

Upper Mississippi River Basin Association and U.S. Army Corps of Engineers Keys to the River 2020 Report

Summary of the January 27-31, 2020 Individual Chapter Team Meetings and February 25-26, 2020 Joint Chapter Teams' Workshop

This summary integrates discussions of the January 27-31, 2020 meetings and February 25-26, 2020 workshop. The first part of the summary focuses on high-leverage actions that are important to continue or to initiate soon in order to enhance the resilience of the river floodplain. The second half focuses on questions and issues that need further deliberation and could be evaluated through the UMRBA-USACE Section 729 planning effort.

This summary is meant to ensure that all interested parties can follow the development of the “Keys to the River 2020” report, which will include many of the ideas contained in this summary. The project’s next steps are to distribute this summary to workshop participants and to seek input from additional individuals and organizations through a survey regarding high-leverage actions and Section 729 planning-related questions and issues.

Strategic, Regional High-Leverage Actions

Flood Actions

- **HEC-RAS** is a strongly supported action. It is thought of as effective, responsible, reasonable, and important. One participant asked that the model be used to simulate levee setbacks and spillways. Feedback included the following:
 - The model should have up-to-date and accurate information on infrastructure and predicted precipitation conditions in the future. It should be used by FEMA for regulatory purposes and be created as an unsteady model that simulates long term annual hydrographs. The model should include sediment transport analysis capabilities.
 - The results should be viewed in the context of climate change.
 - The question driving the model’s output is an important consideration.
- **Flow frequency model** is thought to be an important action. Questions were raised regarding the historical information that would be used to make assumptions about flood probabilities. A suggestion offered was to develop a range of possible future scenarios given the many unknowns of climate change.
- Estimating and communicating risk (i.e., employing a **damages assessment**) is thought to be effective, responsible, reasonable, and important. Participants noted the particular effectiveness for local communities. It was noted that National Weather Service (NWS) does these types of assessments and that recommendations could include improving the database and including monetary impacts and low flow impacts. A suggestion was to incorporate ecosystem services and other non-monetary values.

Concern was raised regarding the potential that a damages assessment might unintentionally create division between agriculture and urban communities. Concern was also raised regarding local communities shielding conversations about risk associated with damages from floods given potential development and tax

implications. Frustration was voiced regarding the lack of progress to reduce known risk after past high water events.

Participants acknowledged that the messenger of the resulting data is important, with one suggestion that local communities perform their own analyses and another that engineers work with communities to explain the impacts and causes of flooding.

[Note: Given the discussion, the recommended language for this action is: “Assess the potential location and magnitude of economic vulnerabilities affected by major flooding.”]

- **Convening discussions regarding changing weather patterns** received mixed reviews. Some participants did not view this item as building resilience; others found it fundamental for building collective expectations of future conditions. Other participants suggested that this action would not result in anything substantial. Participants suggested that the action would be ineffective given the level of uncertainty in forecasts, stating that past events offer the only true certainty. Some participants suggested that this would be effective only if the focus was on explaining climate change science.

[Note: The Corps and UMRBA find this action to be helpful to continue learning and integrating the best available information into river-related planning and management. Therefore, this action will be included as a recommended watershed-level high-leverage action to include in the “Keys to the River 2020” report.]

- Utilizing TNC’s **floodplain prioritization tool** received mixed feedback, which was mostly centered around the availability of willing sellers and the perception that floodplain restoration is a priority solution relative to protection and other measures. Several levee districts expressed desire to protect their existing land use.

[Note: The tool was designed to inform where floodplain restoration would provide important storage capacity. However, the outcomes of using the floodplain restoration tool would reside in the Section 729 planning process among other decision-making tools and factors. Therefore, it is removed as an action item.]

