

Upper Mississippi River Basin Association Water Quality Task Force

February 21-22, 2017
Davenport, Iowa

Meeting Summary

Participants

| | |
|--------------------|--|
| Gregg Good | Illinois EPA |
| Matt Short | Illinois EPA |
| Teri Holland* | Illinois EPA |
| John Olson | Iowa DNR |
| Dan Kendall | Iowa DNR |
| Dian Moles* | Iowa DNR |
| Dana Vanderbosch | Minnesota PCA |
| Justin Watkins | Minnesota PCA |
| Pam Anderson* | Minnesota PCA |
| Joel Chirhart* | Minnesota PCA |
| Lee Ganske* | Minnesota PCA |
| Megan Moore* | Minnesota DNR |
| Eric Lund* | Minnesota DNR |
| Mohsen Dkhili | Missouri DNR |
| Brian Weigel | Wisconsin DNR |
| Shawn Giblin | Wisconsin DNR |
| Jim Fischer* | Wisconsin DNR |
| Kraig Hoff* | Wisconsin DNR |
| Deanne Drake* | Wisconsin DNR |
| Gina LaLiberte* | Wisconsin DNR |
| Marcia Willhite* | Wisconsin DNR |
| Linda Holst* | USEPA, Region 5 |
| Meghan Hemken* | USEPA, Region 5 |
| Paul Proto* | USEPA, Region 5 |
| Amy Shields* | USEPA, Region 7 |
| Laura Webb* | USEPA, Region7 |
| Leo Keller | USACE, Rock Island District |
| Kelly Warner | USGS, Illinois Water Science Center |
| KathiJo Jankowski* | USGS, Upper Midwest Environmental Sciences Center |
| Jeff Houser* | USGS, Upper Midwest Environmental Sciences Center |
| Greg Youngstrom* | ORSANCO |
| Reid Christianson | Center for Watershed Protection |
| Laurie Nowatzke | Iowa State University |
| Susan Heathcote | Iowa Environmental Council/Mississippi River Collaborative |
| Jennifer Terry | Des Moines Water Works |
| Ted Kratschsmer* | National Great Rivers Research and Education Center |
| John Sloan* | National Great Rivers Research and Education Center |
| Dave Hokanson | UMRBA |
| Matt Jacobson | UMRBA |

*Joined the meeting by phone.

Call to Order and Introductions

The Water Quality Task Force (WQTF) was called to order at 2:12 p.m. on February 21, 2017 by Chair Brian Weigel. Introductions by all participants followed.

Approval of Previous Meeting Summary

John Olson identified two grammatical errors, on pages A-5 and A-12, of the September 20-21, 2016 meeting summary. With these corrections to be made, Mohsen Dkhili moved that the summary be approved. Gregg Good seconded and the motion was approved by voice vote.

Lake Pepin TMDL

Justin Watkins provided an overview and status update regarding the Lake Pepin TMDL. Watkins began his presentation by thanking the many individuals who had previously worked on the TMDL, as well as current members of the TMDL team. He then provided a geographic description of both Lake Pepin itself as well as the Lake Pepin watershed, which covers 54% of the state of Minnesota. Watkins also noted the two primary designated uses assigned to Lake Pepin – aquatic life and recreation uses.

Watkins next described the site-specific criteria which have been developed for Lake Pepin, noting that work on Lake Pepin TMDL had been put on hold temporarily while these site-specific water quality standards were in promulgation. The site-specific standards had been adopted and work on the TMDL resumed in 2015. Watkins added that the site-specific standards are applicable to a larger portion of the river than Lake Pepin alone, and that in August 2015 these rules were declared valid in a court decision. Watkins explained that the site-specific standards include the establishment of total phosphorus (TP) and chlorophyll-a (chl-a) criteria, which vary by location on the river, by pool and for Lake Pepin itself. He also showed a comparison of the site-specific criteria to data from the 2005-2014 period, which in many cases demonstrated results that did not meet the criteria.

Watkins said the water quality model underlying the Lake Pepin TMDL was built by LimnoTech in 2009 and is still considered valid by all parties involved in the TMDL. As such, it will continue to be employed in Lake Pepin TMDL work. He explained that the model was used to calculate phosphorus load reductions in the major basins feeding Lake Pepin. Calculated reductions include the following:

- 50% reduction in the Minnesota River
- 20% in each the Mississippi and St. Croix Rivers
- 50% in the Cannon River

He noted that the model “baseline” was the modeling period of 1985-2006.

