Upper Mississippi River Basin Association
Water Quality Executive Committee and Water Quality Task Force
Joint Meeting

June 2-3, 2015
Davenport, Iowa

Meeting Summary

Participants

Gregg Good	Illinois EPA
Marcia Willhite	Illinois EPA
John Olson	Iowa DNR
Jon Tack	Iowa DNR
Jake Hansen*	Iowa DALS
Wayne Anderson*	Minnesota PCA
Rebecca Flood	Minnesota PCA
Glenn Skuta	Minnesota PCA
Kurt Boeckmann*	Missouri DNR
Mohsen Dkhili	Missouri DNR
John Hoke	Missouri DNR
Shawn Giblin	Wisconsin DNR
Brian Weigel	Wisconsin DNR
Susan Sylvester	Wisconsin DNR
Linda Holst*	US EPA, Region 5
Kevin Richards	USGS, Iowa Water Science Center
Mike Clarke	City of Davenport
Colin Wellenkamp*	Mississippi River Cities and Towns Initiative
Dru Buntin	UMRBA
Dave Hokanson	UMRBA
Matt Jacobson	UMRBA

**Joined the meeting by phone.*

Call to Order and Introductions

The joint meeting of the Water Quality Executive Committee (WQEC) and the Water Quality Task Force (WQTF) was called to order at 1:00 p.m. on June 2 by WQEC Chair Susan Sylvester. Introductions by all participants followed.

Approval of Previous Meeting Summary

Mohsen Dkhili requested a correction on page A-4 of the February 3-4, 2015 meeting summary, where language referring to Missouri's development of nutrient criteria should be changed from "less than 10 acres" to "greater than 10 acres." Dkhili then moved that the summary be approved, with the change made on page A-4. Glenn Skuta seconded the motion and the summary was approved by voice vote.

Interstate 305(b) and 303(d) Consultation

Missouri

Dkhili said the listings as presented in the packet for Missouri are correct. He also noted that updates to Missouri's 2018 Listing Methodology are currently under development.

Iowa

John Olson said the listings shown in the meeting packet for Iowa are accurate. Dkhili asked what causes the disparity between Iowa and Illinois in terms of PCB and mercury listings associated with fish tissue concentrations. Olson replied that Iowa and Illinois use different methods for fish tissue analysis and assessment. Dkhili further asked why Illinois shows an impairment of the drinking water use due to atrazine in Reach 8, but Iowa does not. Olson replied that this is likely due to the absence of a drinking water intake on the Iowa side in Reach 8, and as such the drinking water use is not assessed in Iowa.

Illinois

Gregg Good said Illinois listings for 2012 and 2014, as reflected in the packet, are correct. He added that Illinois is currently working on its 2016 listings.

Wisconsin

Brian Weigel said the listings presented in the packet, for 2012 and 2014, are accurate. Shawn Giblin said there will be a change for the upcoming 2016 list, with a phosphorus-related impairment to be added in Reach 5 and Reach 6. Olson asked whether a biological impairment needed to be identified in order for this listing to be made. Sylvester and Giblin replied that a biological impairment was not necessary and that the listing can be based on phosphorus concentrations alone. Weigel added that at least six months of data is needed to determine a phosphorus impairment, with a 90^{th} percentile confidence interval determination to confirm the exceedance.

Minnesota

Skuta said approval of Minnesota's 2014 list by USEPA has been delayed due to issues surrounding its sulfate standard and the protection of wild rice. Giblin asked what the current sulfate standard is. Skuta replied that the current standard is 10 mg/l and that MPCA has research ongoing to determine whether this standard is appropriate and if so under what conditions. He added that new rule making may be necessary, and may include a formula rather than a single number for the sulfate standard. Dkhili asked whether a substantial amount of wild rice grows in Minnesota. Skuta answered that there are large number of naturally occurring stands of wild rice and this is where protection efforts will focus. Sylvester observed that Wisconsin also has significant stands of wild rice, with Weigel adding that the state does not current have a sulfate standard in place and is therefore watching developments in Wisconsin very closely.

Dkhili asked whether, for the UMR, any major changes are anticipated in Minnesota's 2016 list. Skuta responded that it is uncertain currently whether there will changes for the UMR and that Minnesota's new eutrophication standards for rivers may affect future UMR listings.

State Nutrient Loss Reduction Strategy Updates

Sylvester introduced the discussion by saying the WQEC and WQTF provide forums to share updates and lessons learned regarding the implementation of statewide nutrient reduction strategies. As such, this roundtable discussion had been included in meeting agenda. She thanked all the members for their efforts to prepare today's updates.

Wisconsin

Weigel gave Wisconsin's report on its nutrient loss reduction strategy, beginning by outlining some of the basic components of Wisconsin's strategy as follows:

- Baseline: Wisconsin utilizes a baseline year of 1995, which is both consistent with the general reference window recommended by the Gulf Hypoxia Task Force and pre-dates statewide implementation of technology-based limits for phosphorus (per Wisconsin rule NR 217).
- Reduction Targets: A 45% reduction target has been established for both nitrogen and phosphorus. In the case of phosphorus, a 45% reduction is typically less than what is calculated in TMDLs to meet local water quality requirements. As such, there is a "margin of safety" for phosphorus included in existing processes. However, for nitrogen, it is expected that only a 20-25% reduction can be achieved using existing methods and approaches, new technologies/methods for agriculture will need to be developed to reach 45% reduction.
- Geographic Focus: The primary area of emphasis is in the western portion of Wisconsin and watersheds have been ranked according to their contribution to nutrient loading. Among these watersheds, three are being addressed by NRCS RCPP program funding, but there are more than 400 watersheds statewide where needs for nutrient loss reduction have been identified.
- Practices Emphasized: For phosphorus, the technology-based limits in NR 217 have accounted for a large portion of reductions to date and continue to be a key component of limiting phosphorus discharges. Further phosphorus reductions will rely on both point and nonpoint/agricultural source reductions. For agriculture source reductions, key components will be better manure management and implementation of NRCS 590 nutrient management plans.

  In terms of nitrogen, Wisconsin does not have as much tile drainage as other upper Midwest states and reducing agricultural nitrogen loss is challenging. Wetland restoration can perhaps achieve a 20-25% reduction, but would have to be implemented on a massive scale. Genetically modified corn and/or polymer coated fertilizer could perhaps provide significant reductions. The long-term key to reducing nitrogen loss will be balancing crop yield and environmental impact.