- **Other** feedback and ideas received include the following:

- A clear vision and framework need to be articulated for the Section 729 authority, particularly related to flood conveyance.
- It was understood that the SDIC process would distinguish the PAIs who are directly affected by management of floods, sediment, and drought with those who are interested parties. It is unclear whether and how that is happening.
- Decisions should be based on facts rather than assumptions.
- The end product should clearly show where “making room for the river” would have a substantial impact for conveying floods and protecting communities. A related comment was that focus cannot be primarily on removing communities and farming from the floodplain. The resulting plan needs to combine the use of existing areas for flood storage and building up protection in other areas.
- Jargon is often hard to follow. Suggestion offered include simplifying language and creating a glossary of common terms.
- Output-related suggested actions include the following:
 - USGS climate tool for USFWS Region 3.
 - Real-time information per storm regarding how communities and landowners may be affected, including by water depths.

- FEMA buyout projects.
- Upland soil retention.
- Small dam and lake construction projects in the watershed.

Drought Actions

- Developing a **shared definition of drought conditions** is viewed as an important action. The purpose is to inform management by having a common understanding of the start, end, and severity of drought events given meteorological and hydrological conditions and how water use limits agriculture and societal demand. One challenge is communicating the complexity of defining drought conditions and forecasts as well as the need for shared definitions for the purposes of management and mitigation. Participants acknowledged the need to have sector-specific definitions. Suggestions included modeling how various droughts and other factors affect how low water conditions manifest in the river-floodplain.

The NOAA Midwest Drought Early Warning System (DEWS) is leading an effort to define drought for the Upper Mississippi River watershed (as part of the Midwest region) that the “Keys to the River 2020” report can illuminate.

- Establishing a series of watershed-level **triggers for management action** regarding drought events – i.e., identify management actions to take at certain low flows. Triggers (and management actions) could be developed per individual sectors. It was noted that river flow conditions are not necessarily reflective of drought indices.

[Note: While this is a very important action, identifying the need for management and what, where, and when that management will occur will be deliberated through the Section 729 planning process. Therefore, the action will be moved to that section of the report.]

- Creating an **inventory of critical infrastructure** within the river-floodplain that would be negatively affected by drought events is a strongly supported action. Questions were raised regarding whether the five Upper Mississippi River states would have the capacity to do this action. Participants expressed differing views on infrastructure that should be inventoried, including groundwater wells, habitats, flood control structures, and navigation structures. Ultimately, it was recognized that this action needs greater specificity.

[Note: Given the discussion regarding language and intent, the action is revised to “assess the potential location and magnitude of economic vulnerabilities affected by various drought conditions.”]

- Creating a **database of existing tools and information** for drought planning is viewed as an important action, but not as needed as the other actions. The National Drought Mitigation Center and Drought.gov are building databases that will meet this need.

[Note: Reflecting on the discussion, the recommended action is “support the continuing development of a database of existing tools and information for drought planning.”]

- **Other** feedback and ideas received include the following:
 - Models would be helpful that can simulate various low water scenarios, including consecutive years of drought conditions as well as events that may be likely given climate change.
 - Water storage is important for prolonged drought. Solutions raised were reservoirs, floodplain reconnection, wetland restoration, and other conservation practices such as measures that would enhance soil health.

- UMRBA is revisiting its UMR Basin Charter, which currently offers a notification process among the five states of known proposals for significant out-of-basin water transfers.

[Note: This is added as a high-leverage action.]

Sediment Actions

- Optimizing “**beneficial use**” of dredged material is a very important issue. There is some misunderstanding regarding the definition of beneficial use and where it happens, how, and for what purposes. Discussions about the solutions were complex, with many coordination, policy, and marketing solutions being raised. All of which were found to be important for relieving capacity in the system to handle dredged material. Concerns voiced were related to a) sustainability of upland storage and b) less expensive ways of removing sediment than beneficial use. MVR has submitted a request to ERDC for support regarding economics and beneficial uses of dredged material. The issues and nuances are well understood by those who manage them. The challenges (including costs) and solutions need to be more clearly communicated to the public. Issues regarding the type/quality of dredged material accepted by various users were discussed as well as the opportunities for public-private partnerships to sort and market the material.

Suggestions included the following:

- Establish a beneficial use working group in each Corps District.
- Resolve the limiting factors with the federal standard.
- Expand the Corps’ definition of beneficial use to include private uses.
- Expand existing markets and develop new market opportunities.