Watkins said MPCA is currently planning that a draft TMDL would be available for public comment later in the spring of 2017, after internal preparation and review, as well as preliminary review by USEPA.

Watkins also described how the Lake Pepin TMDL is connected to a number of other initiatives ongoing in Minnesota, including the Minnesota River total suspended solids (TSS) TMDL, the statewide buffer initiative, TMDLs in the Cannon and Root watersheds, new Conservation Reserve Program (CRP) funding in southwest Minnesota, and the state’s nutrient reduction strategy as a whole.

Watkins explained that, in terms of point sources, many of the waste load allocations (WLAs) likely to be made under the Lake Pepin TMDL are already in draft and in some cases have already been integrated into permits for point source dischargers. He said that of the roughly 33% reduction observed to date in phosphorus, approximately 2/3 of this can be attributed to point source reductions. Dana Vanderbosch added that the Metropolitan Council had been a leader in making phosphorus reductions.

Watkins noted that an additional tool being considered to improve water quality and the ecosystem in Lake Pepin is island construction. Potential benefits could include: 1) increasing aquatic vegetation 2) restoring depth diversity, and 3) reducing suspended sediments. He said the Lake Pepin Legacy Alliance is coordinating efforts in this regard with a potential schedule to include a feasibility study this year; with possible construction in the upper portion of Lake Pepin in spring 2018 at a cost of approximately \$10 million.

Shawn Giblin said there are definitely numerous benefits to island construction, though he cautioned that in regard to suspended sediments the impact on aquatic life outcomes may be limited as the concentrations of TSS in Lake Pepin are not very close to a “tipping point” value which would be associated with improvements in biological communities. He added that response might be potentially better in backwaters. Watkins said this kind of input would be beneficial to bring to the discussion of island building in Lake Pepin.

Good asked whether efforts to wrap up the TMDL would mean that WLAs would be assigned to point source dischargers. Watkins said this is correct, and outreach to affected entities would be part of the process. Regarding dischargers who had already moved forward in keeping with WLAs, Brian Weigel asked if some of these had reduced to 1 mg/L of phosphorus. Vanderbosch said the specifics would need to be assembled, but in general many of them are below 1 mg/L. Watkins added that some of the largest facilities are down to 0.3 mg/L while other major dischargers are at 0.8 mg/L. Weigel said Wisconsin also has some dischargers already below 1 mg/L and in some cases a TMDL actually sets out a higher level than what is already being achieved. Watkins concurred, saying a number of the point source dischargers likely to be impacted by the Lake Pepin TMDL have already achieved what are likely to be the target reductions under the TMDL.

Giblin asked whether any challenges are seen to Minnesota’s continued implementation of its water quality initiatives. Vanderbosch answered that Legacy funding to a certain extent helps ensure continuity in some of these initiatives, though some dischargers may challenge permit limits and there may be modifications to the buffer program.

Des Moines Water Works Update

Jennifer Terry provided a presentation regarding Des Moines Water Works’ (DMWW) efforts in regard to protecting and improving water quality in the Raccoon River watershed in Iowa, which is the primary water supply source for Des Moines. She noted that DMWW provides water not only to the city of Des Moines, but also to a number of surrounding communities and as such does not have a strictly urban customer base. Terry also emphasized DMWW’s role in protecting public health and described the role of DMWW’s lab in carrying out analyses both for Safe Drinking Water Act (SDWA) purposes, as well as additional analyses such as those for cyanobacteria and algal toxins.

Terry explained that DMWW primarily takes water from a gallery infiltration system along the Raccoon River, but will also draw directly from the Raccoon River and the Des Moines River if needed to meet demand.

Terry next described the multiple challenges regarding water quality in the Raccoon River watershed. These include confined animal feeding operations (CAFOs) and artificial drainage (i.e., tile drainage) throughout a large portion of the watershed. She said these multiple challenges create a very unique set of circumstances for DMWW, with nitrate being a primary water quality concern. Terry displayed graphs indicating increases in both nitrate concentrations and total nitrate loading in the Raccoon River in recent years. She described the operation of Des Moines’ nitrate removal system, its annual costs, and anticipated costs of denitrification system upgrades. However, she also emphasized that there are water quality challenges statewide in Iowa, citing the number of waterways identified as impaired in 2015, and issues beyond nitrate such as the algal blooms which have led to numerous beach closures in Iowa.