Weigel next discussed programs that are part of the implementation of Wisconsin's strategy. He said the strategy builds on existing programs and processes, such as the CWA 303(d) impairment list and Wisconsin Health Watersheds Assessment programs to prioritize projects. However, he noted, these process are both limited spatially and may be dependent on local stakeholder interest and participation. As such, the watersheds where projects are proceeding do not always align with the watersheds that are creating the greatest nutrient loads.

Regarding measurement and tracking, Weigel said tracking implementation for point sources is easier than for nonpoint sources, as point sources can be tracked through permits and required effluent monitoring. Tracking of agricultural reductions is much more challenging, as benefits from best management practice implementation can be offset by other changes in the watershed. As such, Weigel explained, the best measure of success may come from sampling at long-term monitoring sites.

Weigel noted that Wisconsin's greatest successes so far have come in phosphorus reductions. He said Wisconsin is roughly halfway to its phosphorus reduction target, having achieved a 27% reduction in phosphorus loads as compared to the 1995 baseline year. Weigel explained that reductions to date have largely resulted from the implementation of NR 217 technology-based limits, with additional reductions due to the implementation of agricultural performance standards. Overall, with additional gains through statewide phosphorus criteria and TMDLs, it is expected that Wisconsin will exceed the 45% phosphorus reduction target.

In terms of challenges, costs for the implementation of phosphorus and nitrogen removal will be become an economic issue for point sources. Additional gains are needed in agricultural nonpoint source reductions, particularly in regard to nitrogen. Challenges to nonpoint practice implementation include the need for cost share dollars (75% as required in Wisconsin statute) and insufficient funds to implement practices at the scale needed to achieve substantial reductions. Further, for nitrogen in particular, implementation of practices will require balancing environmental and agricultural production needs. In response to a question from Flood, Weigel said Wisconsin is increasing its monitoring efforts to better understand nitrogen loading.

Minnesota

Wayne Anderson provided Minnesota's report, noting that its strategy – finalized in September 2014 – was developed by a steering committee that included 11 agencies with water management responsibilities. He said strategy development also benefitted from statewide nitrogen and phosphorus assessments that had been conducted by MPCA along with partners including USGS and the University of Minnesota.

Anderson explained that Minnesota has set its goals keeping in mind the needs of local waters, other states and international waters, as well as Gulf Hypoxia Task Force goals. As part of an expected strategy update in 2016, new Hypoxia Task Force goals will be addressed. He said while the Hypoxia Task Force recommended the 1980-1995 period as a baseline condition, Minnesota is using information available on changes since the year 2000 as a surrogate baseline against which to measure progress.

Anderson said strategy reduction targets have been developed to incorporate existing standards and water assessments for nutrients, including new eutrophication standards for rivers. In terms of alignment with Lake Pepin targets, Anderson said statewide (downstream) phosphorus reduction goals are a close match for Lake Pepin reduction targets. However, for nitrogen, the statewide (downstream) goals require much greater reduction than Lake Pepin targets. Anderson said MPCA is also working to develop an aquatic life toxicity standard for nitrate, but it is expected that the Gulf Hypoxia goal will remain as a complementary driver of actions to achieve nitrate reductions.

Since 2000, Anderson noted that phosphorus concentrations have declined approximately 33%, while there has been less success with regard to nitrogen – where efforts to date have prevented increases in nitrogen loss but reductions have not been achieved.

Turning to a discussion of practices to reduce nutrient loss, Anderson noted that nitrate is primarily a cropland issue, while phosphorus comes from a more distributed set of sources. He then reviewed a list of management practices – including increased fertilizer efficiencies, living cover, erosion control, drainage water retention and treatment, urban stormwater management, and wastewater treatment – and reductions that could potentially be achieved by these. Anderson emphasized that numbers associated with achieving targeted reduction through these practices are "big" both in terms of scale of adoption needed and likely costs. He said these scale implications have been one of the "aha" moments of putting together the statewide strategy. Anderson commented that reductions will be needed from both point and nonpoint sources, though it is really on the nonpoint side where significant impacts to the landscape would result.

Anderson said one approach being taken by MPCA is to integrate the nutrient reduction strategy with water quality protection efforts being implemented at the HUC-8 level Watershed Restoration and Protection Strategies (WRAPs) process. He also noted three pilot projects utilizing remaining Nutrient Strategy Grant funds, as well a nutrient reduction calculating tool, as among the approaches being advanced by Minnesota. Anderson explained that the Agricultural Certification Program will be expanded to a statewide effort using funds received via the USDA NRCS Regional Conservation Partnership Program (RCPP). He said additional work is also ongoing to explore the use of cover crops

and also noted Governor Dayton's recent initiative to put buffers in place around all Minnesota waterways. Further efforts noted by Anderson included an $18 million Minnesota contribution for leveraging a conservation reserve enhancement program (CREP) expansion to a new 100,000 acres and six additional watersheds added under the Mississippi River Basin Healthy Watersheds Initiative (MRBI). Additionally, a soil health initiative is underway and the University of Minnesota has been funded to carry out a program called Forever Green to help accelerate cover crop adoption.

Regarding wastewater, a five step approach to reducing nitrogen has been identified. Anderson said Minnesota is fully engaged in step 1 of this process, requiring influent and effluent monitoring at waste water treatment plants.

In terms of challenges, Anderson noted that measurement and tracking continue to be areas in need of further work. Overall, however, he said the strategy is moving forward with a strong basis in policy.

Sylvester asked whether Minnesota's strategy included any edge-of-field monitoring. Anderson replied that this is part of the Discovery Farms program in Minnesota, but there is a lot of variability observed in results and as such it has been difficult to use monitoring to determine effectiveness of practices in place. He added that estimated reductions (i.e., modeling) have also been calculated as a means to determine the likely impact of practice adoption.