This solution is big and complex, but it is very important for maintaining the ability to remove sediment at the rate that it is accumulating in the navigation channel. Therefore, the “Keys to the River 2020” will include two related actions that will have the greatest ability to resolve the needs. These include 1) market the availability of dredged material to private and public entities and 2) address federal and state policies that limit innovative and effective ways of utilizing dredged material for public and private uses.

- Effective and efficient management of dredged material requires having sufficient **agreed-upon plans and agreements between the Corps and states**. Site-specific, pool-wide, and systemic plans allow for smart and opportunistic management of dredged material. Established agreements between the Corps and states for handling the material streamlines the ability for the states to meet their respective water quality permitting responsibilities, including when unpredicted channel constrictions occur. Participants encouraged the inclusion of new, innovative approaches to channel management in plans going forward. In particular, river managers acknowledged the need to develop pool-wide and systemic plans to account for unpredicted dredging and placement needs and to consider downstream impacts. Broader planning would also encourage more integrated management of sediment. A suggestion was offered to change the focus from how to best dredge the river to how to best manage sediment systemically, including using river training structures.

[Note: Reflecting on the discussion, the recommended action is “For USACE and states: Ensure planning, permitting, and other agreements are established and allow for proactive, strategic placement and use of dredged material.”]

- **Advocating for programs and projects that slow water and sediment movement** from the tributaries to the Upper Mississippi River. This is a highly important action because it addresses the root problems associated with the volume and velocity of water and sediment in the river-floodplain. Participants discussed the need to better understand tributary inputs and to focus on the tributaries having the greatest impact on the river-

floodplain. A suggestion was to encourage federal agencies with watershed management and the states to integrate goals and leverage resources.

— **Other:**

- These actions are mostly focused on the navigation channel. Dredging/sediment management is also required to restore deep water habitat in the backwaters.
- Sediment management should acknowledge impacts to flood conveyance.

Integrated River-Floodplain Resilience Planning (Section 729 Planning Framework)

Vision, Goals, Objectives, Problem

January 31, 2020 Meeting

On January 31, 2020, the Section 729 team reflected on a variety of questions posed by the flood, sediment, and drought teams to facilitate discussion about the vision, goals, and objectives for a potential Section 729 planning authority.

Participants generally agreed with the following reasons compelling UMRBA and the Corps to pursue long term, integrated planning:

- Leading regional coordination to achieve a common vision.
- Integrating best available information into risk analyses.
- Improving knowledge of land use and weather changes altering watershed and floodplain dynamics.
- Developing systemic, agreed-upon approaches to management.
- Ensuring necessary investment to improve system infrastructure (structural and nonstructural).

Ultimately, the purpose is to develop a coordinated plan with a commonly-held vision for systemic flood, sediment, and drought management. Regional leaders and stakeholders had offered the following outcomes for this planning effort:

- a) Integrate and better facilitate federal, state, local, and private actions.
- b) Improve implementation of federal and state laws and regulations through better education, consistent enforcement, and systemic management, which would reflect regional goals and objectives (when defined).
- c) Identify existing levels of protection throughout the entire Upper Mississippi and Illinois Rivers (potentially utilizing FEMA's approach to levee analysis and mapping flood hazards).
- d) Guide the development of individual pool-scale dredged material management plans.
- e) Identify targeted structural and non-structural actions in the watershed and floodplain – e.g., upland storage, floodplain restoration, levees, desired land use practices, improved buildings, and stabilizing bankline erosion.
- f) Develop a business plan for marketing beneficial use of dredged material – e.g., in-river fish and wildlife habitat restoration, upland placement, management facilities to sell material.
- g) Advance multi-purpose management of the Upper Mississippi and Illinois Rivers.

In general, we should be able to explain the desired future condition (coalesce around a shared vision) and how elements of that condition will thrive and be resilient. We will need to define resilience in the context of the issues related to flooding, sediment, and management. We will need to understand how changing tributary influences will shape future management of the river-floodplain. And, federal, state, and local governments will need to determine how they can be more consistent and integrated in planning and managing the river-floodplain.

