Pool 8, a backwater located in the upper end of Pool 8 near La Crosse. They have been able to model current velocity, nitrate concentrations and particle transport and display this information in an useful visual format. They have also evaluated how potential island placement would alter these processes. This research will provide new tools for evaluating future habitat projects as well as help in the assessment of nutrient and oxygen dynamics in backwaters. Hydrodynamic modeling will be particularly useful for evaluating particle transport, which should aid in the evaluation of potential spills and other water quality issues since understanding water movement is the key to evaluating water quality/biology in large river systems.

- Continuous water quality monitoring in Illinois. Mat Short, ILEPA. Matt described the results of state-wide continuous monitoring project at a few hundred sites over a ten year period (2001-11). The presentation was focused on their continuous DO data though they collected additional measurements on temperature, pH and conductance. USGS and the Illinois State Water Survey assisted with this effort. Water quality, fish and macroinvertebrate IBIs and habitat characteristics were collected at each site. The principal focus of this study was to determine if various patterns of dissolved oxygen cycling were associated with chemical, biological or habitat characteristics. During 2007 to 2009 there were 372 deployments of continuous monitoring equipment but only 71 had useable data. Problems with successful deployments included, too much flow (rain), too little flow (probes exposed), battery failure, sonde failure, probe fouling, erratic probe response and excessive post-calibration error. Statistical evaluations involved classification of 5 separate DO responses based on comparing DO concentrations to DO standards and percent saturation. Then DO classifications were compared to water quality, habitat and biological data. Significant differences in DO patterns were associated with temperature, alkalinity, hardness, chloride, Total N, nitrate, TOC, canopy, substrate, macro invertebrate and fish IBI and latitude.
- Continuous water quality monitoring in UMR backwaters/wetlands. John Sullivan, WDNR. Continuous water quality measurements were conducted in selected backwaters of Pool 8 to evaluate the influence of filamentous algae and duckweeds (metaphyton) on near-surface dissolved oxygen (DO) and water temperature. This work was part of investigations evaluating nutrient impacts in backwater (see Shawn's Presentation above). Metaphyton biomass and growth rate measurements were also made. 2011 studies focused on continuous DO/temperature measurements in two backwaters with low nutrient concentrations. In addition, the 2011 investigations also evaluated plant tissue nutrient composition suggesting nutrient limitation. Large season changes in DO (0-15 mg/L daily avg) were apparent. Lowest DO was found in areas with high vegetation and little hydraulic connectivity with flowing channels. Heavy duckweed biomass normally contributed to lower DO likely a result of reduced re-aeration and lower light penetration. There was no evidence that metaphyton had a significant influence on near-surface water temperatures.
- Wetland water quality assessment by states, John Sullivan. This was a very brief discussion of monitoring efforts that are underway as part of the National Wetland Condition Assessment. This is a first ever probabilistic sampling survey of our nations wetlands and is being directed by USEPA with state assistance.
- Long Term mayfly emergence data for Pools 2 and 3 of the UMR -Kent Johnson, MCES. Kent described their efforts in developing a *Hexagenia* mayfly hatch monitoring network with local cooperators for the period 1987 to 2011. Cooperators included USACE staff at Lock and Dams 2 and 3 and staff at their Metro Wastewater Treatment Plant in St. Paul. They developed a 5 scale narrative rating of the strength of the hatch based on relative densities or aggregations ("piles") of mayflies accumulating below lights. He believed this information was valuable for evaluating general water quality trends but stressed the need for having able and interested cooperators. Kent also described the need for the re-establishment of fall benthic surveys in Pool 2 and Pool 3 to improve our understanding of hatches and to provide additional information for evaluating environmental conditions supporting mayflies. Kent suggested that there would be value in expanding this network to include more lock and dams and well as other potential cooperators along the river.
- Update on mass mayfly emergence tracking and modeling - Mark Steingraeber, USFWS. Mark described his efforts at modeling *Hexagenia bilineata* and *limbata* hatches based on water temperature. He also discussed the early work of Cal Fremling and the importance of having adequate DO at the sediment interface to support mayflies. Mark also stressed the need to seek out additional cooperators along the river to help document mayfly hatches, which would benefit model development and verification.

- Water quality monitoring associated with proposed Mississippi River hydropower projects. There was a short information discussion of what some of the states were suggesting as part of the license review for these project.

Attendees

Carrie Davis - Univ. Iowa – LACMRERS
John Olson – Iowa DNR
Kent Johnson – Metropolitan Council Environmental Services (St. Paul)
Scott Yess – USFWS
Mark Steingraeber – USFWS
Shawn Giblin – WDNR
Mike Coffey – USFWS
Matt Fisher – The Nature Conservancy
Cathy Henry – USFWS
Matt Short – ILEPA
Keith Schilling – IDNR
Eilean McLellan – Environmental Defense Fund
Doug Schnoebelen – Univ. Iowa – IHR Hydroscience & Engineering
Jeff Houser – USGS-UMESC
Manuel Suarez – USGS-UMESC
David Hokanson – UMRBA
John Sullivan - WDNR