Dkhili asked whether there is a Mississippi River phosphorus concentration that is expected to result from the reduction in loading targeted in Minnesota's strategy. Anderson replied that, in particular, concentrations at Lock & Dam 3 and at the state line are measured, and that expectation is that over time phosphorus concentration reductions will be observed at these locations proportionate to loading reductions. He said the goal is that the Mississippi River meets the phosphorus levels specified in Minnesota's new eutrophication standards. Rebecca Flood added that the new standard for phosphorus applicable to the Mississippi River is 100 ug/L. She explained both the water quality standard and strategy-based load reduction are important, though action is really driven more by the load reductions than the standard *per se*. Skuta commented that while the strategy goal and the water quality standard are largely independent of each other in a specific sense, they are certainly complimentary goals.

Iowa

Jake Hansen began Iowa's update, noting that Iowa has elected to use a baseline of 2000-2012 data for comparison, a more recent background than the time period chosen by the Gulf Hypoxia Task Force (1980-1995). He summarized reduction targets under Iowa's strategy as follows:

- Nitrogen: 45% overall reduction (41% from nonpoint sources, 4% from point sources)
- Phosphorus: 45% overall reduction (29% from nonpoint sources, 16% from point sources)

Hansen said the reduction goals have been established at a statewide level, though the demonstration components of Iowa's Water Quality Initiative (WQI) have been targeted to high priority HUCs.

In terms of nonpoint practices to reduce nutrient loss, Hansen said Iowa emphasizes the following practices:

- For Nitrogen: Cover crops, nutrient management, wetlands, and saturated buffers.
- For Phosphorus: Cover crops, no till, nutrient management, terraces, basins, and grade stabilization structures.

He said the state legislature has not yet taken action on budgetary support for practice adoption via the WQI in FY 16, but that the current proposal is for $7.5 million, following allocations of $6.8 million in FY 14 and $4.4 million in FY 15.

Regarding measurement and tracking of implementation, Hansen said IDALS has been coordinating with Iowa State University to collect state and federal information to help document reductions, with assistance from other public and private sector partners. This information should appear in the next strategy implementation progress report from the Iowa Water Resources Coordinating Council. He noted that June 1st to May 31st has been established as the annual reporting period for strategy implementation and the next report should be available by June 30, 2015.

Hansen explained that it is challenging to document reductions for various types of management practices. As such, the best current measure of impact is often simply the number of acres where a nutrient loss reduction practice has been applied. Hansen said one of Iowa's leading goals is to ground truth expected reductions and then be able to be more precise in predicting what expected reductions from practices should be.

Hansen identified the following as successes in the implementation of the nonpoint elements of Iowa's nutrient reduction strategy:

- Broad engagement, with lots of input from many stakeholders, with 30-40 partners participating in HUC-based meetings.
- High demand for new cost-share assistance funds. Money is being obligated very quickly on statewide basis.
- Successful leveraging of RCPP funding, including on WQI and Middle Cedar River projects.
- Implementation of 16 active WQI demonstration projects, including 4 new demonstration projects to help accelerate delivery of certain practices that have been available on a limited basis,
- 2 years of statewide practice implementation including expanded use of cover crops.

Additionally, he identified five nonpoint source challenges as follows:

- Timeline. Specifically, while seeking to meet Hypoxia Task Force goals, not sure if newly set goals can be met.
- Distractions and competing interests, most specifically the recent avian flu outbreak.
- Limited staffing, with only a small number of staff assigned to strategy implementation. This requires careful planning to spread strategy implementation and funding most effectively.
- Also, limited funding to implement the practices identified in the strategy. With scare resources, it is particularly challenging to fund on-the-ground implementation (e.g., will be difficult to reach strategy's goal of 7,000 acres of CREP wetlands).
- Measurement and reporting of progress, both in terms of accuracy and being able to obtain data on practice implementation and outcomes.
- Not a seamless integration with partners. For example, challenges in meshing with NRCS in regard to funding flow, NRCS practice standards, and permitting.

Buntin asked how Iowa is approaching edge-of-field monitoring. Hansen said Iowa is hoping to ramp up its edge-of-field monitoring practices, including better quantification of inflow and outflow.

Jon Tack next provided an update on Iowa's strategy implementation in regard to point sources. In terms of reduction goals overall, he said Iowa has chosen to focus on the reduction goals set by the Hypoxia Task Force, as described previously by Hansen. Additionally, Iowa's point source efforts have focused on utilizing existing programs and authorities (e.g., application of Iowa Administrative Code 567, Chapter 62 regarding the need for technology-based treatment to prevent impacts of pollution).

Tack explained that Iowa's point source strategy is to focus on 145 major dischargers, of which 130 contribute significant nutrient loads. It is really these 130 facilities that are the focus of point source work, and Iowa DNR expects that these facilities should be able to meet technology-based effluent limits of 10 mg/L total nitrogen and 1 mg/L total phosphorus using biological nutrient removal. As such, Iowa DNR has asked these facilities to undertake feasibility studies regarding biological removal. Dischargers are given two years to complete the study and then DNR will review the study and negotiate a construction schedule with the facility. Facility permit may incorporate the construction schedule.

Tack noted that this approach will bring in approximately 80% of Iowa's municipal dischargers, who serve 55-60% of the state's entire population. He said Iowa hopes to achieve a 2/3 to 3/4 overall reduction in nutrients from point sources, noting the following as point source reduction goals:

	Current	**After Strategy Implementation**
Total Nitrogen – Annual Statewide Point Source Loading	18,300 tons/year	7,300 tons/year
Total Phosphorus – Annual Statewide Point Source Loading	2,900 tons/year	730 tons/year

Regarding implementation, Tack said 54 permits have been issued to date that incorporate studies, with the first of these feasibility studies due in September 2015. He added that Iowa's goal is to issue 20 such permits each year. Three facilities have already installed enhanced treatment and eight more are on public notice regarding construction, with two facilities now falling below the definition of a major discharger.

In terms of the state's strategy overall, Tack said the biggest challenge is nonpoint measureables – particularly quantifying the application of management strategies on the landscape. He noted that remote sensing data (e.g., LiDAR) could be employed here, but there are privacy concerns. Tack said Iowa DNR and IDALS are working together to find solutions regarding this issue. He added that impacts from practice adoption could be predicted using models based on expected reductions.

Additionally, Tack said trading approaches are appearing on the horizon and efforts are being made to identify potentially tradeable credits even before a formal trading system is in place.

