

**Minutes of the 160th Quarterly Meeting
of the
Upper Mississippi River Basin Association**

**November 16, 2021
Web-Based Conference Meeting**

Dru Buntin called the meeting to order at 8:00 a.m. Participants were as follows:

UMRBA Representatives and Alternates:

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| Rick Pohlman | Illinois Department of Natural Resources |
| Chad Craycraft | Illinois Department of Natural Resources |
| Dave Glover | Illinois Department of Natural Resources |
| Loren Wobig | Illinois Department of Natural Resources |
| Tim Hall | Iowa Department of Natural Resources |
| Jake Hansen | Iowa Department of Agriculture and Land Stewardship |
| Sam Hiscocks | Iowa Department of Transportation |
| Barb Naramore | Minnesota Department of Natural Resources |
| Katrina Kessler | Minnesota Pollution Control Agency |
| Dru Buntin | Missouri Department of Natural Resources |
| Jennifer Hoggatt | Missouri Department of Natural Resource |
| Chris Klenklen | Missouri Department of Agriculture |
| Matt Vitello | Missouri Department of Conservation |
| Cheryl Ball | Missouri Department of Transportation |
| Steve Galarneau | Wisconsin Department of Natural Resources |
| Jim Fischer | Wisconsin Department of Natural Resources |

Federal UMRBA Liaisons:

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| Brian Chewning | U.S. Army Corps of Engineers, MVD |
| Branden Villalona | U.S. Department of Transportation, MARAD |
| Ken Westlake | U.S. Environmental Protection Agency, Region 5 |
| Sabrina Chandler | U.S. Fish and Wildlife Service, UMR Refuges |
| Mark Gaikowski | U.S. Geological Survey, UMESC |

Others in Attendance:

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| Randy Schultz | Iowa Department of Natural Resources |
| Megan Moore | Minnesota Department of Natural Resources |
| Patrick Phenow | Minnesota Department of Transportation |
| Chris Wieberg | Missouri Department of Natural Resources |
| John Hoke | Missouri Department of Natural Resources |
| Sara Walling | Wisconsin Department of Agriculture, Trade, and Consumer Protection |
| Greg Searle | Wisconsin Department of Natural Resources |
| Mike Halsted | Wisconsin Department of Transportation |

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| Jim Cole | U.S. Army Corps of Engineers, MVD |
| Leanne Riggs | U.S. Army Corps of Engineers, MVD |
| Ben Robinson | U.S. Army Corps of Engineers, MVD |
| Thatch Shepard | U.S. Army Corps of Engineers, MVD |
| James Lewis | U.S. Army Corps of Engineers, MVD |
| Ben Robinson | U.S. Army Corps of Engineers, MVD |
| Angela Deen | U.S. Army Corps of Engineers, MVP |
| Steve Tapp | U.S. Army Corps of Engineers, MVP |
| Chris Erickson | U.S. Army Corps of Engineers, MVP |
| Dave Potter | U.S. Army Corps of Engineers, MVP |
| Andrew Goodall | U.S. Army Corps of Engineers, MVR |
| Karen Hagerty | U.S. Army Corps of Engineers, MVR |
| Marshall Plumley | U.S. Army Corps of Engineers, MVR |
| Rachel Hawes | U.S. Army Corps of Engineers, MVR |
| Roger Perk | U.S. Army Corps of Engineers, MVR |
| Chuck Theiling | U.S. Army Corps of Engineers, MVR |
| Davi Michl | U.S. Army Corps of Engineers, MVR |
| Jodi Creswell | U.S. Army Corps of Engineers, MVR |
| Megan Medinger | U.S. Army Corps of Engineers, MVR |
| Jasen Brown | U.S. Army Corps of Engineers, MVS |
| Brian Markert | U.S. Army Corps of Engineers, MVS |
| Shawn Sullivan | U.S. Army Corps of Engineers, MVS |
| Sharon Sartor | U.S. Army Corps of Engineers, Headquarters |
| Kraig McPeek | U.S. Fish and Wildlife Service, Illinois-Iowa Ecological Services |
| Sara Schmuecker | U.S. Fish and Wildlife Service, Illinois-Iowa Ecological Services |
| Matt Mangan | U.S. Fish and Wildlife Service, Illinois Ecological Services |
| Tim Yager | U.S. Fish and Wildlife Service, Winona |
| Jim Duncker | U.S. Geological Survey, Central Midwest Water Science Center |
| JC Nelson | U.S. Geological Survey, Midcontinent Region |
| Kristen Bouska | U.S. Geological Survey, UMESC |
| Jennie Sauer | U.S. Geological Survey, UMESC |
| Jeff Houser | U.S. Geological Survey, UMESC |
| Jennifer Dieck | U.S. Geological Survey, UMESC |
| Jayme Strange | U.S. Geological Survey, UMESC |
| Nate De Jager | U.S. Geological Survey, UMESC |
| Mike Welvaert | National Oceanic and Atmospheric Administration, NWS |
| Tom Streight | Alter River Terminals |
| Olivia Dorothy | American Rivers |
| Kim Lutz | America's Watershed Initiative |
| Nat Miller | Audubon |
| Bob Gallagher | City of Bettendorf, Iowa Mayor |
| Jennifer Kissel | City of Bettendorf, Iowa |
| Phil Stang | City of Kimmswick, Missouri Mayor |
| Eileen McLellan | Environmental Defense Fund |
| Carolyn Mahlum-Jenkins | League of Women Voters/Naiad Consulting |
| Doug Daigle | Lower Mississippi River Sub-Basin Committee (Hypoxia Task Force) |
| Colin Wellenkamp | Mississippi River Cities and Towns Initiative |
| Brandt Thorington | Mississippi River Cities and Towns Initiative |
| Maisah Khan | Mississippi River Network |

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| Eileen McLellan | Mississippi River Network |
| Gretchen Benjamin | The Nature Conservancy |
| Liz Crow | The Nature Conservancy |
| Heidi Mehl | The Nature Conservancy |
| Tom Boland | Wood |
| Kirsten Wallace | Upper Mississippi River Basin Association |
| Mark Ellis | Upper Mississippi River Basin Association |
| Lauren Salvato | Upper Mississippi River Basin Association |
| Andrew Stephenson | Upper Mississippi River Basin Association |

Minutes

Tim Hall moved and Steve Galarneau seconded a motion to approve the draft minutes of the August 10, 2021 UMRBA quarterly meeting as provided in the agenda packet. The motion was approved unanimously.

Kirsten Wallace offered a correction to the May 25, 2021 UMRBA quarterly meeting minutes. Wallace explained that, during the August 10, 2021 UMRBA quarterly meeting, Olivia Dorothy questioned a statement made by Andrew Goodall about whether the L&D 25 lock wall modification was classified as a small-scale efficiency project or part of the lock’s modernization. It is the latter – i.e., part of the L&D 25 lock modernization. Given the back-and-forth nature of the subject discussion and the point being raised, Wallace offered that the minutes be corrected by adding a note at the end of the statement that explains that it was an error and to correct the statement. The note would read “[Correction: The L&D 25 lock wall modification is part of the lock modernization project. It was incorrectly stated to be a small-scale navigation efficiency measure.]” Barb Naramore moved and Tim Hall seconded a motion to approve the correction to the May 25, 2021 UMRBA quarterly meeting minutes as read by Wallace. The motion was approved unanimously.

Executive Director’s Report

Kirsten Wallace pointed to the Executive Director’s report in the agenda packet for a summary of the Association’s other work efforts since the August 2021 quarterly meeting. Wallace reported on new announcements since the packet publication and elaborated on a few key developments, as follows:

Wallace recalled that, during the August 2021 quarterly meeting, the Board approved her executing a contract with the Corps for up to \$70,000 to support the 2022 UMRR Report to Congress development. Subsequently, on September 28, 2021, UMRBA executed a \$67,000 contract with the Corps to assist in the development of the UMRR 2022 Report to Congress. Per the contract, UMRBA staff are helping to draft various sections of the report. This includes developing a description of desired future condition of the river ecosystem utilizing various programmatic documents and partner agreements as well as updating and developing new implementation issue assessments. Wallace noted that this revenue to UMRBA is not reflected in the FY 2022 budget as approved by the Board.

UMRR convened a series of workshops in September and October 2021 to 1) determine future hydrologic modeling needs of the UMRS and 2) conduct a vulnerability assessment of aquatic vegetation in the UMRS. Wallace expressed appreciation to the UMRR partners who hosted the workshops, suggesting that this work is important for improving our knowledge and positioning UMRR and the partners well to make smart decisions about river restoration and management.

The UMR Spills Group finalized a draft five-year strategic plan and is scheduled to meet on November 30, 2021 to finalize any remaining details and develop a plan for external review.