Terry said DMWW has engaged in a number of collaborative, water quality-focused efforts in the past. However, she said there have been a number of roadblocks in achieving improved water quality via collaborative, voluntary means. Therefore, Terry explained, DMWW has also sought to pursue other mechanisms of improving water quality and upholding “basic standards of care” in a watershed approach. One of these other tracks has been the filing of a lawsuit by DMWW with the intent of responding to increasing nitrate concentrations by addressing nitrate input from artificial drainage systems.

Terry explained that the lawsuit’s complaint seeks to declare the drainage districts named in the suit as “point sources,” not exempt from regulation, and required to have a permit under federal and Iowa law, just as any other business that discharges in the waters of Iowa. Further, the complaint states that the drainage districts have violated and continue to be in violation of the Clean Water Act and Chapter 455B, Code of Iowa, and demands the drainage districts take all necessary actions, including ceasing all discharges of nitrate that are not authorized by a National Pollutant Discharge Elimination System (NPDES) permit. She explained that the suit can be separated into state and federal pieces, and that the state piece is no longer going forward as the Iowa State Supreme Court in January 2017 dismissed all claims under Iowa Law. However, Terry said the federal component of the case, involving permit requirements was still active as of the time of the meeting.

Beyond the lawsuit, Terry said DMWW is also advocating for the creation of a Watershed Management Authority (WMA) for the Raccoon Rive, which would be the largest WMA in the state. Further, DMWW would like to see that an adequate, sustained funding mechanism to clean up Iowa water is created and that drainage districts are given specific and explicit authority *not* to pollute.

Good observed that in Illinois fertilizer sales have leveled off, but widespread use of artificial drainage is a significant factor in the loss of nutrients into waterbodies. Terry concurred, saying the combination of monocultures and artificial drainage continue to contribute to nutrient losses.

Kelly Warner asked whether DMWW has a specific role in the Iowa Watershed Approach, which will be implemented using a grant from the Department of Housing and Urban Development (HUD). Terry said DMWW does not have a direct role, but that a WMA is being created for the North Raccoon River as part of the effort.

Watkins asked to what extent livestock operations are seen as important impacts to water quality in the Raccoon River. Terry answered that some impacts likely occur, but they are not seen as the predominant factor as compared to crop production and as such livestock has not been a major focus of discussion to date.

Good asked that if DMWW’s lawsuit is successful, and permits would be required, who would be the permit holder? Terry answered that this is to be determined, but that it would likely be the drainage district. Matt Short asked whether these districts have taxing authority and Terry indicated that they do have this authority. She added that not all agricultural producers are in opposition to DMWW’s work and that polling indicates 62% of Iowans support what DMWW is trying to achieve, adding that is not clear there is support in Iowa’s Legislature.

Heathcote said one important piece to keep in mind regarding Iowa’s water quality is the economic development angle – that is, the impact that water quality degradation has on such sectors as recreation and water supply. She emphasized that there are many opportunities for improvement including but not limited to the lawsuit. Terry concurred, saying the scope of the endeavor is large, but that it is important to get started moving forward.

Minnesota-Wisconsin Pilot Monitoring Update

Joel Chirhart said all macroinvertebrate data has been received from the lab and work is ongoing to generate scores using the Wisconsin IBI and establish a threshold value to use in the provisional assessment. Giblin commented that chemistry sampling is proceeding as planned and will be completed in April.

Weigel asked whether TSS was ultimately included in the provisional assessment methodology. Hokanson replied that TSS is included, though the primary assessment method for aquatic life is the dual assessment using fish and macroinvertebrates. He noted that vegetation and TSS are incorporated as supplemental assessment tools to provide further information beyond the primary dual assemblage assessment.

Hokanson said the pilot monitoring group held a call in mid-January and at that time targeted that draft reports for the pilot project should be available for the June meeting of the Water Quality Executive Committee and Water Quality Task Force. Hokanson explained that there likely two reports to be produced, one which evaluates the success and “do-ability” of the pilot project and UMR CWA monitoring, as well as a second report which describes water quality condition per the procedures set out in the provisional CWA assessment methodology for the UMR.

Vandersbosch emphasized that it will be important in presenting condition results to distinguish that these are not 303(d) listing or even a 305(b) assessment, but more of a preliminary general condition assessment. Hokanson concurred, saying there would definitely be language to this effect incorporated into the report.

Interstate 305(b) and 303(d) Consultation

Missouri

Dkhili reported Missouri’s 2016 impairment list was approved by USEPA in October 2016, and there are no changes from the 2014 to 2016 listings. As such, the 2014 and 2016 listings for the UMR are identical, as shown in the tabular summary in the meeting packet.