Buntin asked if there is any impact on the nutrient reduction strategy stemming from the Des Moines Water Works lawsuit against several Iowa counties regarding their nutrient contributions. Tack responded that it will take a long time for this legal action to play out and that Iowa remains focused on moving forward with strategy implementation to the greatest extent possible.

Illinois

Marcia Willhite presented an update on Illinois' nutrient loss reduction strategy, noting that the strategy has been designed to address both local impacts to water quality as well as reducing contributions to Gulf Hypoxia. The strategy is still in draft, with a goal of finalization by July 2015.

Overall, Illinois has targeted a 45% reduction goal for both nitrogen and phosphorus, in line with the Hypoxia Task Force goal, using the 1980-1996 time period to establish baseline conditions. While there is not a target date associated with this 45% reduction, milestone reductions have been identified as follows:

- Reduction in nitrate-nitrogen of 15% by 2025.
- Reduction in phosphorus of 25% by 2025.

Additionally, local water quality goals/reductions will be established by TMDL process and/or watershed-specific studies.

To achieve overall of reductions of phosphorus, Wilhite said Illinois is seeking a roughly 50/50 split in load reductions between point and nonpoint sources. She explained that the point source component may be higher in Illinois than in other states due to Chicago's predominance as a point source discharger. Willhite also noted the relatively large contribution to both nitrate and phosphorus loading to the Mississippi River from the Illinois River.

Willhite explained that, in regard to nonpoint source contributions, tile drainage is a primary driver of nitrogen loading while topography is primary driver of phosphorus loading. With this in mind, Illinois has identified priority watersheds in which to address nonpoint nitrogen, nonpoint phosphorus, and point source nitrogen and phosphorus loss. She noted that the Keep It for the Crop program is active in a number of these priority watersheds.

Willhite next presented findings from Illinois' science assessment which explored the efficacy and cost of various practices/scenarios (i.e., combinations of practices) in reducing nitrogen and phosphorus loading. She said these analyses illustrate that there is no one singe practice or "silver bullet" that will lead to reduction targets on its own. Rather, it is clear that combinations of practices are needed to reach reduction targets. Further, the results begin to illustrate the annualized costs of implementing various scenarios which could result in major reductions in nutrient loss.

Willhite said Illinois' agricultural community has been quite engaged in the strategy, leading efforts to fund research, outreach, and on-farm demonstration of effective practices. In particular, she noted the following industry-led initiatives:

- Nutrient Research and Education Council
- Keep It for the Crop, including:
    - N-Watch
    - Nitrogen management systems
    - On-Farm nitrogen rate trials
    - N-Calc (Maximum Return to N [MRTN] calculator)
- Cover Crop Training Initiative

On the point source side, Willhite described Illinois' nutrient-related effluent limits in NPDES permits, noting that 42% of major municipal dischargers now have a permit with phosphorus limits, and this reflects a total of 80% of the regulated discharge from major municipal facilities. She added that permit limits for the Metropolitan Water Reclamation District of Greater Chicago alone will achieve 33% of the point source load reduction goal for phosphorus. Willhite also described watershed planning efforts, such as one moving forward on the Fox River, that addresses both local impairments and reduces overall nutrient load leaving the state.
Future directions for strategy implementation were noted by Willhite as follows:

- Nutrient Loss Reduction Feasibility Plan
    - Focus on major point source dischargers in priority watersheds, asking them to evaluate feasibility of enhanced treatment (e.g., biological nutrient removal)
- Review data and identify additional strategies, such as those to better address:
    - Nitrate-nitrogen
    - Industrial discharges
- Expand reduction planning efforts to additional watersheds to address local water quality problems

Willhite next discussed means by which Illinois plans to demonstrate progress in nutrient loss reduction, including:

- Tracking environmental outcomes and implementation activities
- Utilizing monitoring programs, including the Statewide Nutrient Export Loadings Network
- Practice Implementation Measures, including:
    - NPDES Permits
    - 319 Program
    - Soil Conservation Transect Surveys
    - Natural Resources Inventory
    - NRCS Annual Report
    - Ag Industry Voluntary Reporting

Reporting on progress in practice implementation is expected to take place via biennial reports published in odd-number years, while water quality status will be reported on in even-number years through existing 305(b)/303(d) processes.

Willhite explained that the draft Illinois nutrient loss reduction strategy had been available for public comment through January 24, 2015 and that Illinois EPA and Department of Agriculture are currently working to review and address comments received. All comments are currently posted on the Illinois EPA website with finalization of the strategy scheduled for July 2015.

A number of groups will continue to guide strategy implementation, Willhite noted. These include a Policy Working Group, Nutrient Monitoring Council, Ag Water Quality Partnership Forum, Urban Stormwater Work Group, and Nutrient Science Advisory Committee. In particular, she said the role of the Nutrient Monitoring Council is to help guide ongoing monitoring to make sure it is effective. Also, the Nutrient Science Advisory Committee is standing up in order to aid numeric nutrient criteria development. Willhite explained that the Science Advisory Committee will look at information related to numeric nutrient criteria development and after 18 months provide a recommendation to Illinois EPA. Additionally, she noted that the watershed utility concept advocated by the US Water Alliance is also an idea in play as implementation proceeds.

Among the challenges in strategy implementation, Willhite noted it is particularly difficult to establish what the agricultural practice adoption baseline is, due to factors such as information restrictions on NRCS program data resulting from privacy policies. She said that both this baseline adoption and any subsequent adoption is difficult to measure.

Willhite noted that resource constraints are another challenge to implementation, and therefore collaboration and leveraging resources will continue to be important. As an example, Willhite described Illinois EPA's work with the agriculture sector to provide outreach and education in regard to best management practices.

Lastly, Willhite identified parity of effort as an implementation challenge. In particular, she said, those in the point source sector are concerned regarding the expenses that may be incurred by discharges as compared to costs incurred in the nonpoint sector.

Buntin asked Willhite to comment further on the role of targeting within strategy implementation in Illinois. Willhite said Illinois is definitely seeking to align programs - e.g., from 319, NRCS, Illinois Department of Agriculture, private sector – to focus on shared priorities/priority watersheds.

Sylvester asked Willhite to provide additional details on the numeric nutrient criteria development component of the strategy. Willhite replied that the Science Advisory Committee's report will be available in 18 months, after which time Illinois EPA will consider options for implementation.