Wallace pointed to UMRBA's financial statements on pages B-6 to B-9 of the agenda packet. Steve Galarneau moved and Tim Hall seconded a motion to approve the Association's budget report and balance sheet as included in the agenda packet. The motion was approved unanimously.

UMR Ecosystem and Water Quality Assessments

Kirsten Wallace acknowledged the tremendous lift of our predecessors (i.e., those who worked to imagine UMRR, make it a reality, and continually improve its implementation) to advocate and resource long term monitoring as well as the incredible people in our partnership who work to make it all happen. We now benefit by having extensive knowledge of the Upper Mississippi River ecosystem and water quality conditions. We have in-depth knowledge of the river's complexity and what is challenging it and where, and how we've improved the river and where. Additionally, the states have long term ambient monitoring programs that allow for long term analysis on a number of important water quality parameters.

UMRR Long Term Resource Monitoring Status and Trends

Jeff Houser provided a deeper review of what the Upper Mississippi River Restoration program has learned about the river through the process of developing the program's third long term resource monitoring status and trends report. While the content is complete, the publication process is taking longer than anticipated. USGS anticipates having the report published in 2022, but until that happens, it is not considered as having final agency approval and therefore the information provided today should be viewed as provisional.

Houser reminded that the purpose of UMRR's long term resource monitoring is to tracking and better understanding the ecological conditions in the Upper Mississippi and Illinois Rivers. That primary focus drives everything about how the program is structured and what the program aims to address. Houser acknowledged the extensive contributions among broad partnership that is highly functional and collaborative, involving multiple federal agencies and the five Upper Mississippi River states. This partnership has allowed for the expansive monitoring network and research and analysis capabilities.

Houser said the purpose of the status and trends report is to provide a clear, quantitative assessment of what we know of how the Upper Mississippi River ecosystem is doing (i.e., where and how it has changed over time), how we know that, and why it matters. It does not provide a "grade" in terms of how it compares to desired future conditions. This assessment is based on a collection of about 40 indicators within four main topics: 1) hydrology, 2) geomorphology (i.e., sedimentation and changes in land), 3) floodplain land cover, and 4) water quality, aquatic vegetation, and fisheries, which are all collected from long term monitoring within the UMRR's six study reaches.

In summary, the Upper Mississippi River System is a large and diverse ecosystem with many regional differences. The most widely observed trend throughout the system is there is more water more of the time (i.e., discharge is increasing) and there is a variety of resulting implications. Concentrations of nutrients (total nitrogen and total phosphorus) remain high throughout the system. Floodplain forest area has declined in much of the Upper Mississippi River System, total phosphorus has declined while total nitrogen has not, and water clarity has increased resulting from declines in total suspended solids and turbidity. In some areas, aquatic vegetation has increased significantly and interacts with water

clarity and lentic fishes have increased. Where invasive carps have proliferated, they have dominated and changed the ecosystem. Forage fish, which exist in the middle of the food web, have decreased and this decline has some overlap with the proliferation of invasive carps. Additionally, in some areas, sediment has accumulated in backwaters.

Houser elaborated on those findings as follows:

Hydrology: Overall, there has been a broad and sustained increase in discharge. While in a couple of places, an aspect of hydrology is stable, there have been no declines anywhere. Additionally, there has been a seasonal shift in peak flows from April to May or June. There are a variety of implications to the ecosystem. Hydrology is the main driver for sediment disposition and erosion, affecting the overall structure of the river. Higher discharge more of the time affects habitat suitability in off-channels and backwaters by altering their connection to the main channel and thereby the water velocity, temperature, and dissolved oxygen. Prolonged high water levels through most of 2019 appear to have led to extensive floodplain forest mortality.

Floodplain land cover: Floodplain forest area has declined everywhere except for the unimpounded portion of the river system. This decline is probably the result of several things. One important factor appears to be the high prevalence of herbaceous invasive plants that quickly take over the forest floor after tree mortality, limiting the ability for native hard wood trees to reestablish. Houser reminded that the land cover/land use data set used in this report is from 2010 and therefore the 2019 mortality is not included in this assessment. USGS is processing the 2020 land cover/land use dataset, which will provide further insight into the forest condition.

Water quality (suspended solids, total phosphorus, total nitrogen): Analyzing the water quality data via long term flow-normalized concentrations allows for understanding how concentrations of sediment, phosphorus, and nitrogen are changing in absence of variability in discharge. LTRM monitors in a collection of tributaries to better understanding how the watershed influences conditions in the river. Throughout the Upper Mississippi River System, suspended solids have decreased over time with the exception of Pool 13. The overall decline from many tributary inputs is not as great as the decline being detected in the river, suggesting that there is something else adding to the decline. Later in this presentation, Houser explains the feedback loop with aquatic vegetation.

Total phosphorus is very similar to the suspended solids trend, which is not surprising given the high affinity particles that make up suspended solids – i.e., typically about half. Those two parameters are highly correlated. Additionally, major improvements at wastewater treatment plants are reflected in the long term changes. On the other hand, nitrogen is much more variable among the different parts of the Upper Mississippi River System. There are very few significant trends. However, for both total phosphorus and total nitrogen are still both generally greater than benchmarks USEPA Ecoregion recommendations.

Aquatic vegetation – In the Upper Impounded Reach, the increasing trend in aquatic vegetation is the most obvious change in the last 25 years. The basic pattern is a steady increase through 2010, followed by stable conditions in Pools 4 and 8 and a recent decline in Pool 13. Submersed aquatic vegetation remains scarce in the other parts of the system.

Fisheries – Forage fishes have declined over the period of record. These fish occupy the middle part of the food web and are important conduits of energy for invertebrates and smaller organisms as well as larger fish. Lentic fish consist of bluegill and large mouth bass, which are typically peoples' favorites. Lentic fish prefer quiet off-channel areas. Lentic fish have increased in three of the study reaches and declined in the

La Grange reach on the Illinois River. The other major change in the Upper Mississippi River ecosystem over the last 25 years is the proliferation of invasive carps, particularly in La Grange and Pool 26. That change has been significant and large. That is probably part of the reason for the decline in forage fish in those areas. The increase in lentic fish in Pools 4 and 8 likely correspond to the increase in aquatic vegetation in those areas and the associated habitat conditions.

Houser explained that there are associations among the various trends that are important for understanding why those changes are occurring:

Relationship between water clarity, vegetation and fish: In the Upper Impounded Reach (Pools 4, 8, and 13), a period of low discharge in the mid-2000s is when much of the dramatic increase in vegetation occurred. When there is low discharge, there is less input of suspended solids from tributaries that results in clearer water. The shallower conditions allow for more sunlight to reach the river bottom. The river current is slower and less disruptive. All of those things have the potential to contribute to increases in aquatic vegetation.

Over the time of that vegetation increase and over a longer period of time, in Pools 4 and 8, there has been a substantial decline in turbidity, which is a major indicator of water clarity and is a function of total suspended solids. There has been a decline in total suspended solids in many (but not all) tributaries, but that reduction in inputs is not enough to explain the trends in water clarity. There are two possible explanations: 1) as vegetation returns, water velocity and wind fetch are slowed, further facilitating plant growth. The plants anchor sediment and improve water clarity. Those feedback loops within those variables can help to sustain conditions. 2) The feeding mechanisms of common carp are very disruptive to plants in a few ways, making water more turbid. The substantial decline of common carp over time may have removed their negative impact to vegetation.

The sustainability of these conditions in Pool 13 is uncertain but seems more doubtful. In Pool 13, the decline in common carp has not been as low as Pools 4 and 8 and turbidity has increased again. And, there has been a recent decline in vegetation. UMRR is currently planning a habitat restoration project in Pool 13 to address some of the challenges to aquatic vegetation.

Long term effects of bigheaded carps: Because of its orientation around assessing a broad suite of indicators, LTRM has been able to provide interesting insights in how bigheaded carp have affected the river in areas where they have proliferated. There have been numerous studies in the La Grange Reach using LTRM data to better understand those long term changes. The results have shown declines in native filter feeding species, sport fishes, and overall native fish communities. Invasive carp are filter feeders, and there has been a notable decline in both zooplankton and phytoplankton. LTRM has also detected other shifts in the fish community composition and overall ecological conditions.

Houser discussed a specific example of how LTRM's longevity of data collection can provide very important insights. LTRM measures the total length of fish it captures through electrofishing. There are a few years where there is an enormous number of very small invasive carp and over time those classes can be tracked through time as their sizes get bigger. Comparing against hydrologic conditions, the data show that the timing of the spring flood can trigger a large spawning event.