Illinois

Good said the listings given in the packet are accurate in terms of identified impairments and status of approval. He noted that Illinois EPA had lost its integrated report coordinator, which may impact listing process, though work on the 2018 list is expected to commence soon. Matt Short noted that new fecal coliform-related listings for 2016 are due to new data, and that data can be fairly dynamic from cycle to cycle.

Iowa

John Olson said Iowa’s 2016 impairment listings are currently under review at USEPA Region 7, though the listings shown in the packet are correct at present. He said the new PCB-related impairment in Reach 7 results from USEPA sampling of large carp for fish tissue analysis in this area of the river. Olson explained that fish consumption advisory for this area has also been put into place alongside the impairment. Additionally, an indicator bacteria impairment was added in Reach 7 to match Illinois’ fecal coliform impairment of the same reach.

Kelly Warner asked why Iowa does not, in most cases, have a fish consumption use listing for PCBs comparable to those for Wisconsin and Illinois on the same reaches. Olson explained that this is in part due to different methodologies employed by the states, where Illinois and Wisconsin utilize the Great Lakes protocol and Iowa follows the USEPA Region 7 protocol for fish tissue analysis.

Minnesota

Dana Vanderbosch said completion of Minnesota's 2016 list was slowed somewhat by database issues, but that the list had been submitted to USEPA in December 2016. She added that Minnesota is also still awaiting approval of its 2014 list by USEPA. Short asked whether Minnesota's new database is ATTAINS or whether it maintains its own in-house database. Vanderbosch replied that it is an in-house database. Olson observed that Iowa also developed an in-house database which in part is intended to aid reporting to ATTAINS.

Wisconsin

Weigel said the packet materials are also correct in terms of Wisconsin's listings. He noted that approval of Wisconsin's 2016 list is still pending, due to a contested case holding up approval. Weigel said Wisconsin has also been working on data flows as related to WQX. Olson asked how successful this endeavor had been to date. Weigel replied that Wisconsin is seeking to meet requirements, at minimum, but a high degree of complexity is involved. Olson said Iowa would be very interested in any success Wisconsin has had in the automation of data processing. Weigel replied that Wisconsin would certainly plan to keep Iowa updated in this regard.

TMDLs on the Mainstem UMR and Major Tributaries

Wisconsin

Weigel noted the TMDL for the Wisconsin River, pointing out that the portion of the Wisconsin River Basin addressed by the TMDL covers approximately 9,000 square miles.

Minnesota

Aside from the Lake Pepin TMDL, which was discussed earlier in the meeting, Vanderbosch noted that the Minnesota River TMDL has been a leading area of effort in an attempt to address sediment loading. She said a draft Minnesota River TMDL is expected in May 2017. Further, she noted that the metro Mississippi River TSS TMDL had also recently been approved.

Iowa

Olson said he did not have any new activity report on TMDLS since the last meeting. While not river-related, Olson mentioned that Iowa is looking at TMDL approaches for situations where the shore conditions on lakes are very different from that of the lake as a whole. Dan Kendall said this has included monitoring of parameters such as indicator bacteria and microcystin both at the beach as well as in deeper waters. Giblin asked whether Iowa is doing any phytoplankton enumeration as part of this work. Kendall responded that some enumeration is being conducted.

Illinois

Good said Illinois is looking at the possibility of a TMDL to address the atrazine impairment on UMR Reach 8, which is an impairment of the drinking water use. Weigel asked how Illinois envisioned implementing a TMDL which is tied to nonpoint source(s) of pollution. Good said a separate, non-regulatory implementation plan is anticipated.

Missouri

Dkhili said Missouri has several bacteria TMDLs in progress on UMR tributaries in the St. Louis area.

Other Agency/Partner Reports

Minnesota

Vanderbosch highlighted the recent fact sheet formatted report regarding the Mississippi River in Minnesota, entitled “What to Protect, What to Fix.” She said the intent of this document is to create a report very much geared to the general public. In the development of this document, Vanderbosch explained that scientists were involved though ultimately decisions regarding content were made by MPCA’s communications team. She also said there is no ‘full,’ or longer report behind this document. Rather, the underlying data and information will be made available in a variety of formats as requested.

Vanderbosch said one important message this reports seeks emphasize is in regard to protection in the river’s upper reaches. She said this can be a potentially challenging message to get out as the river is in relatively good shape in this area, but there are needs to ensure that condition is protected going forward. She also noted that Governor Dayton’s most recent Water Summit was held in northwest Minnesota, where the conversion of timber stands to potato farming has placed increase pressure on water quality in this area.