Flood asked whether Illinois is seeing success with the use of cover crops, adding that Minnesota's short growing season has been a constraint to this practice. Willhite answered that Illinois is seeing that some cover crop types can be successful, but that the usual farming factors of weather and soil moisture are important determinants of cover crop success.

Linda Holst asked whether Illinois will be able to correlate changes in nutrient levels with practices adopted and treatment changes implemented. Willhite replied that success will be measured by tracking load reductions and well as the status of aquatic life. Anderson commented that Minnesota will also focus on tracking loading, as nutrient reduction goals are expressed in terms of loading. Tack commented that there can be long lag times between practice implementation and actual observed reductions. Brian Weigel concurred, adding that the lag time can be very system-specific.

Missouri

Kurt Boeckmann gave Missouri's nutrient strategy update. He reported that the strategy had been finalized in December 2014 and benefitted from a significant amount of stakeholder input during its development.

Boeckmann said Missouri is utilizing an adaptive management approach in implementing its strategy. As such, the strategy does not include numeric reduction targets *per se*, but rather focuses on the implementation of conservation practices and the expected reductions resulting from these activities. He said nonpoint source practice adoption will remain voluntary under the nutrient reduction strategy.

He noted that the strategy also builds on the successes Missouri has had in its conservation programs in the past several decades, which have been funded since 1984 with a one-tenth-of-one-percent sales tax to support state parks and soil and water conservation efforts. Specifically, there has been a nearly 50% reduction in soil erosion rates since the sales tax funding mechanism was implemented.

Boeckmann said Missouri's strategy also includes an increased focus on monitoring. RCPP projects and the Our Missouri Waters program are some of the mechanisms by which monitoring programs will be expanded.

Boeckmann explained that strategy implementation will include a HUC-based approach, allowing for focus and prioritization in the use of funding. Missouri also has numerous MRBI projects underway and has received $6 million in RCPP funds to support the Our Missouri Waters program over the next five years. Additionally, Boeckmann noted that Missouri has developed a nutrient tracking tool in collaboration with the Texas Institute for Applied Environmental Research and Tarleton State University. This tool is available for use online. Boeckmann also said outreach efforts to producers are ongoing and Missouri DNR is working with partner groups, including agriculture groups, in these efforts.

In addition to the efforts to address agricultural, nonpoint nutrient loss, Boeckmann said the strategy also addresses point sources (municipal and industrial dischargers), urban stormwater, and on-site wastewater disposal systems (septic systems). Additionally, he said Missouri is examining how trading approaches may fit into its nutrient reduction strategy.

Boeckmann emphasized that Missouri is putting a lot of effort into cover crops as a leading practice to reduce nutrient loss. He explained that many cover crops went in fairly late last year, and the goal will be to get them in earlier this year.

Flood asked whether Missouri is putting nutrient effluent limits into NPDES permits. John Hoke responded that effluent limits are being considered, but currently are only implemented in areas with TMDLs or particularly sensitive waters.

USEPA
(USEPA's report was made on the meeting's second day, but is included here for purposes of continuity.)

Linda Holst provided an update on nutrient reduction strategies from USEPA Region 5, noting that Tom Davenport is the Region's lead for the strategies. She said the Region's priorities include TMDL implementation to address nonpoint sources and, on the point source side, focusing on monitoring (including effluent monitoring) for nutrients. Additionally, the region is reviewing and re-evaluating Municipal Separate Storm Sewer Systems (MS4) permits and working to maximize the effectiveness of National Pollution Discharge Elimination System (NPDES) permits for confined animal feeding operations (CAFOs) in those cases where this permitting applies.

Holst said the Region is also assisting states in their efforts to focus on priority watersheds, via the development of watershed management plans and the incorporation of priority watershed work into performance partnership agreements (PPAs) and annual work plans. The Region is also encouraging the states to integrate Farm Bill programs such as the Mississippi River Healthy Watersheds Initiative (MRBI) and Regional Conservation Partnership Program (RCPP) into their nutrient strategies. Holst added that the Region also plans to continue its nutrient reduction strategies webinars throughout 2015.

Weigel asked how the Region makes decisions to allocate resources for TMDL implementation. Holst said she would inquire within the Region on this and provide a response to the WQTF.

(*Holst shared the following reply from Matt Gluckman, Section Chief, Region 5 Watersheds and Wetlands Branch on June 15, 2015: "We work with the states on an annual basis to identify their priorities for TMDL project funding. EPA Headquarters provides annual TMDL project funding allocations to regions as available from congressional appropriations. The overall funding for such projects has decreased substantially over the past several years. As such funding becomes available, we work with the states to secure funding for the highest priority projects. Following this process, we have identified projects to address nutrient-related impairments in the MRB as high priorities for funding over the last several years.")*

Summary Discussion

Weigel offered that, in listening to the updates, the following seemed to be common challenges encountered:

- Reducing nitrogen loss (state have been more successful in regard to phosphorus).
- Tracking and reporting of progress

- Determining how to successfully implement the "4 Rs" (right source, right rate, right time, right place) of nutrient stewardship
- Moving trading concepts to implementation

Skuta and Tack agreed that these do seem to be common challenges. Willhite concurred, suggesting that is these areas of common challenges that the states should collaborate on via UMRBA and other forums.

Municipal Perspectives

Mississippi River Cities and Towns Initiative

Colin Wellenkamp, Executive Director of the Mississippi River Cities and Towns Initiative (MRCTI) provided an update on recent MRCTI activities and plans for their September 15-17, 2015 annual meeting in Dubuque. He began by noting the value that MRCTI places on building partnerships, such as the memorandum of agreement (MOA) signed between MRCTI and USACE's Mississippi Valley Division to collaborate on issues of common interest. In regard to water quality specifically, Wellenkamp said MRCTI is currently interested in the following: 1) supporting sustainable supply chains that reduce impacts on water quality and working with organizations such as Field to Market in this area, 2) encouraging city-based nutrient reduction efforts, such as the RCPP project in which the City of Cedar Rapids is engaged, and 3) working with the states in implementing statewide nutrient reduction strategies. Wellenkamp said MRCTI views UMRBA as important partner in working to improve UMR water quality.