Participants voiced support for the five-state effort, noting that the plan will need to be developed at a regional scale and integrate flood, sediment, and drought planning. There was general agreement to utilize existing information to inform today's conversations, determining what information is relevant and identifying new information needs. An evaluation of management strategies should consider benefits and trade-offs within an integrated, multi-purpose management context. This should result in a suite of actions that would have the greatest benefit to the river-floodplain.

Flood Questions/Issues

January 31, 2020 Meeting

The proposed objective for flood-related planning is to “create a regional framework for flood storage locations, levee elevations, as well as conveyance floodways.” Objectives proposed were the following:

- What are the existing levels of protection?
- Where are the chronic flood bottlenecks and how should they be addressed?
- Where and how will floodplain restoration help achieve resilience objectives, utilizing TNC's floodplain prioritization toolkit?
- What are the most effective structural and non-structural actions – e.g., upland storage, floodplain restoration, levees, desired land use practices, improved buildings, and stabilizing bankline erosion?

Participants of the January call suggested evaluating the relevant authorities' governing structures, noting that differing federal and state management approaches result in conflict and, in some cases, poor flood conveyance in bottleneck areas. In comparison to the Lower Mississippi River flood conveyance management, the Upper Mississippi floods occur differently with various factors that will affect the efficacy of certain actions. Snow melt and other influencing factors should drive flood management decisions including where protection is needed.

February 25-26, 2020 Meeting

The January discussion led to the series of questions and issues listed below to facilitate a broader discussion at the February 25-26, 2020 workshop. A summary of the February discussion is also provided below.

- What are the existing levels of flood protection?

Roughly half of the participants find this action to be very important and the other half as somewhat important. That may be partly due to how the question is asked. Comments were that:

- This question implies structural protection and not non-structural protection such as flood storage areas – e.g., connected floodplain.

- The question should be expanded to consider both how volume and velocity of river flows affect flood protection as well as how flood protection measures affect river flow upstream and downstream. An alternative question to capture this might be “how does flood protection interact with water volume and velocity?”
- The question should be more specific. It will be important to acknowledge gaps in our current information. For example, where is flood protection (i.e., levee heights) different than what is currently authorized and understood by the public?
- The question should go further and ask whether the existing levels of protection are adequate? And, at what magnitude of floods are the measures effective – i.e., beyond a 100-year flood?
- The question should be specific to various protection needs – i.e., communities, agriculture, commercial property.

— Where are the chronic flood bottlenecks and how should they be addressed?

Participants mostly found this action to be highly important. However, the term “bottleneck” triggered questions and comments. Participants suggested defining the term or replacing it with a more specific term. Bottlenecks could consist of constraints in policy, funding, or management. Additional questions offered were as follows:

- Given climate change, where are anticipated future bottlenecks in the system?
- What land management changes have added to flood frequency and duration?
- Where could flood capacity be added within the system?
- What contributes to flood conveyance issues?

— Where and how will floodplain restoration most effectively achieve resilience objectives?

Most participants found this question to be highly important. Two people, out of 21 survey respondents, found this question to be not important. One comment suggests that this is because the word “restoration” is ambiguous and will be interpreted differently by different stakeholders. For example, a restored floodplain could mean a forest and backwaters or a farmed area that is allowed to flood during high water conditions.

— What are the most effective structural and nonstructural actions to deal with floods – e.g., upland storage, floodplain restoration, levees, stabilizing bankline erosion?

Participants found this action to be highly important. Suggestions included ranking different types of floodplain restoration actions or structural and nonstructural measures – i.e., where will structural and nonstructural actions be most effective to reduce flood risk? Others suggested focusing on how we will “make room for the river” to accommodate the volume of river flows.

— Other questions and comments were as follows:

- Reduction in volume and velocity should not be the only objective. Flood pulse is an important consideration.
- Is the goal to reduce ecosystem or human impacts?