In summary, the Upper Mississippi River System is a large and diverse ecosystem with many regional differences. There is no single answer that can be provided to the question of how is the river doing. The hope is to summarize the current knowledge to inform all sorts of restoration and management

purposes, including for providing context for work to define a desired future condition for the river ecosystem.

Houser recognized the inherent difficulty in assembling 25 years worth of data collected over six study reaches, five states, and multiple federal agencies. He acknowledged how truly remarkable it is to have this partnership that is able to function in a collaborative way and do things that we could not accomplish as individual agencies. Houser specifically mentioned the tremendous work done by state field stations, which collect data in all sorts of conditions and are involved in the analysis and writing related to the data. This infrastructure of field stations in terms of equipment and expertise is remarkable. Houser showed an image of a single episode of stratified random sampling in Pool 13 to exemplify the magnitude of data collection. Houser acknowledged the contributions of UMESC staff who help turn the data into knowledge and understanding.

Houser said UMESC staff hope the report will be available in early 2022. Houser encouraged comments or questions be submitted to him.

In response to a question from Dru Buntin, Houser and Jennie Sauer said the 2020 land cover/land use covers the floodplains as legislatively-defined Upper Mississippi River System. Mapping has been completed for Pools 4, 8, 13, 26, and half of the Unimpounded Reach, is anticipated to be completed for the La Grange Pool in December 2022, and is planned to be initiated for the second half of the Unimpounded Reach in FY 2022. Field work has been completed for Pools 9, 10, 11, 12, and Alton Pools. An unexpected retirement has reduced mapping capacity. USGS is moving forward with recruitment to hire another mapper.

UMRBA Water Quality Assessment

Kirsten Wallace summarized UMRBA's recent assessment of water quality conditions on the river. Wallace reminded that UMRBA was specifically tasked by the Governors to serve as its interstate water quality entity.

A first major initiative of UMRBA was a deep dive study to describe the river's water quality conditions. Wallace said the resulting 1989 How Clean is the River? Report found that 69 percent of the river had water quality problems, with most of the degradation at the upstream and downstream ends of the river. The best water quality was between L&Ds 10 and 19 and L&Ds 20-21 – i.e., away from the major metropolitan areas and major tributaries (Minnesota, Illinois, and Missouri Rivers). The biggest impact in the areas associated with lesser water quality was the harm to the fish. The How Clean is the River? Report was used to set the course in subsequent years for UMRBA's focus on sedimentation and toxic pollutants.

In 2019, UMRBA's Water Quality Task Force reflected on this report, observing that a lot has changed since then and decided to reassess the long term trends in water quality. This report picks back up from where the 1989 report concluded in terms of the trend period, evaluating trends from 1989 to 2018 and using flow-adjusted trend analyses, which allows for measuring the trends in concentration that are not simply correlated with river flows. The analysis uses ambient water quality data collected by Minnesota Pollution Control Agency, Wisconsin DNR, and Illinois Environmental Protection Agency as well as the UMRR's long term resource monitoring as well as long term continuous flow records from gages maintained by USGS and the Corps. UMRBA anticipates publishing the results of this report in late winter/early spring 2022.

The How Clean is the River Report? evaluated the 23 water quality parameters. Some of the trends are very encouraging and some are concerning. Wallace summarized a few of the findings as follows:

Nutrients: Consistent with other studies, total phosphorus and ammonia are decreasing. Historically, there has been greater focus on regulating these two nutrient forms than other nutrients. Total nitrogen and nitrate and nitrite trends are increasing in the northern stretches of the Upper Mississippi River and are more variable or less statistically significant in the southern half of the river. There are some decreases in nitrogen in the Illinois River and nitrate and nitrite in the middle portion of the Upper Mississippi River.

Total suspended solids: Turbidity is decreasing in most places throughout the Upper Mississippi River. This trend is consistent with UMRR long term monitoring. This trend is likely in response to soil erosion measures implemented in the river and throughout the watershed.

Chlorophyll: Unlike some of the other parameters, chlorophyll, which is an indicator of algal biomass, showed a very clear split in trends, with the northern half of the Upper Mississippi River showing decreases and the southern half of the river showing increases. Chlorophyll may be increasing in the southern reaches because the catchment area is larger and therefore the concentrations of nutrients are still likely high enough to support algal growth despite overall reductions.

Temperature: Water temperature is trending downward throughout the Upper Mississippi River System. This trend corresponds with the increasing trend in available oxygen since colder water can hold more oxygen.

Heavy metals: Heavy metals are often bound to sediment in the environment. Decreases in suspended solids may be contributing to downward trends in heavy metals such as zinc, aluminum, and copper. The increasing trends in lead concentrations were surprising. There is not a clear explanation as to why. UMRBA staff are working with state experts to review the data and/or evaluate potential sources.

Sulfate and chloride: The widespread increases in sulfate and chloride are not surprising and reflect the states' priorities to focus on loading reductions.

Wallace listed the important takeaways from the results as follows:

- These results are consistent with other studies including UMRR long term resource monitoring.
- While the 1989 results led UMRBA to focus on toxic pollutants and sediment; the focus for UMRBA now is on nutrients and chloride and the new report confirms that that is the right focus.
- The more encouraging trends for toxic pollutants, sediment, and phosphorus provide evidence that the work that has been accomplished in managing water quality is beneficial and that the approaches taken have been effective.
- Long term monitoring is incredibly valuable for understanding the effectiveness of management and where to invest to have the biggest impact.
- While water quality is an aspect of UMRR's long term monitoring, it provides very helpful knowledge beyond its intent and programmatic mandate.

Wallace said UMRBA anticipates publishing the How Clean is the River? Report in early 2022. UMRBA is

partnering with UMRR and America's Watershed Initiative to package and communicate these results so that they can be meaningful to key people and organizations.

Wallace expressed appreciation to Missouri DNR staff Erin Petty, who pulled the results together and is helping to write the report. Additionally, Wallace thanked the UMRBA Water Quality Task Force for encouraging this report to be a priority and to Illinois EPA's Gregg Good for surfacing the 1989 report that triggered this assessment.

Wallace acknowledged the next hurdle making all of this information accessible and understandable to support decision makers and the public's use of the river.

UMRBA Water Quality Executive Committee Report

UMRBA Draft 10-Year Water Quality Program Plan

Katrina Kessler, Chair of the UMRBA Water Quality Executive Committee (WQEC), reported on UMRBA's water quality program in 2021 and provided an outlook for planned efforts in 2022. Of particular note, the WQEC developed a draft 10-year program plan that will help guide where the states prioritize resources over the near term with a long term vision in mind. Kessler thanked Wisconsin DNR for providing volunteer facilitation support by Dan Helsel.

Over the course of one and a half years, the WQEC held several strategic planning sessions, focusing on "what business should UMRBA be in and why?" and the answer involved a series of strategies related to monitoring, assessment, research, partnering, communications, and aligning the states' water quality programs in the river and watershed.

Kessler acknowledged that significant achievements have been realized, with long term monitoring showing improvements over time in some water quality parameters in the Upper Mississippi River System. These trends have shown what can be accomplished through a mix of voluntary and regulatory measures. The primary WQ problems facing the region today are related to nutrients, sediment, and chloride, which may be exaggerated by the changing climate and hydrology. The draft 10-year water quality program plan reflects the states' needs in advancing their responsibilities for CWA and nutrient reduction strategies and the states' shared concerns regarding HABs, emerging contaminants, and chloride among other parameters.

Kessler reported that the draft plan has been reviewed internally within the WQEC's respective agencies. Next steps after incorporating that feedback are to request review a) by a broad array of stakeholders and b) the UMRBA Board.

Kessler said the draft 10-year UMRBA WQ program plan involves five goals relating to better understanding water quality conditions and trends, improving water quality conditions (aligning the states' programs at a regional, interstate level), maintaining effective forums for interstate cooperation, building new and strengthening existing strategic partnerships, and securing resources to effectively implement the other goals. Kessler acknowledged that the plan is ambitious, particularly considering existing levels of funding. But the work is necessary, and the hope is that the plan strategically positions UMRBA to compete for various funding opportunities.