Willhite said the WQEC and WQTF look forward to continued collaboration with MRCTI and are happy to aid in any preparations for water quality discussions at the MRCTI annual meeting. Wellenkamp replied that input is certainly welcome in scoping the MRCTI water quality discussions. In addition to nutrient reduction strategies, Willhite said the WQEC could also present information regarding state revolving loan fund (SRF) programs. Wellenkamp observed that MRCTI is definitely interested in supporting full funding for SRF programs. He added that one objective of MRCTI is to address water quality not just on the UMR, but throughout the Mississippi River and replicate successes in specific states/areas across the entire river.

City of Davenport/Clean Water 4 Life

Mike Clarke of the City of Davenport provided a presentation regarding the city's "Clean Water 4 Life" initiative, which he described as an integrated water system approach bringing together four water systems that have typically been treated separately but actually are integrated: 1) the natural water environment (wetlands, streams, creeks, rivers and oceans), 2) the potable water system (processing and distribution system), 3) the waste water system (collection, treatment and discharge system), and 4) the storm water conveyance system (collection and discharge). He said an overarching goal for the initiative is that water discharged in the City of Davenport is cleaner than water withdrawn. Clarke then displayed maps of how these four water systems are currently laid out in Davenport and described some of the specific goals and approaches that would be taken under "Clean Water 4 Life" in Davenport, including:

- Adding resiliency to the City's potable water supply system
- Restoring and daylighting Mad Woman Creek
- Transferring waste water to the natural system through biologically engineered wetlands
- Addressing flooding and water quality (*E. coli*) challenges in Duck Creek
- Utilizing bioswales to improve water quality

Clarke also emphasized ancillary benefits arising from these efforts, such as the creation of trails and other amenities. He also noted the many partners involved in the project, including: The Nature Conservancy, University of Iowa School of Urban and Regional Planning, Partners of Scott County Watersheds, River Action, Iowa American Water Company, Davenport School District, Iowa Department of Natural Resources, Quad Cities Chamber of Commerce, U.S. Army Corps of Engineers Rock Island District, Scott County Iowa Soil and Water Conservation District and Congressman Dave Loebsack, Iowa Second Congressional District.

Clarke said the City plans to move forward in incorporating Clean Water 4 Life via the following:

- The City Council will approve Clean Water 4 Life as an action task in the 2016 Davenport Strategic Plan.
- Six projects will be approved in the Davenport Capital Improvement Program as part of the FY 2016 Budget as follows:
    - CIP 58: Micro-Watershed Environmental Assessment $50,000
    - CIP 70: Micro-Watershed Wetland Design $50,000
    - CIP 71: Micro-Watershed Wetland Property Acquisition $50,000
    - CIP 03: Micro-Watershed Wetland Construction $50,000
    - CIP 72: Grey Water Reutilization Study $100,000
    - CIP 83: 10th and Grand Storm Water Daylighting $80,000

Rebecca Flood asked whether Dubuque had a combined wastewater system or whether it is separated. Clarke answered that the system had been combined and the city has been working to separate the storm water and sewer systems. He added that aging infrastructure has also been a challenge in upgrading the wastewater system.

Regarding Duck Creek, John Olson asked where *E. coli* monitoring has been conducted. Clarke said a total of 38 samples have been collected in recent monitoring, all on tributaries to Duck Creek. Of the *E.coli* detections, Clarke said two had been identified as coming from a human source – indicative of sewer leakage – while the others were determined to be from animal sources. Skuta asked whether there is an existing network of stormwater retention ponds in Davenport. Clarke replied that there is not a network in existence. Jon Tack noted that one important consideration here is in regard to the diversion of discharges away from the Mississippi River, so that there is not a disincentive created in moving discharges to other water bodies (i.e., regulatory barriers to shifting discharges).

Clarke noted that many entities withdraw water from the Mississippi River and many discharge to the river. He said he is interested in any mapping that may have been done of both these types of facilities, as well as categorization of the types of withdrawals and discharges, on both the Mississippi River mainstem and tributaries.

Willhite asked if any load reduction calculations had been made to estimate the impact of the various projects proposed for Davenport. Clarke said this had not yet been done, but certainly could be. Flood and Willhite observed that a beneficial role for MRCTI would be to bring together innovators from the cities to discuss initiatives such as this one. Flood added that challenges for cities and utilities engaging in this type of work include both asset management and appropriate rate structures.

The meeting adjourned for the day at 5:30 p.m. on June 2 and reconvened at 8:00 a.m. on June 3.

UMR CWA Assessment Feasibility Project

John Olson reported that the *Provisional Methodology for CWA Assessment of the UMR* has been drafted and that a few key questions remain in finalizing the methodology. As such, he explained, the discussion in this meeting will focus on resolving some these remaining questions.

"Reach 0" Inclusion and Naming

Hokanson noted that the intra-state (within Minnesota) section of the UMR, referred to as "Reach 0" is included in the pilot monitoring effort. He asked whether Minnesota's intent was also include this reach in the provisional assessment methodology and, if so, whether the WQTF wished to begin using a naming convention other than "Reach 0" for this segment. Skuta said from Minnesota's perspective the reach should be included in the methodology and the "Reach 0" name should remain. All concurred with Skuta's suggestion.

Recreation Use Assessment

The WQTF discussed the appropriate approach in comparing chlorophyll-a results to threshold values in the assessment. All concurred that the average chlorophyll-a value should be used. In term of the range of data incorporated into the assessment, Giblin observed that while data is being collected from April to October, a shorter assessment window may be appropriate. Skuta concurred, saying MPCA typically assesses chlorophyll-a in a June to September period. All agreed that the assessment itself should utilize a June to September period, while samples would still be collected in the April to October time frame.

Drinking Water Use Assessment

Olson explained that US EPA had recently released guidelines for microcystin and cylindrospermopsin levels in drinking water. He noted that two sets of guidelines were included, one for the general public (1.6 µg/L for microcystin, 3.0 µg/L for cylindrospermopsin) and one for children younger than school age (0.3 µg/L for microcystin and 0.7 µg/L for cylindrospermopsin). Olson said as a starting point the lower numbers, applicable for young children, had been included in the provisional assessment. Giblin suggested that the lower numbers continue to be used. Good concurred, saying that this would be a more conservative approach and would address concerns that cellular lysing during some types of water treatment could potentially increase algal toxin levels. All agreed to using the lower values for algal toxin thresholds in the assessment.