Noting that this report extends from the headwaters to the Twin Cities, Weigel asked if there are plans to create a similar report for the remainder of the Mississippi River below the Twin Cities. Vanderbosch replied that the next report of this type will be for the Minnesota River, but that eventually a report will cover this lower portion of the Mississippi River within Minnesota. Giblin asked how MPCA staffs communications efforts such as this. Vanderbosch responded that MPCA has a dedicated section which focuses solely on communication work.

USGS

Kelly Warner said USGS is looking at developing a Mississippi River basin-wide initiative to foster science collaboration. She said this could include targeting some cooperative funds and resources towards projects on the Mississippi River. Warner indicated more information about this initiative should be available for discussion at future meetings.

Wisconsin

Weigel said Wisconsin’s discharger variance for phosphorus had recently been approved. He explained that this incorporates median household income as a factor considered in granting the variance, with the intent being to allow some regulatory relief for smaller communities. However, it does include a 20-year schedule for compliance and investment in nonpoint source pollution projects, as well as incremental reductions in discharge concentration. Dkhili said it is still then tied to a permit cycle. Weigel concurred that this is correct.

Giblin asked whether any steps have been taken to bring spill prevention discussion into UMRBA venues. Hokanson replied that the UMRBA Board had discussed this in its November 2016 strategic planning session, and that it concurs this topic should be addressed going forward.

Missouri

Dkhili said Missouri has a new DNR Director, Carol Comer, who previously served as the Commissioner of the Indiana Department of Environmental Management.

The meeting adjourned for the day at 5:30 p.m. and reconvened at 8:07 a.m. on February 22, 2107.

Wrap Up of Day 1 Discussion

Susan Heathcote noted that the Iowa Environmental Council had recently completed a report regarding nitrate in drinking water entitled *Nitrate in Drinking Water: A Public Health Concern for All Iowans*. She said the report is available at IEC's website (<http://www.iaenvironment.org/>).

Harmful Algal Blooms

USEPA Region 7 HAB Workshop

Amy Shield gave a summary of the HAB workshop hosted by USEPA Region 7 on February 15-16, 2017. Diane Moles thanked Shields for organizing the workshop, saying it was an excellent opportunity to exchange information. Weigel asked whether the workshop was able to explore modeling and predictive capacities in regard to algal blooms. Shields responded that this was addressed to a certain extent via discussion of satellite monitoring capabilities and historic distribution of HABs.

Weigel further asked, in terms of lessons learned from hosting the workshop, if there were any recommendations Shields might have for a future workshop. Shield said she'd recommend spending a bit more time delineating the impacts of HABs in a variety of sectors, including the ecosystem, agriculture, human health, and drinking water treatment. She also said it would be beneficial to more deeply explore the circumstances that contribute to the presence of algal toxins, since there are situations where cyanobacteria are present, but toxins are not produced.

USEPA Draft Recreational Criteria for Cyanotoxins

Meghan Hemken provided an overview of the draft criteria recently released by USEPA. She explained that USEPA developed draft values that can be used as CWA Section 304(a) recreational criteria *or* swimming advisories for microcystins and cylindrospermopsin.

Hemken said USEPA reviewed the state of the science describing the human health effects from exposure to cyanobacteria and the toxins microcystins and cylindrospermopsin during recreation. Ultimately, the agency chose to focus on human exposure as a result of primary contact recreation activities such as swimming where immersion and incidental ingestion of ambient water are likely, though dermal and inhalation exposures associated with primary contact recreation were also evaluated. However, it was determined that significant absorption via dermal exposure is not expected due to the large size and charged nature of these molecules and that inhalation is likely negligible compared to incidental ingestion while recreating. Hemken also noted that consumption of fish and shellfish were not considered as part of the exposure scenario used to develop the criteria.

Hemken presented the draft criteria as summarized in the following table:

| Application | Draft Recreational Advisory Values | |
|------------------------------------|--|--------------------|
| | Microcystins | Cylindrospermopsin |
| | 4 µg/L | 8 µg/L |
| <i>Swimming Advisory</i> | Not to be exceeded on any day. | |
| <i>Recreational Water Criteria</i> | Not to be exceeded more than 10 percent of days per recreational season up to one calendar year. | |

Hemken also described steps in the criteria finalization process as follows:

- Draft AWQC/Swimming Advisory was published 12/19/16.
- In response to multiple requests, the 60-day public comment period was extended by 30 days and now ends 3/20/17. 12 comments have been received to date.
- Next step is to revise criteria based on comments received with the goal of publishing a final document by the beginning of the 2017 recreation season.