2021 Highlights

Kessler mentioned highlights of UMRBA's water quality work in 2021 as follows:

- On April 9, 2021 and April 13, 2021, UMRBA hosted a workshop on progress tracking related to the states' implementation of their respective nutrient reduction strategies. WQEC members and state staff who work on the nutrient reduction strategies took deep dives into four topics related to progress tracking: measuring nutrient reduction from BMP implementation, capturing private investment in BMPs, monitoring water quality to detect changes in nutrient reduction, and incorporating new datasets.
- The WQEC developed a chloride resolution in consultation with the state DOTs. The WQEC will be reviewing the feedback in the next month and anticipates bringing that in front of the Board for consideration of endorsement during its February 2022 quarterly meeting.
- The Hypoxia Task Force Coordinating Committee meets monthly and has arranged working groups focused on advancing specific priorities, such as monitoring, communications, ecosystem, social metrics, and so on. WQEC members, other UMRS state staff, and UMRBA staff are actively involved in the working groups. The HTF is scheduled to meet December 13-14, 2021 virtually. UMRBA and the states are preparing for presentations and various remarks. UMRBA and USGS will be presenting on the nutrient trends from both the UMRR Status and Trends and the UMRBA How Clean is the River? Reports. Of particular note, the Hypoxia Task Force Coordinating Committee is meeting to discuss the funding specifically directed to the Hypoxia Task Force states in the infrastructure package as well as the other funding made available through USEPA, USDA, and other federal agencies that could be used for nutrient reduction. This is in addition to, but can be leveraged with, the American Rescue Plan funds, annual federal appropriations, and the reconciliation bill as well as state financing. Kessler recognized that this is a unique moment where significant progress can be advanced on the Gulf Hypoxia Action Plan, which aims to reduce nutrient runoff through the watershed.
- UMRBA continues to engage with federal agencies and Congressional members, including with the Federal Water Subcabinet and new Administration officials within USEPA. UMRBA as well as WQEC and WQTF members participate on various regional and national forums.

UMR Interstate Water Quality Monitoring: Reaches 8-9 Pilot Update

John Hoke presented an update on the implementation of the UMR Interstate Water Quality Monitoring Pilot in CWA-defined Reaches 8-9 – i.e., 109 river miles from the Iowa River confluence to L&D 21. This pilot is being implemented in partnership among UMRBA, Missouri, Illinois, and Iowa. Hoke remarked that it has been a truly collaborative project among the state environmental and conservation agencies. He acknowledged the Lauren Salvato's leadership in coordinating the project and ensuring that its implementation is seamless among the states. It has been a very positive experience. Hoke expressed appreciation to Dan Kendall with Iowa DNR for his role as WQTF Chair through most of this project.

Hoke explained that the purpose of the pilot is to test the feasibility and effectiveness of the UMR Interstate Water Quality Monitoring Plan (also known as the UMR CWA Recommended Monitoring Plan). This is the second of two pilots of that plan. Minnesota and Wisconsin implemented a pilot in Reaches 0-3 (i.e., Twin Cities to the Root River confluence) in 2016. The Reaches 8-9 pilot benefitted from the various implementation methods used in the Reaches 0-3 pilot, but deviated as appropriate to reflect the very different characteristics and needs of the river system in the southern portion of the

UMR. While the Reaches 8-9 pilot collected fish tissue samples to assess human health designated uses, it did not collect vegetation and macrophytes as was done for the Reaches 0-3 pilot.

All three states contributed evenly to the project, resourcing \$60,000 in either in-kind contributions or a direct payment to UMRBA which then paid for various aspects of the pilot's expenses. For example, Missouri DNR provided in-kind laboratory analysis so that most, if not all, of the data analysis would be done consistently across the pilot. Iowa DNR provided analysis of cyanotoxins and USEPA Region 5 provided analysis of PFAS samples.

Hoke overviewed project modifications given unforeseen implementation challenges, mostly involving the onset and duration of the COVID pandemic. COVID-related travel constraints delayed the project timeline by a year. The pilot team was able to effectively pivot on the various challenges and identify solutions. Sampling period was postponed and restarted after about a six-month delay. Sampling protocols were implemented with various COVID safety measures. Water suppliers in the pilot area were prepared to voluntarily collect information related to public drinking water designated uses, but were unable to do so because of capacity constraints during the pandemic. The data were able to be collected elsewhere. Additionally, USEPA Region 5 adjusted sampling protocols to combat contamination issues, new tracking protocols were implemented to help combat shipping issues (i.e., lost packages), and the macroinvertebrate sampling size was reduced due to the loss of five Hester Dendy samplers (out of 34 total) in both Reaches 8 and 9.

Hoke provided a status update on the pilot implementation. Data collection is mostly complete with the exception of remaining fish sampling. Laboratory analysis of water chemistry, PFAS, and cyanotoxins is complete. Fish tissue analysis is awaiting the remaining fish collection. Hoke announced that the Missouri Department of Health and Human Services received grant funding to analyze fish tissue for PFAS. The Reaches 8-9 pilot will be able to utilize that funding to detect PFAS levels in the fish already captured in addition to the other parameters that were initially planned for fish tissue analysis. The contractor planned for analyzing the macroinvertebrate samples is no longer available and the pilot team is searching for a new contractor with that capability.

Hoke thanked Andy Fowler of Iowa DNR for developing a database for the Reaches 8-9 pilot that will be available for future use. The field staff are currently entering their respective data into the database and performing QA/QC. Hoke reflected on the amount of consultation to reconcile the various individual state monitoring standards so that the project data would be consistent and also available for other uses in the future. Hoke said John Olsen, formally with Iowa DNR, will serve as a private contractor to analyze the data and write an assessment report.

In response to a question from Dru Buntin, Hoke said staffing constraints was the primary reason that private water suppliers were no longer able to voluntarily collect the water quality data. Additionally, the logistics of getting the samples to laboratories was problematic, especially given their staffing constraints. Hoke noted that the data was collected through another mechanism.

Jim Fischer congratulated Missouri, Iowa, and Illinois for implementing the pilot during a challenging time. Fischer recalled the Reaches 0-3 pilot experiencing similar challenges implementing sampling during record high water conditions. A few Hester Dendy samplers were lost then as well. Fischer asked for Hoke's opinion on whether he believes the Hester Dendy method is appropriate to continue using or if he would suggest considering a different macroinvertebrate sampling method. Hoke noted the inherent challenges of macroinvertebrate sampling on large river systems, but expressed his opinion that the Hester Dendy method is useful. Fischer noted that the southern pilot used the UMRR long term

resource monitoring methods whereas the northern pilot used the EMAP-GRE methods. In response to a question from Fischer, Lauren Salvato said that question will be explored as the analysis and evaluation reports are being developed and the WQTF reflects on the assessment. Salvato noted some feedback from sampling crews that the shorter sampling transects in the LTRM method is beneficial to them from a logistics standpoint. Salvato mentioned that one challenge in the Reaches 8-9 pilot for fish sampling was getting the minimum number of bass in the right size parameters. Fischer said he looks forward to reviewing the analysis and reflecting on both pilots to improve the overarching UMR Interstate Water Quality Plan.

Karen Hagerty noted that UMRR is considering reinstating macroinvertebrate sampling as part of its long term resource monitoring and is interested in learning from the Reaches 0-3 and Reaches 8-9 pilots. Hagerty noted that the Reaches 8-9 area is a transitional zone for aquatic vegetation and asked if the sampling crews noted the presence of aquatic vegetation. Salvato explained that the UMR Interstate Water Quality Plan calls for vegetation monitoring from Reaches 0-6 (or to Pool 13), but the pilot team did consider sampling anyway because of the limited data there. But, given the intensity of the sampling methods, the Reaches 8-9 pilot ultimately did not include vegetation monitoring.

Navigation and Ecosystem Sustainability Program

Andrew Goodall reviewed the construction-readiness projects under the Navigation and Ecosystem Sustainability Program (NESP) authority. These projects were prepared for construction in FY 2021 under the \$5 million allocation. Navigation-related projects totaling \$12.5 million include the L&D 25 lock wall modification, L&D 14 mooring cell, and Moore's Towhead systemic mitigation project on the Illinois River. Ecosystem restoration-related projects totaling \$10 million include Twin Islands shoreline protection project, Alton Pool Islands, Pool 2 wingdam notching, and Starved Rock habitat restoration and enhancement. Goodall confirmed that all of these projects are anticipated to be construction-ready in FY 2022.

Goodall reported that MVD submitted NESP as a candidate to consider for funding through the Infrastructure Investment and Jobs Act (IIJA). It is anticipated that the Corps will announce IIJA allocations in 30 to 60 days.

Goodall explained that the L&D 22 fish passage tentatively selected plan is being transmitted to Corps HQ for approval. HQ review is required for any fish passage projects nation-wide. Goodall said he anticipates meeting the scheduled milestone of having HQ approval for the LD& 22 fish passage feasibility study by the end of calendar year 2021.