Hokanson asked whether cylindrospermopsin should now be added to the list of parameters in the *UMR CWA Recommended Monitoring Plan*, since it is addressed in the methodology document. All agreed it should be added while acknowledging that further work needs to be done to define what sampling and analysis methods would be employed.

Fish Consumption Use Assessment

Olson and Hokanson explained that fish tissue sampling underlying fish consumption use assessment had been scaled back from what was originally proposed in the *UMR CWA Recommended Monitoring Plan* (i.e., multiple fish collected at each of the probabilistic locations) to a smaller number of fish per reach. This change had been made largely in response to feedback from states' fish consumption program staff. In light of the reduced sample size, Hokanson noted that one of the key questions is whether the WQTF wants to be able to provide assessment at the pool level or whether the CWA reach level is sufficient for the assessment. Giblin and Weigel said the CWA reach is the appropriate unit for this assessment. Skuta concurred, saying further sampling/pool-level characterization could potentially be pursued as a follow up step when needed. Hokanson suggested one way to incorporate states' existing advisories, which are often on a pool basis, would be to incorporate the existence of any current advisories into the assessment process, similar to the way extraordinary treatment is considered in the

drinking water use assessment. All agreed that existing advisories should be integrated into the methodology if possible.

Next Steps

Hokanson said the immediate next step for the methodology is that input from today's discussion will be integrated with the intent of finalizing the provisional assessment document by July 1, 2015. He noted that some issues have been identified which will require further information to resolve beyond the July 1st target date. These "parking lot" issues will be documented and revisited in any future updates to the methodology. Hokanson asked the group whether a formal endorsement of the provisional methodology by the WQEC or UMRBA Board is needed at this time. Flood said a report to the Board on the methodology's status would be sufficient at this time, with a next step being to run data through the methodology to test its performance. Buntin concurred with this approach.

UMR Water Quality Research

Ecological Shifts and Stable States on the UMR

Giblin presented findings from the paper *Ecological Shifts in a Large Floodplain River During a Transition from a Turbid to Clear Stable State*, authored by himself, Brian Ickes, Heidi Langrehr, Andy Bartels, and Kraig Hoff. He introduced the concept of alternative stable states in a riverine ecosystem, specifically describing two stable states as follows:

- Turbid/unvegetated state, characterized by:
    - Increased wind resuspension
    - Increased phytoplankton abundance
    - Decreased refuge for zooplankton
    - Increase in benthivorous fish (e.g. common carp)
    - Reduction in visual feeding top predators (e.g. northern pike)
- Clear/vegetated, characterized by:
    - Decreased wind resuspension
    - Decreased phytoplankton (allelopathy + sinking in plant beds)
    - Increased refuge for zooplankton
    - Decrease in benthivorous fish
    - Increase in top predators (trophic cascade)
    - Increase in denitrification within plant beds

Giblin described how UMRR-LTRMP data from 1993 to 2011 for Pool 8 were examined to identify the characteristics of these stable states, how the river has moved between stable states over time, and key factors that drive the ecosystem towards one stable state or the other. He said examination of this data revealed two distinct "epochs" in Pool 8 ecosystem state – an early epoch from 1993 to 2001 in the turbid/unvegetated state and a late epoch from 2002 to 2011 in the clear/vegetated state. In terms of key threshold values, Giblin explained that a value of 17 mg/l for total suspended solids (TSS) appears to be an important breakpoint in determining the state of the ecosystem. He noted that that this TSS value corresponds to a Secchi disk depth of 67 cm (approximately 2.25 feet).

Giblin offered the following conclusions from this research:

- Multi-decadal datasets are important for tracking change and identifying ecological tipping points.
- Substantial increases in aquatic vegetation and water clarity have occurred in Pool 8.

- The fish community has also changed substantially, with more top predators and fewer benthivores.
- We are likely underestimating internal factors that are regulating the ecosystem.
- Good water quality may be our best defense against non-native invaders.
- There appear to be thresholds for vegetation and TSS where the ecosystem fundamentally changes.
- Staying the course with long-term data collection will be important in the future.

Hokanson asked whether this analysis was done just for particular strata in Pool 8 or whether all strata were covered. Giblin replied that all strata were included in the analysis. Olson asked where the UMR "wants to be," meaning where is the predominant stable state likely to be for the river. Giblin answered that over the last 50 years it appears that the UMR has been in clear/vegetated state a majority of the time, so that may be its "desired" condition. He added that he thinks we are seeing increasing resilience in the system, keeping the UMR more often in the clear/vegetated state.

Skuta asked what the drivers have appeared to be for historic vegetation collapse years. Giblin replied that this has never been definitively determined, but that the collapse years were also drought years so this may have been a key factor. However, since the data from the time period are relatively limited, it is difficult to diagnose specifically. Flood added that many other variables changes in the 1980s, such improvements in wastewater treatment, which also impacted the river's condition.

Giblin asked if these findings could likely be extrapolated beyond Pool 8. Giblin answered that the dynamics are likely applicable through the Quad Cities (Pool 15). He suggested that TSS targets of 32 mg/l above Lake Pepin and 17 mg/l below Lake Pepin (to Pool 15) appear to be reasonable and attainable water quality targets.

Macroinvertebrate Methods Study

Joel Chirhart gave an update on the macroinvertebrate methods comparison study undertaken by Minnesota PCA, Wisconsin DNR, and the Metropolitan Council. He reminded the WQTF that the key question investigated in this study is: *Which method provides the best measure of biological condition on the UMR: Hester-Dendy samplers, kick nets, or a combination of the two?* He added that "best" in this context considers both responsiveness to changes in biological condition and cost effectiveness. Chirhart also noted that one of the drivers for this investigation was the finding that the Great River Macroinvertebrate Index (GRMIn) did not appear to be particularly sensitive to stressors on the UMR.

Chirhart described the methods used in the study (i.e., kick net sampling and artificial substrate samplers) as well as additional data collected at each of the study sites (water chemistry, temperature, habitat, etc.). He said all data from the study has now been collected and data analysis is currently ongoing. Chirhart also noted that the recovery percentage for artificial substrate samplers had been excellent (96%).