Hokanson thanked Hemken for her presentation and for kicking off the discussion related to the draft criteria. He next invited Marcia Willhite to offer perspectives as informed by her participation in the Association of Clean Water Administrators (ACWA) as it has engaged with USEPA regarding the draft criteria. Willhite said there is some concern among states that they will be compelled to adopt the proposed values as criteria, and as such the “either/or” approach described by USEPA in releasing the draft criteria (that is, states could use as either criteria or advisory) is not really a realistic. She said an ACWA survey indicated the states’ preference to have an advisory only, but as proposed it is likely to become a de facto criteria for all the states.

Willhite said the states also see the use of a toxin level as a criteria as problematic, since a toxin is not a pollutant in the traditional sense and is not amenable to being addressed via a TMDL. Willhite added another ongoing challenge is to develop an appropriate monitoring program for toxins, as algal bloom monitoring is not necessarily amenable to a traditional monitoring approach and it is challenging to design an effective surveillance program. Additionally, there are questions about how notification would be implemented, particularly in cases where only a portion of the waterbody appears to be affected. Willhite said a further, important component will be working with state and local health department as the criteria/advisory moves forward, so that efforts are coordinated and consistent.

Good asked whether the 20,000 cells/ml count is also considered to be part of the draft criteria. Hemken replied this is not considered to be part of criteria per se, though the 20,000 cell/mL count is associated with the development of the 4 µg/L levels for microcystins, as described in the criteria development document.

Giblin said he understood that fish and shellfish concentrations were not considered in the development of this particular criteria, but asked whether USEPA is considering a means to incorporate this pathway of exposure. Hemken said that currently not enough data is available to pursue potential criteria development. Giblin said some of Wisconsin’s laboratory staff has raised concerns regarding the potential presence of toxins in fish tissue. Good said this issue has also come up in Illinois.

ORSANCO/Ohio River Update

Greg Youngstrom provided an update on ORSANCO’s ongoing work to investigate and understand the large-scale bloom that occurred on the Ohio River in 2015. He said a white paper on lessons learned is expected to be released next week and would share this with the WQTF when it becomes available. He also noted that ORSANCO has submitted a grant application in collaboration with Northern Kentucky University to better develop predictive capacity related to HABs. Youngstrom said ORSANCO has also developed an HAB research collaborative in coordination with USEPA-ORD along with several universities in the region. He suggested that developing a research collaborative might also be something for UMRBA to pursue in the UMR basin.

Youngstrom next presented a number of graphs illustrating the levels of various water quality parameters during the 2015 bloom. He noted that bloom conditions were present even though total phosphorus concentrations were below 100 µg/L. Youngstrom also said there appears to be some

correlation between temperatures above 80 degrees and the presence of blooms, although the relationship is not particularly definitive and this is still lower than temperature criteria for the river. In terms of flow, he said lower flow conditions were indeed present during the bloom, but again the relationship is not completely definitive as there were also areas of low flow where blooms did not appear. Additionally, when turbidity levels dropped, blooms became more predominant. Lastly, Youngstrom mentioned that higher than usual precipitation had occurred early in 2015 and was then followed by a much drier period. In terms of further data analysis, he said ORSANCO has applied for applied for a Regional Applied Research Effort (RARE) grant to support additional investigation.

Youngstrom offered the following conclusions regarding the 2015 Ohio River bloom:

- There is no “smoking gun” that definitively explains the bloom.
- A leading hypothesis is that unusual June/July rainfall and consequent flow pattern disrupted the normal algal community. August drought conditions then favored cyanobacteria.
- The leading hypothesis may give some predictive ability even if it isn’t definitive on the cause (i.e. here are the conditions that allowed it to start)
- Further analysis (hopefully via USEPA RARE grant) might provide more answers.

Youngstrom then described ORSANCO’s further HAB-related activities subsequent to the 2015 bloom as follows:

- An improved the HAB Response and Communications Plan
- Improved bloom detection, including:
 - Satellite imagery
 - Datasondes at Pike Island L&D (Wheeling) and Meldahl L&D (Cincinnati)
 - Improved communications with L&D operators, water plants
 - New laboratory capabilities at ORSANCO including ELISA and microscopy
- Numerous HAB-related investigations on both the Ohio mainstem and tributaries, though in general there were comparatively few issues on the Ohio River in 2016

John Sloan asked whether satellite imagery has proven useful in regard to HABs on the Ohio River. Youngstrom replied that cloud cover has been the biggest issue in regard to the use of satellite imagery. He added that resolution is also an issue, but not to the same extent as cloud cover. John Olson observed that one takeaway from ORSANCO’s work regarding the 2015 bloom is that it was not driven by nutrient levels alone, that interaction of factors appeared to be in play. Youngstrom concurred, noting that clarity was clearly also a contributor, as ORSANCO was getting 7 foot Secchi depth readings during the same period as the bloom occurred.