Goodall reported that the Corps District-based river teams recommended 29 habitat projects to advance as a first set of ecosystem investment through NESP. A subset of 12 of those projects were submitted to MVD for review and approval. Pending NESP funding, those projects would start planning and design work. Following MVD's review of the first subset of projects, MVR plans to submit the remaining 17 projects to MVD for review. Goodall reflected on the set of projects, noting that they provide a robust suite of important ecosystem restoration opportunities. Upon approval, these projects will be added to NESP's website. Goodall provided further detail on the first subset of 12 habitat projects, noting that two projects are systemic in nature (forest restoration and water level management).

Dru Buntin noted that there is not currently an existing forum for NESP member agencies to consult on program implementation. Buntin asked for the Corps' perspective on out-year planning for investments in both the navigation and ecosystem components of the program. He acknowledged the tremendous

amount of coordination that has to occur to make NESP as a program and the individual projects a success. Buntin asked what will be the forum for coordination and consultation to ensure that all NESP member agencies are operating effectively together. Goodall recalled that NESP received \$4.5 million in FY 2020 after a long period of not receiving funding and being inactive. The Corps had informal conversations with partners in FY 2020 and FY 2021 and work with partners through the District-based river teams to generate the current list of habitat projects reported on earlier. Goodall reflected that there were some challenges because of the lack of a formal consultation body but said *ad hoc* coordination conversations have occurred. Goodall reported that the Corps intends to prioritize partner coordination accordingly with the additional funding. Goodall said he would envision a coordinating body being convened similar to NECC. He noted the value of having a forum for addressing implementation challenges among other reasons. Buntin added that the states have efforts underway on the river that could benefit from coordination and understanding how best to invest resources and leverage capacities.

Olivia Dorothy asked Kirsten Wallace when a briefing may be scheduled on the NESP 2019 economic update, noting prior requests from UMRBA to the Corps for information on the analysis. Wallace noted that the Board has received a briefing of the economic update in summer 2019. Goodall said the 2019 economic update was released via a FOIA request, but there has been no further instruction to disseminate the update. Wallace said she can raise it with UMRBA's Board as to whether to include the briefing during a future meeting.

In response to a question from Dorothy, Goodall said the NESP website was revamped about 1-2 years ago and he would ensure that relevant program documents are made available. Hagerty described the location of the 2004 navigation feasibility study EIS.

Kraig McPeek reiterated the necessity of reestablishing formal consultation arrangements. Whatever the result of NESP's inclusion in the IJIA work plan or appropriations process, McPeek advised that NESP's member agencies need to be prepared to have deliberations in a formal manner to fully support the program and work together as a group of implementing partners. Goodall expressed understanding and appreciation for McPeek's perspective.

In response to a clarification from Andrew Stephenson, Goodall confirmed that an informal group of NESP's implementing federal and state partners expressed concurrence for the first 12 projects sent to MVD. The Corps notified the informal group of the remaining 17 projects but the group did not express a similar level of concurrence. Gretchen Benjamin asked who was involved in determining the number of projects to submit to MVD out of the 29 projects and which of those projects to submit to MVD. Benjamin asked if there were just Corps staff or if other partners were involved in the decision making. Goodall said other partners were involved in the decision making. Kirsten Wallace and Andrew Stephenson clarified that the Corps identified the 12 projects and presented that list to the informal group of federal and state partners, which in turn voiced support for the submission to MVD.

Mississippi River Initiatives

Mississippi River Cities and Towns Initiative

Chair of the Mississippi River Cities and Towns Initiative (MRCTI) and Mayor of Kimmswick, Missouri Phil Stang announced that Rep. Benny Thompson introduced the MRCTI-backed Safeguarding the Mississippi River Together (SMRT) Act (HR 4729). Mayor Stang cited natural disasters and infrastructure and budget challenges occurring in the river's cities and towns. He explained that MRCTI's intent through this

measure is to establish a comprehensive restoration plan and a national Mississippi River program office for the purposes of restoring the river's ecology, mitigating disasters, sequestering carbon, and making the region more resilient. Mayor Stang said the program office would be placed within USEPA, which would operate the program in close coordination and cooperation with the Secretary of the Interior and in consultation with USDOT, USDA, and USACE. Mayor Stang said MRCTI's intent is collaboration with river-based economies such as navigation, agricultural, tourism, and manufacturing economies. The measures include funding for natural and other forms of infrastructure and states' nutrient reduction strategies. Mayor Stang welcomed UMRBA feedback into MRCTI's legislative proposal.

Mayor of Bettendorf, Iowa Bob Gallagher echoed the sentiments of Mayor Stang regarding MRCTI's member mayors' perspectives on the importance of the legislation and in encouraging UMRBA to provide its member states' joint comments. Mayor Gallagher said MRCTI is also working to address the problems associated with plastic pollution. Noting that the Mississippi River drains 40 percent of the continental United States, the volume of plastic pollution and associated challenges are particularly acute for the cities and towns located along the river. Mayor Gallagher cited research estimating that, if strong measures are not taken, by 2040, about 29 million metric tons of plastic trash will flow into the oceans globally every year. Mayor Gallagher noted that clean up efforts have been occurring for decades, underscoring the need to invest in efforts to prevent plastic pollution from entering the nation's rivers and streams.

MRCTI has partnered with United Nations Environment Programme, National Geographic Society, and the University of Georgia to launch a pilot initiative in three major Mississippi River cities (Baton Rouge, St. Louis, and St. Paul). These cities will promote education and outreach materials about plastics in inland waters and support local data collection events in their communities. In part, data collection is done through the use of a marine debris tracker created by the University of Georgia. The purpose is to help determine what, where, and how plastics make their way into the Mississippi River. It is anticipated that the results will catalyze policy makers, business leaders, and citizens to take action. During April 2021, approximately 75,000 pieces of litter were collected in these major cities through the marine debris tracker, with 75 percent of those items being plastic. The most common items collected were cigarette butts, food wrappers, and beverage bottles. The Quad Cities was selected for a second phase of the pilot. In October 2021, over 25,000 items were collected in the Quad Cities area. The inventory of the collected trash is ongoing.

Mayor Gallagher emphasized the importance of this initiative to river communities. Global waste in inland waters and oceans is an increasingly urgent problem. On behalf of MRCTI, Mayor Gallagher called for coordinated and systemic action to reduce plastic pollution in the Mississippi River.

Dru Buntin emphasized that the relationship between states and local communities is essential. Buntin noted his recent visit to Kimmswick, Missouri with Mayor Stang, indicating that it has helped shaped the State of Missouri's planning around a grant program to work with local governments in advancing joint priorities such as storm water and flood events, recreation and tourism, or ecological restoration projects.

In reference to the SMRT Act, Buntin observed that UMRBA and MRCTI share common objectives but that there are some concerns and questions about how it is structured. Buntin offered to have a conversation about how the proposal is structured. Buntin acknowledged that UMRR is one of the oldest and first big river ecological restoration and monitoring programs in the country and it is important that the program remain a priority for the region in addition to the other priorities covered in the SMRT Act. Buntin said it is particularly important to carefully consider the best mechanism to support federal, state, and local

partnerships in advancing the states' nutrient reduction strategies, including with the stakeholders who would be responsible for implementing the various conservation measures.

Colin Wellenkamp responded that MRCTI concerns with comments shared by Buntin. Wellenkamp said MRCTI referenced UMRBA's work in assembling the SMRT Act. In particular, that includes a priority to reduce nutrient runoff at its source. The SMRT Act includes a grant program that MRCTI believes would help facilitate the states work with farmers. The SMRT Act would work to protect existing authorities and investments. It includes language that existing agencies doing work in the river would not lose their current authorities or budget items and nothing in the Act would usurp current work. Instead, the SMRT Act would create space for the work of federal agencies, states, and various local governments to better coordinate, share information, and support one another. Wellenkamp acknowledged the complexities for local governments in working with eight different federal agencies with some responsibility on the river as well as states and counties. The intent is to facilitate their cooperative action to leverage resources and capacity. Wellenkamp said MRCTI would welcome the opportunity to work with UMRBA to review the proposal.

Olivia Dorothy asked about why MRCTI's agenda topic was expanded from a single topic of plastics pollution as indicated in the preliminary agenda to the generic title of "MRCTI report." Dorothy expressed frustration that MRRRI was not invited to provide a briefing regarding its legislative proposal under this portion of the agenda. Kirsten Wallace explained that UMRBA requested a presentation from MRCTI on its plastics pollution initiative because it is a recent event with newer information. In response to that request, Wellenkamp requested a broader MRCTI briefing that was accepted. Wallace mentioned that MRRRI has briefed the UMRBA Board during a previous quarterly meeting and that UMRBA continues to offer a relationship to discuss MRRRI's legislative proposal similar to the offer just made with MRCTI. Dorothy expressed concern with feedback that she received from a Congressional office about UMRBA's position on MRRRI. Dorothy observed that there are significant differences between MRRRI and the SMRT Act, including how they are structured and relate to existing authorities. Dorothy expressed her opinions related to the SMRT Act, including its geographic focus, relation to existing authorities, and public engagement, particularly among communities of color and low income. Dorothy put forth her concern that UMRBA appears to be excluding environmental groups and the MRRRI proposal in particular in today's panel about Mississippi River initiatives.