Chirhart described the ongoing analysis process as follows:

- Calculate stressor score for each station (EMAP methods)
- Calculate IBI scores
    - Use EMAP methods and ad hoc IBI for kick net samples
    - Use WI large river IBI for HDs (Weigel & Dimick 2011)
- Determine if kick nets, HDs, or a combination of the two respond better to stress

He said initial results have not demonstrated expected responses to stressors. As such, analysis is ongoing to determine a possible explanation for these results and preferred method(s) for the UMR have not yet been identified. Chirhart added that the spatial limitation of the study data (to only the MN-WI reach and UMR within Minnesota) may also be making it more difficult to understand relationships. As such, extending this type of methods comparison further down the UMR may be valuable in ultimately choosing preferred method(s) river-wide.

Chirhart said upcoming work on the study is likely to include:

- Reexamining stressor scores
- Expanding dataset to increase stressor gradient
- Revise or develop new IBIs as needed
- Modifying the scoring criteria
- Exploring additional metrics

UMR CWA Monitoring Strategy

Minnesota-Wisconsin Pilot Monitoring

Hokanson reminded that group that Minnesota and Wisconsin are moving forward to pilot monitoring under the *UMR CWA Recommended Monitoring Plan* in calendar year 2016. Skuta noted that the (Twin Cities) Metropolitan Council – Environmental Services has been engaged to assist with monitoring on Reaches 0 and 1. Giblin said there a number of laboratory/methods issues to be sorted out in moving forward with implementation.

In terms of funding, Weigel said Wisconsin plans to utilize $140,000 of its CWA Section 106 supplemental monitoring funds to support the pilot and US EPA has indicated support for this proposed use. However, this is still $20,000 short of what is needed for Wisconsin to conduct monitoring as planned. As such, Sylvester commented, it would be very beneficial if Wisconsin is able to identify/receive an additional $20,000 in funding from US EPA or another source. In Minnesota, Flood explained, the pilot is to be supported using Legacy Amendment funds. However, an FY 16 budget has not yet been agreed to and there is a chance that Legacy funding to MPCA could be reduced under a final budget deal. Therefore, she said, funding of the pilot is not yet assured.

Hokanson said he is working to draft a Field Operations Manual to accompany the pilot monitoring effort, but it is still quite preliminary and not yet ready for review beyond the pilot project planning group.

Data Mining/Virtual Pilot

Matt Jacobson demonstrated initial work to identify and compile existing UMR water quality data using a an online mapping application.

John Hoke asked what the ability is for the web viewer to be edited by other users. Jacobson replied that this is fairly limited currently, in part because UMRBA has been simply utilizing freely available software tools to date.

Skuta asked what time frame had been used when extracting data from various sources. Jacobson replied that initially a ten year window was attempted, but this was later revised to a narrower window of 2010 to 2014 (five years), as a way of making the data set more contemporary and more manageable. Hoke suggested that accompanying metadata be brought along whenever data is pulled in.

Weigel observed that a UMR water quality data and information plan may be needed. He suggested that a work group be formed to draft such a plan. Buntin and Sylvester agreed with the idea of forming a data management work group. Sylvester suggested that UMRBA staff send out a request for membership suggestions subsequent to this meeting. Hokanson indicated he would do so.

Recent UMR Spills and Water Quality Implications

Hokanson commented that with the occurrence of several high-profile spill incidents along the UMR in recent months, there has been interest in hearing more about these events and their possible impacts to water quality. He then gave an overview of three recent spill events on the UMR: 1) train derailment involving ethanol on February 4, 2015 just upstream of Dubuque, Iowa, 2) train derailment involving Bakken region crude oil on March 5, 2015 near Galena, Illinois, and 3) pipeline leak releasing diesel fuel at Hartford, Illinois on April 17, 2015. Hokanson also shared with group the reference handout *Key Spill Planning and Response Tools for the Upper Mississippi River* which had been developed at the request of UMRBA's Board.

Giblin then described Wisconsin DNR's engagement in water quality monitoring associated with the Dubuque area ethanol spill. He described downstream sampling by Wisconsin DNR at Mud Lake and Sunfish Lake, as well as at the incident site. Parameters sampled included ethanol, temperature, dissolved oxygen, pH, specific conductance (all top and bottom), ice depth, snow depth, water depth, and water velocity. Giblin said downstream sampling 24 hours after the incident did not detect any ethanol, although some residual concentrations were detected at the spill site itself. He noted the following lessons learned from this incident:

- Need to be able to get near the site quickly (within hours) to collect meaningful samples.
- Need to have someone on site who can calculate residence times and plume movement on the fly.
- Need to have intra and interstate phone trees developed.
- Water quality sampling accuracy for contractor-collected samples was a concern.
- Need to realize the level of public concern about the recent increase in hazardous spills on the UMR.

Olson said there definitely were communication issues with this incident and delays in notification to interested parties. Hokanson commented that although notification to the National Response Center (NRC) is required and the UMR Spill Plan includes an interstate notification protocol, there still seem to be communication gaps in reaching interested/impacted agencies and other groups on the UMR. As such, he suggested that "over-communication" may be an appropriate strategy in these situations. Hokanson asked whether Giblin felt addition modeling of river flows would be of aid in responding to future UMR spills. Giblin replied that, in his view, there is limited value in modeling and much greater value in getting individuals engaged in the response who are knowledgeable about local river flows.

Giblin said there would also be value in mapping the occurrence of spills on the UMR to get a better understanding of when and where spills are likely to occur. Hokanson said this idea has also been suggested in the UMR Spills Group and that UMRBA will be working to develop such a map.

WQTF Chair Transition

Hokanson explained that the WQTF typically rotates its Chair every two years. He said Mohsen Dkhili has served the last two years as Chair, with Glenn Skuta as Vice Chair. If the typical rotation is followed, Skuta will now take over as Chair and Brian Weigel of Wisconsin will become Vice Chair. All concurred with this change in Chairs. Skuta then thanked Dkhili for his service as WQTF Chair.

Next Meetings/Conference Calls

The WQTF agreed its next meeting should be held in September 2015. Hokanson said he would send a scheduling email to the group to identify a preferred date.

With no further business, the meeting adjourned at 12:10 p.m. on June 3, 2015.