Illinois EPA Large River Monitoring Program for Microcystin

Gregg Good gave an overview of Illinois EPA monitoring locations for microcystin on the Illinois, Ohio, and Mississippi Rivers, a total of 15 sites. He said this represents an expansion of previous monitoring, and that each of the sites is sampled either 4 or 9 times per year during a June to October sampling period. Good explained that this monitoring project is an ambient surveillance program which runs in addition to response-based monitoring.

Weigel asked how Illinois EPA intends to use this data. Good responded that some of this is to be determined, noting that for lake monitoring, results of similar monitoring are typically shared with lake

associations but there is not necessarily an analogous user group for the rivers. He added that this monitoring is not intended for use in the issuing of beach advisories. Matt Short added that the monitoring is being done in part to provide information about what a surveillance program might look like. Giblin asked whether enumeration will be part of the analyses. Good said this is not part of the initial scope, but Illinois EPA has some capacity in place to do enumeration if desired. Warner asked if monitoring included near-bank samples. Short replied that some will be collected at lock and dam structures while others will be from the main channel.

Olson said Iowa has been doing some limited cyanotoxin monitoring in inland waters and at drinking water intakes. Terry said DMWW would be interested in engaging in monitoring and in sharing data. Giblin said Wisconsin DNR has proposed microcystin and cylindrospermopsin monitoring in UMR Pools 4 and 8 during 2017, though approval/funding for this project is still pending. Warner observed it may be beneficial to include some upstream/tributary monitoring along with the pool-based monitoring.

Giblin asked whether Minnesota is doing any routine monitoring for HABs or cyanotoxins. Pam Anderson responded that Minnesota's program is strictly response-based, as the state has far too many waterbodies to do a surveillance program. She added that most of Minnesota's monitoring is focused on lakes, as opposed to rivers, though the Minnesota Department of Health (MDH) did conduct monitoring and public water supply intakes in the past year. Diane Moles describes Iowa's project working with public water supplies, noting that this includes two intakes utilizing the Mississippi River.

UMR HAB Work Group

Hokanson said the UMR HAB Work Group had previously agreed to hold three conference calls per year, with today's discussion representing the group's "pre-season" call. He asked whether there were any suggestions for further Work Group activity based on the discussion today. Sloan said there may be value in pursuing the research collaborative idea suggested by Youngstrom. Gina LaLiberte concurred, saying it may be a beneficial way of bringing more potential collaborators together and bring additional capacities together. As an example, she said it may be beneficial to look at genetic makeup of cyanobacteria, but that this level of research might require capacities beyond what is currently available in the Work Group.

Nutrient Loss Reduction Activities

White Paper: Upper Mississippi River Nutrient (Loss) Reduction Strategies

Reid Christianson of the Center for Watershed Protection (CWP) gave a presentation summarize CWP's white paper comparing nutrient loss reduction strategies in three Upper Mississippi River states. Christianson began with an overview of CWP, noting that it is a nonprofit organization focused on the following activities: 1) distilling research into practical tools, 2) provide local watershed services, and 3) train others to manage watersheds. He also explained that CWP worked with the Walton Family Foundation on the white paper he'll be discussing as the Upper Mississippi is a priority area for Walton.

Christianson introduced the white paper by making a few high-level observations regarding the three state strategies addressed in the paper:

- Iowa Nutrient Reduction Strategy
 - First published strategy
 - Focused on Major Land Resource Areas (MLRAs)
- Minnesota Nutrient Reduction Strategy
 - Splits priorities due to multiple drainage basins
 - Focuses on watershed specific plans

- Illinois Nutrient Loss Reduction Strategy
 - Newest of the three examined
 - Utilizes components of both Iowa and Minnesota strategies
 - Identifies priority watersheds for nitrate and phosphorus reduction

Christianson then showed word clouds developed from the text of each strategy, and discussed the relative emphases of each strategy indicated by these word clouds. He then presented a graph illustrating land use in each of the states, and described how land use is clearly reflected in each state's strategy.