Wallace clarified that, in any conversations with legislative staff about either legislative measure, she has clearly articulated that any questions or observations were solely hers as having worked on river policy for many years. UMRBA has not taken a position on either measure except stating a desire to learn more about them. Wallace said she has simply asked questions about what either measure would mean in terms of logistics and other factors. Wallace offered time to talk following the meeting further about MRRRI. The Board has expressed interest in learning more about MRRRI. Rep. Betty McCollum's staff Josh Straka provided a briefing on MRRRI to the UMRBA Board during its August 2020 quarterly meeting. UMRBA requested that presentation shortly after MRRRI was introduced publicly. Shortly after that, Wallace said she reached out to Rep. McCollum's office offering to work with them to learn more and connect MRRRI with other river stakeholders. Wallace said there was no intent to exclude any group from today's discussion. All three groups included on today's agenda had recently finished or launched an event that is relevant to the Board's interest. Buntin said UMRBA has talked about both legislative measures. The states have questions about how they would be implemented. The Board's initial conversations helped Wallace form some of the questions she has asked, but those questions are intended to better understand the measure and inform the feedback and any potential positions that UMRBA and/or the states may want to offer.

Brandt Thorington responded to Dorothy's observations about the SMRT Act and extended an offer to work with UMRBA and the MRRRI coalition. Regarding environmental justice, Thorington said the SMRT Act is endorsed by the NAACP and the National Urban League, sponsored by Rep. Benny Thompson, and is named after civil rights leader Ambassador Andrew Young. Thorington added that the SMRT Act includes a grant program that would advance environmental justice. Wellenkamp added that MRCTI includes a number of mayors that represent some of the most vulnerable and historically neglected communities in the country along the delta area. They had worked with Rep. Thompson to make sure that social equity was a major component throughout the measure. The bill includes a position designated for the Congressional Black Caucus to serve on the federal committee for the Mississippi River national management plan.

Mississippi River Basin Monitoring

Liz Crow shared The Nature Conservancy's (TNC's) efforts to design and secure a Mississippi River Basin comprehensive monitoring system. In the basin, Crow explained that TNC's state chapters work collaboratively towards a shared goal of reducing nutrients entering the Gulf of Mexico by 20 percent by 2025. Crow said she anticipates that goal shifting given timing and new efforts to create a basin-wide monitoring system. TNC's Mississippi River Basin program originally started in 2015-2016. TNC has organized teams of staff from the state chapters relating to science, agriculture, floodplains, government relationships, finance, and leadership.

Crow explained that, while there is incredible monitoring work in the Upper Mississippi River, there are not similar levels of investment in monitoring in other major subbasins of the Mississippi River. Crow and Heidi Mehl explained that TNC's various teams that were focused on the Mississippi River Basin simultaneously began to ask whether the current monitoring programs are adequate to determine levels of risk and the effects of actions to mitigate those risks. This is important for guiding and assessing the effectiveness of TNC's investments. This triggered a robust effort led by TNC and in consultation with partners to design a monitoring system while also exploring how the funding and policy could be secured to support and maintain the proposed system. TNC is committed to working through a robust collaboration of partners to develop a problem statement and find solutions that are feasible and lasting.

Mehl reported that, as a results of TNC Agility Labs designed to collaboratively reach decisions more quickly, three categories of needs were identified: target places and solutions, align funding, and recruit champions and advisors. Ultimately, TNC's north start goal that was defined during the Agility Labs is to "have a fully funded, constructed, and staffed monitoring system across the Mississippi River in the next five years."

Mehl described the process to date. So far, a majority of the work has been in building a coalition. The Agility Lab was held in summer 2020 that kicked off the process. In spring 2021, TNC began announcing this effort more broadly. That was made possible through a Lower Mississippi River Science Symposium hosted by Tulane University and funded by the Charlotte Beyer Hubbell Fund. The Symposium is intended to be an ongoing meeting through which TNC is growing its partnership on this effort. Mehl invited interested people to contact her to join that symposium. TNC's focus in spring and summer 2021 was on building the coalition, with the goal of speaking as a unified voice and acquiring the support and public funding necessary to meet the monitoring goal for the Mississippi River Basin. Growing the coalition will be a continued focus for TNC. Mehl mentioned that UMRBA has been involved in these efforts and is a member of the coalition.

Additionally, TNC distributed a survey broadly to its partners following the Agility Lab to get input on what a sentinel monitoring system should address. Responses generally revolved around these themes: leverage funding available for navigation and flood risk management and resilience to also address ecosystem restoration and water quality and hypoxia in the Gulf of Mexico as well as throughout the Mississippi River system.

TNC held a second Agility Lab with members of the coalition to focus on design principles. The goal for the lab was to “urgently deploy a durable, consistent, integrated, and transparent monitoring system across the Mississippi River Basin that will be a ‘sentinel for the basin,’ providing critical infrastructure for the nation through standardized information on present and future flooding and flood risk, water quality and sediments, and ecosystem health.” Mehl reviewed the principles (e.g. accessible, efficient), design elements (e.g., functionality), and data and information (e.g., real-time data, trends). Mehl emphasized that the monitoring design needs to tell the story of the river and help with adaptive management. TNC is currently convening 1) a technical design group to identify criteria and selection of high priority monitoring sites for stream gauges, including reviewing existing monitoring programs that can be replicated in other parts of the Mississippi River Basin and 2) a support group to identify key stakeholders and decision makers who can be champions of this work and identify sustainable federal funding sources.

Ecosystem Restoration Index

Eileen McLellan recently wrapped up a series of workshops, titled “Landscapes and Riverscapes: Metrics for a Healthy Mississippi River Ecosystem.” The Walton Family Foundation tasked the Environmental Defense Fund (EDF) with developing a metric (or set of metrics) that could connect the work of their various grantees. The Foundation suggested a larger vision of a healthy and resilient Mississippi River basin. The challenge for EDF was in bringing people together to simplify the complexity of the river ecosystem into that set of metrics. McLellan observed that there is a growing recognition of the importance for increased federal investment in the river system.

Leading up to the workshops, EDF conducted an extensive literature review and convened lengthy interviews with various government representatives as well as academic and nonprofit scientists and practitioners. The group of interviewees had a deep and wide ranging knowledge of the river ecosystem.

Pointing to the Mississippi River basin’s expansive geographic area, McLellan identified the two greatest human-induced impacts within the system to be intensive agriculture production primarily in the Upper Mississippi River basin and extensive large-scale river engineering in the Lower Mississippi River alluvial valley and delta. McLellan recognized that, while many stakeholders are familiar with their part of the system, they may not consider the grander scale of the basin and how the various places interact.

McLellan said people tend to value what is seen and measurable – e.g., water chemistry and abundance of biota. These things are typically reflective of ecosystem condition. However, McLellan explained that improving ecological health requires a deeper understanding and recognition that ecosystem condition reflects ecosystem function and resilience. Improving the former will require pulling levers of the latter. Additionally, work needs to focus on the stressors that impact ecological function and resilience. McLellan explained various future trajectories of ecosystem condition over time given management intervention. The idea is to focus on a desired future condition – i.e., designing a future ecosystem that maximizes ecological benefits while recognizing the social and economic needs of the region.

The workshops were focused on convening experts to loosely define that desired future condition. The answer was “we will know we have a healthy Mississippi River ecosystem when we have clean water, thriving wildlife, and vibrant communities.” The resulting goals and targets are as follows:

— Goals:

- Clean water supports people and wildlife (*water quality goal*)
- Rivers and streams flow at levels that support people, fish, and wildlife (*hydrology goal*)
- Habitat is protected and restored (*habitat/biota goal*)

— Targets:

- Nutrient concentrations
- Population of select biota
- Percent of native vegetation – wetlands

McLellan acknowledged that there is a massive amount of work needed to develop numeric values for these targets. She asked for partnership from UMRBA and experts on the Upper Mississippi River to provide technical input.

McLellan explained that a large part of the workshops focused on how the stated desired future condition might be achieved. Participants spent a considerable amount of time discussing indicators of stressors, functions, resilience, and condition, trying to understand how changes in those various things might change over time.

McLellan explained a conceptual model relating the stressors, impacts, functions (ecosystem services). For example, land use change might include increased percentage of agricultural land. That would likely result in reduced pollutant sinks, impacting hydrologic regulation, biogeochemical regulation, and habitat provision. McLellan defined increased resilience as a) maintaining function under greater levels of stress and b) allowing for greater ecosystem functions under any given level of stress.

McLellan said the workshops generated “leading” indicators that collectively might predict the future of ecological condition. They include 14 indicators of stressors, nine indicators of ecosystem function, and four indicators of ecosystem resilience as well as 17 “lagging” indicators of ecosystem condition. McLellan discussed how the integration of these indicators can provide a basis for an adaptive management framework, helping to evaluate whether management actions are actually resulting in desired change.

Next steps for the Environmental Defense Fund are to develop numeric targets, compare the proposed metrics to other ecological areas, engage with other groups working on similar projects, explore remote sensing approaches, and explore a potential synoptic indicator that would make it easier to communicate about the overall Mississippi River system’s ecological health to the public.

Kirsten Wallace noted that the Environmental Defense Fund had originally proposed developing a single indicator, and asked McLellan to reflect on what has been learned about the complexity of the river system that requires 40 indicators rather than finding one indicator. McLellan said the Environmental Defense Fund recognizes the necessity of having a single, synoptic indicator or restoration index (as a way of combining indicators) building public awareness of the river system and garnering their interest in its management. The use of so many indicators, which also have quite a bit of variation within the system, is

confusing the public. The Environmental Defense Fund intends to build towards that single indicator or index. Buntin said it would be helpful to connect this work to the UMRBA Water Quality Task Force.

Brandon Road Lock and Dam

Loren Wobig said Illinois DNR serves as the non-federal sponsor for the Brandon Road L&D ecosystem project, which is intended to provide a deterrent from invasive carp advancing into the Great Lakes. Brandon Road is a key focal point of control because the dam is very tall and therefore any advancement of an aquatic creature would need to move through the lock in order to transfer between basins. The goal of the Brandon Road ecosystem project is to create a gauntlet of technologies that would deter fish from moving upstream. The technologies include the use of sound, bubbles, sterile channel, electricity, flushing of the lock, and more.

Wobig provided an update of the project in the preconstruction, engineering, and design (PED) phase. The project is being advanced in partnership with the U.S. Army Corps of Engineers and State of Michigan, which is contributing \$8 million to meet the non-federal cost-share requirement as well as providing technical expertise. Almost \$29 million is estimated to complete PED on the first of three construction phases. This funding would allow for designing construction plans for the first iteration as well as achieving a 30 percent design level on the remaining two construction phases.

The PED phase includes various planning meetings and design charrettes, initiating land rights initiate land writes (including surveying, testing, and negotiations for securing non-public lands), research related to the innovative project technologies, and outreach with stakeholders and interested parties. Plans include soils and environmental testing to examine concerns related to hazardous waste on properties in the vicinity of the project area.

Wobig explained that, between now and through FY 2024, milestones include completing data gathering and modeling as well as land rights negotiations and acquisition, and completing construction plans and specifications. It is anticipated that a construction contract award for the first increment would occur in FY 2024. Work on construction plans and specifications related to the second and third construction phases would occur in FYs 2024 through 2029.

Wobig said the Brandon Road project is exciting in that it is truly innovative engineering, combining technologies in new ways and incorporating new technologies. He explained the technology and testing, including through the Corps' Engineering Research and Design Center (ERDC) and the three-dimensional pier for the tainter gate section of the dam.

Wobig said a meeting is scheduled with navigation industry representatives on December 2, 2021 at ERDC to view the construction of the physical modeling as it is progressing. Wobig elaborated on some of the outreach initiatives (communication, collaboration, and connection), including through the use of forums, workshops, and a newsletter. Wobig reflected on Illinois' perspective related to public waters. Illinois DNR is charged to jealously guard and vigilantly protect the rights, interests, and uses of the public in any public body of water, including the natural resources thereof. This requires Illinois to ensure that the impacts of Brandon Road to public waters be avoided, minimized, or mitigated. Noting Illinois' floodway use regulations, Wobig explained that the Brandon Road design team has initiated the process of issuing a letter of map revision. This will allow for more flexibility to do work in the approach channel without needing to be concerned of regulatory floodway issues within the state.

Wobig spoke to Illinois' priorities for ensuring social and environmental justice. In particular to the Brandon Road area, Illinois wants to ensure public access is maintained for people who use the river to fish for sustenance.

Wobig reported that Illinois has initiated using the Corps' issue escalation process to resolve impediments to project implementation related to project partnership agreements (PPAs) and the requirement for securing Illinois state permits. Wobig acknowledged the tremendous contributions of many individuals who are working very hard to create the most cost-effective construction project with the least environmental impact.

Wobig noted that the current cost-share funding requirement for Brandon Road is 80 percent federal and 20 percent non-federal cost share. On behalf of Illinois, Wobig made the following requests:

- UMRBA submit letter of support to Senate EPW Committee requesting full federal funding for Brandon Road, copying the Congressional Great Lakes Task Force
- The states of Iowa and Missouri to ask their respective Senators to join Great Lakes States' Senators in supporting full federal funding for Brandon Road due to the Mississippi River Basin wide benefits

Buntin expressed appreciation for the level of coordination occurring recently with the navigation industry. Buntin said he believes Missouri would support Illinois' request, expressing the importance to address the impacts to navigation in the area and the ability to enact two-way control measures. Wobig said the project team has occurred two workshops with the navigation industry that have resulted in important improvements to the project. Wobig mentioned that the project design team is evaluating incorporating deterrents at the upstream side of the lock to prevent movement downstream of aquatic invasive species. Barb Naramore said a letter from UMRBA would be helpful and appropriate. Steve Galarneau expressed support for a letter from UMRBA as requested, but also suggested Illinois consider seeking full federal funding for operations and maintenance in addition to construction and design. Tim Hall said he believes Iowa would support the letter, but would need to get review from Iowa DNR leadership. Wobig said he would be happy to work with Kirsten Wallace to draft a letter for the Board's consideration.

Naramore observed the importance of continuing to evaluate and advance opportunities to reduce the potential for transmission of aquatic invasive species from the Great Lakes to the Mississippi River Basin. She directed that there be consideration regarding a communications strategy for expressing UMRBA's priorities for protecting the Mississippi River Basin. Wobig agreed, citing Illinois' priority for ensuring that the electric barrier located within the Chicago Sanitary and Ship Canal is not diminished as it protects inter-basin movement of invasive carp.

UMRBA Resilience Planning Priorities

Kirsten Wallace recalled that the UMRBA Board met in-person on July 27-29, 2021 to identify joint state priorities related to flood, drought, and sediment to pursue through the Association. UMRBA continues to hold the following long term goals that it developed in 2016, as follows:

- Minimize the threat to health and safety resulting from flooding
- Develop new, or renew existing, comprehensive long-term channel management strategies
- Develop mitigation strategies for multi-year drought events

- Support environmental sustainability, restoration, and water quality goals
- Accelerate reduction in the volume and rate of runoff to the Mississippi River

During the July 27-29, 2021 meeting, UMRBA’s Board members reflected on the input received throughout the Keys to the River Report development. One major observation is the immense contributions of the various federal agencies, academic institutions, nonprofit entities, and others. This work will benefit from the region’s wide ranging commitment to collaboration both at the regional scales and within the states. UMRBA can leverage those collaborations and utilize knowledge and capacity and learn with them. The Board recognizes the importance of convening trusted experts and various interdisciplinary expertise and skillsets and building a powerful collaborative.