Christianson next walked through a series of figures illustrating how each state's science assessment categorized the relative contribution of various practices to nutrient reduction. He said the states were in rough agreement about the contributions of wetlands, perennial energy crops, and buffers to nutrient reduction. However, he observed there was less concurrence on the benefits of cover crops, bioreactors, nitrogen management/reduction, maximum return to nitrogen, and soil test phosphorus.

In summarizing findings of science assessments across states, Christianson displayed graphs of the anticipated reductions from various practices as calculated by the three states. He also noted that the following research gaps emerged from the inter-state comparison:

- Cover crop seeding method
- Phosphorus removal for wetlands
- Controlled drainage in Illinois
- Bioreactor design
- Ancillary benefits (i.e. soil health)
- BMPs in series (i.e. cover crops and bioreactors)
- River/stream BMPs
- Regional or global economic impacts

Warner asked whether the information regarding comparison of practice efficacy can be found within the state strategies or if they are housed in different documents. Christianson said for Illinois and Minnesota, the information is found in a separate science assessment, while in Iowa it is included directly in the state strategy.

Good asked why these three states were selected, as opposed to all five UMR states. Christianson said these were the three states with science assessments that delved into practice effectiveness and as such they were of greatest interest to the Walton Family Foundation in determining what practices seem to hold the most promise in reducing nutrient loss.

Warner said she was surprised that cover crops were not shown to be more effective in the states' assessments. Christianson agreed this was a bit surprising and indicated that some of the data incorporated into the science assessments might be a bit dated and newer information from recent cover crop research could potentially show greater effectiveness.

Weigel asked whether, based on his research, Christianson would make any recommendations to the states regarding their nutrient reduction strategies. Christianson said he would suggest states endeavor to track their progress, including the adoption of practices and the measurement of the outcomes that result. Weigel asked whether Christianson felt the states should make greater efforts to incorporate concepts emphasized by NRCS such as soil health into their strategies. Christianson replied this would be helpful, but perhaps the greatest need is to document the linkages between practice implementation and outcomes. Weigel agreed, but said it can be challenging to measure, or model, the impacts from a whole-farm conversion to a suite of conservation practices.

Tracking Conservation Practice Adoption in Iowa

Laurie Nowatzke gave an overview of Iowa's efforts to track the implementation of conservation practices. She began by noting the nutrient reduction goals listed in the Iowa Nutrient Reduction Strategy and emphasized the importance of being able to measure progress toward those goals. Nowatzke then described how, in terms of categorizing practices there are a lot of options for conservation on farmland, many of which are funded through state and federal programs. For the purposes of categorization in this effort, they are considered in three groups: in-field nutrient management, edge-of-field practices and erosion control, and land-use.

Nowatzke described the data sources that are anticipated to be used in Iowa's effort. These include both currently available data sources from state and federal cost share programs and anticipated sources including private co-ops surveys of practices and the Iowa State University/Iowa DNR BMP mapping project. She added that the currently available data sets from state and federal-funded programs were not really set up with tracking in mind, rather they are primarily administrative data sets with some restrictions on their use. As such, they are somewhat limited in their usefulness.

She noted that traditional data based on cost share programs does not capture the full extent of practices employed, so this project will seek to measure implementation beyond cost share programs. Of these practices, she said edge of field practices may prove the most difficult to capture. This project, Nowatzke explained, will use multiple techniques and sources of data, including LiDAR, to provide a more complete picture of conservation practice adoption, as well as water quality outcomes.

Heathcote asked whether there will be new water quality monitoring conducted as part of the effort. Nowatzke said it will primarily rely on existing data, but that data will be correlated to practice adoption in a watershed. Good asked whether this would primarily be focused on chemistry monitoring and Nowatzke concurred it would be chemistry-focused.

Giblin asked whether any social science components would be part of the effort. Nowatzke said social science is definitely being integrated, including results from every four year farmer surveys. She explained that these surveys would be conducted in both priority and non-priority watersheds and would look at the relationships between knowledge, attitudes, and behavior.

Weigel asked when the results of LiDAR review might be available. Nowatzke replied this may be available in approximately one year. Weigel thanked Nowatzke for her presentation and said the WQTF would be interested in hearing more on this work once results have emerged further.

Next Meeting

Hokanson said the next meeting of the WQTF would be a joint session with the UMRBA Water Quality Executive Committee (WQEC). He noted that previous feedback from the WQEC indicated that June 7-8, 2017 would be a preferred meeting date and that the meeting would likely be in the Quad Cities or Dubuque.

With no further business, the meeting adjourned at 12:03 p.m.