The UMRBA Board identified the following suite of actions to pursue in 2022-2024 to advance the stated goals mentioned previously:

- Strengthen cooperative action (overarching principle)
 - Elevate the perspectives of, and build relationships with, leaders from the diverse cultural, racial, and ethnic communities
 - Build understanding, mutual respect, and empathy among stakeholders and floodplain residents
 - Create and implement an ongoing community engagement plan
- Assess vulnerabilities from flood and drought events
 - Convene and resource an interstate task force to assess resilience to flood and drought events of floodplain communities, economies, and ecosystems, including by developing an assessment of relative risk
 - Estimate long term impacts on water uses and users of long duration low flow conditions
 - Partner with Culver-Stockton on a video of anecdotal stories of vulnerabilities experienced in the floodplain
- Improve knowledge of resilience and assumptions of associated risk
 - Develop a collective scientific understanding of tributary influences on floodplain and main stem dynamics
 - Advocate for federal resources, including renewed flow frequency profiles, Atlas-14, NIDIS, USGS NWGOS, HTF, UMRR/NESP, and UMRBA Interstate (CWA) Monitoring
 - Develop a flood prediction tool to guide planning and mitigation for a variety of organizations and individuals in the floodplain
- Advance long term, systemic navigation channel planning
 - Develop implementation assessments for three to five of the most impactful barriers to effective channel maintenance and management
 - Evaluate, and recommend, the use of existing and innovative tools for sediment placement and management
 - Advocate that the Corps undertake comprehensive, strategic channel maintenance planning in light of new conditions (recognizing the high flow conditions)

- Evaluate potential sediment-related modules to integrate into systemic HEC-RAS
 - Amplify the benefits of a reliable navigation channel, particularly the resulting economic benefits of channel management investments
- Facilitate greater utilization of beneficial reuse
- Employ a market analysis to determine the potential to increase the quantity of dredged material taken from placement sites
 - Assess the potential for increasing the quantity of dredged material utilized by existing public and private organizations
 - Explore issues and opportunities for expanding the utilization of dredged material to new user types
 - Identify efficiencies and process improvement opportunities with for state regulations and procedures
- Improve drought preparedness
- Implement scenario planning to model impacts and to identify water supply vulnerabilities in a multi-year and flash drought
 - Elevate best management practices and improve knowledge, learning from state and federal drought plans and resources
 - Integrate drought issues with the challenge of potential out-of-basin water diversions
 - Improve knowledge and create common vocabulary regarding drought management
 - Use HEC-RAS to model low flow dynamics

Jennifer Hoggatt observed that there is so much important work that needs to be done. Hoggatt underscored the value of the retreat for Board members to reflect and think collectively and strategically about the Association’s next steps knowing that we cannot work on everything at one time.

Missouri River Container-On-Barge Project

Cheryl Ball announced that, in January 2021, Missouri DOT partnered with AGRIServices of Brunswick in jointly submitting an application for container-on-barge project designation under the USDOT American Marine Highway Program. In July 2021, MARAD approved the project designation, which will provide container-on-barge services on the Missouri River to the Gulf of Mexico. This would provide a new transportation means for specialty crops and manufactured goods to reach international ports. Ball said this is an exciting opportunity. Missouri DOT anticipates that this service will help normalize container-on-barge shipping with more destinations added along the Missouri, Upper Mississippi, Illinois, and Lower Mississippi Rivers.

Ball said the joint partnership with a private entity is particularly promising and sets this initiative apart from previous attempts at establishing container-on-barge. Ball noted that there is a small, undedicated service that moves a few containers per week between St. Louis and the Gulf of Mexico. This proposal is a direct outgrowth of AGRIServices’ own marketing forecast based its expected business needs in working with its customers.

Ball reviewed information provided in the application in support of the proposal. Ball explained that a comparison of price and time is needed for shippers to consider using the waterways for shipping

containers versus rail or truck. Additionally, contingency plans are necessary due to reliability challenges for the Missouri River – e.g., flood events. A benefit from this particular service is the ability for AGRIServices to transport a container with a smaller amounts of different specialty products, meeting the needs of smaller countries and prospective buyers. The anticipated service is to transport five barges per week carrying 36 containers per barge, amounting to 180 containers per week just at AGRIServices. This is just below the threshold of 210 containers to establish a dedicated service. But, the containers can be shipped with bulk containers and be picked up or dropped off along the route. Other ports could eventually use this service to also ship containerized barges, potentially meeting the needs for the dedicated service. Ball mentioned that the announcement of this project designation has generated a lot of inquiries from companies importing and exporting along the Missouri River.

Ball said the service is scheduled to start in 2022, but may be a moving target given the national challenges associated with container shipping logistics. Ball said the project aligns with the five Upper Mississippi River states' conversations about establishing a container-on-barge service on the Upper Mississippi River System.

Illinois River Next Generation Water Observing System

Jim Duncker reported on an update to the Illinois River Basin Next Generation Water Observing System (NGWOS). NGWOS is an element of USGS's Integrated Water Sciences program, collecting real-time observations or measurements of various water parameters to inform research regarding water processes and improve prediction capabilities. Simultaneously, USGS is modernizing its data delivery through its National Water Information System's National Water Dashboard. This will improve how data is shared with the public.

A related, follow-on program with separate funding, the Integrated Water Availability Assessments (IWAA) is scheduled to start in FY 2022 for the Illinois River Basin. The purpose of this effort is to comprehensively assess the water availability at regional and national level considering water quality and quantity from surface and groundwater sources as related to human and ecosystem needs and as affected by human and natural influences.

The Integrated Water Prediction (IWP) program develops large-scale modeling tools. Modelers will be listening to the conversations about data gaps and information needs to assess what types of prediction capabilities will be important for water resources management going forward.

Duncker reminded that the Illinois River Basin project started in January 2021. Stakeholder engagement was a primary focus in this first year, understanding priority issues for the basin. Additionally, work in FY 2021 included cataloging existing data and information, identifying data and knowledge gaps (including a deeper statistical review), developing a basin-wide science plan, and equipment acquisition as well as limited field work. The planned work in FY 2022 includes collecting new data, assembling existing data, conducting new research, and advancing regional and national model development. Duncker confirmed that stakeholder engagement will remain a constant priority throughout the Illinois River Basin NGWOS development. Duncker reported on the stakeholder engagements in 2021.

Of note, Duncker reported that USGS NGWOS was able to utilize its resources to monitor the 2021 HAB at Starved Rock, Illinois. That involved using new instrumentation to compare discrete sampling with water quality conditions, mapping the spatial extent of the bloom with field crews, and using areal imagery to examine the bloom. Under the Illinois River Basin NGWOS, USGS installed five of eight supergages, selected two field sites to examine groundwater and surface water interaction, implemented synoptic

surveys in the Mackinaw and Vermillion Rivers to measure nutrients, and tested airborne electromagnetic survey in the Upper Fox River (in southeast Wisconsin) leveraging another project. USGS has also initiated planning to develop a sediment budget for the Illinois River, working with the Corps.

In response to a question from Tim Hall, Duncker explained that most sensors stay in the water year-round, including during ice cover conditions. The algae tracker is a smaller buoy that collects parameters important to HAB monitoring and transmits the data to the cloud. That sensor must be pulled during winter.

In response to a question from Lauren Salvato, Duncker said the Illinois River NGWOS is covering the expense of two supergages important to the Illinois River nutrient reduction strategy. These include the supergage at Florence and at the Metropolitan Reclamation District's gage in Joliet. Those are two critical points. Critical to NGWOS is information about nutrient loads coming from Chicago and the Illinois River Basin.

Kirsten Wallace asked Duncker if there is an update on USGS's plans to advance social equity through NGWOS in the project area. Duncker explained that USGS is considering an urban social component within the Illinois River NGWOS. Duncker said there is not much to report at this time outside of a desire to engage an underserved community at the west side of Chicago that frequently experiences non-riverine flooding.

Water Resources Development Act 2022

Kirsten Wallace noted that UMRBA is planning to advocate to Congress that WRDA 2022 include provisions to eliminate a significant impediment to public-private partnerships in advancing important water resource projects. Namely, the impediments involve liability requirements that conflict with state constitutions and tort law and that are challenging for nonprofit entities and local governments to assume. UMRBA has joined similar advocacy efforts by the Interstate Council on Water Policy (ICWP), and is planning to join as a signatory to its letters to Congress requesting PPA reform.

As discussed earlier in the meeting, UMRBA will be considering its support for full federal funding for the Brandon Road project, including the project's remaining design, construction, and perpetual OMR&R. UMRBA will also consider a request or more general communication relating to developing a holistic two-way system for the prevention of inter-basin transition of aquatic nuisance species.

Wallace reported that UMRBA has tasked a small group to consider a provision requesting that the Corps undertake comprehensive, strategic channel maintenance planning in light of new and evolving hydrology, sedimentation, and other conditions.

Loren Wobig added that Illinois DNR has elevated the PPA-related reform needs within the context of its cost-share responsibilities on the Brandon Road ecosystem project. Wobig underscored the need for Congress to utilize WRDA 2022 to direct the Corps' liability arrangements within non-federal cost share agreements.

Wallace requested that UMRBA partners and stakeholders contact her with any WRDA 2022 provisions that they may be considering for the purposes of raising awareness of the UMRBA member states and/or requesting that UMRBA consider comments or a position.

Administrative Issues

Future Meeting Schedule

February 2022 — Location TBD

- UMRBA quarterly meeting — February 22
- UMRR Coordinating Committee quarterly meeting — February 23

May 2022 — Location TBD

- UMRBA quarterly meeting — May 24
- UMRR Coordinating Committee quarterly meeting — May 25

August 2022 — Location TBD

- UMRBA quarterly meeting — August 9
- UMRR Coordinating Committee quarterly meeting — August 10

With no further business, the meeting adjourned at 3:09 p.m.