- New question: What authorities exist to encourage (or require) land owners to hold or store waters on their lands? What current barriers are there, if any, to implementing innovative ideas in the way we manage the river – i.e., levee setbacks, floodplain restoration, wetland habitat?
- New question: What is the anticipated future frequency, magnitude, and extent of flooding? What is an acceptable level of flooding?
- New question: In the face of climate change, where and how can nonstructural changes to flood protection benefit people and the environment?
- New question: How can we evolve/change the system to ensure communities are working together in planning and responding to floods rather than protecting localized benefits only?
- New questions re watershed influences: How broadly (geographically) can management actions be implemented? What is effective management? How important are actions taken up in the watersheds in reducing volume and velocity of water? What sub-watersheds are most impacting and/or affected by flood frequency? Are soil conservation programs targeting the right areas? Are there effective programs to address upland contributions?
- Add a question related to water level management at dams.

Drought Questions/Issues

January 31, 2020 Meeting

The proposed objective for drought-related planning is to “develop consistent approaches to drought management throughout the Upper Mississippi River watershed.” Objectives discussed by the drought team were the following:

- How should available water be prioritized and allocated in a low flow situation?
- What potential long-term solutions exist to ensure resilience – e.g., water and land use changes, reservoirs, ecosystem restoration?
- What are the triggers to take action and what actions would be implemented at various drought stages?

Participants of the January call recognized the complexity and enormity of potential drought planning needs within the Upper Mississippi River watershed. There was a generally-accepted recommendation that a first step be to compare the state and federal plans that might affect water levels on the Upper Mississippi River. Additionally, questions were raised regarding out-of-basin transfer requests. UMRBA is currently working with the five states to examine a new or updated Basin Charter of the five states. [Note: It is now proposed as a high leverage action.]

February 25-26, 2020 Meeting

The January discussion led to the series of questions and issues listed below to facilitate a broader discussion at the February 25-26, 2020 workshop. A summary of the February discussion is also provided below.

- How should available water be prioritized and allocated in a low flow situation?

Roughly half of the participants described this action as very important and the other half as somewhat important. That may be partly due to how the question was phrased. One comment suggested that this action be taken more immediately and not delayed until the Section 729 planning process is started.

- What potential long-term solutions exist to ensure resilience – e.g., water and land use changes, reservoirs, ecosystem restoration?

About two-thirds of participants found this action to be very important; the other third of participants described this action as somewhat important. Comments were to add specificity regarding resilience to this question, to examine the effectiveness of the solutions, and to add soil health to the list of examples.

- What are the triggers to take action and what actions would be implemented at various drought stages?

Participants generally found this action to be important. Suggestions included replacing the word “triggers” although that is an accepted term for drought planning. One comment received was the assumption that triggers would be based on consequences of greatest concern, suggesting that a sub-question consider those priority consequences.

- Other questions and comments were as follows:

- Examine the inter-relationship between renewable energy and coal/nuclear energy with respect to water needs.
- New question: What drought consequences are of greatest concern? What are the precursors to those consequences?
- New question: How important are coordinated efforts among the Upper Mississippi River states?
- New question: What sub-watersheds are at highest risk for water shortages (supply and in-stream) during extended drought?
- New question: How can drought vulnerabilities best be predicted and prepared for?

Sediment Questions/Issues

January 31, 2020 Meeting

The proposed objective for sediment-related planning is to “develop long terms plans for the placement of sediment.” Objectives discussed by the sediment team were the following:

- How can we achieve full utilization of dredged material through beneficial use?
- Where are the chronic dredging sites and how can we address them?
- What are the trends in sedimentation from the highest major tributary contributors?
- When will pools become essentially “full” and what will that mean for channel management?
- Is there a tipping point (and what is it) whereby sediment conditions permanently degrade the navigation channel and/or ecosystem?

Participants on the January call focused primarily on the influences of the watershed and the need to find ways to resolve the reasons for why the volume and velocity of sediment entering the river system continues to increase. Participants also discussed the differing sediment challenges and management solutions from the northern to southern segments of the Upper Mississippi River. A potential high-leverage action is to compare sediment management challenges and approaches along the UMR.

The January discussion led to the series of questions and issues listed below to facilitate a broader discussion at the February 25-26, 2020 workshop. A summary of the February discussion is also provided below.

- How can we achieve full utilization of dredged material through beneficial use?

Roughly half of the participants described this action as somewhat important and the other half as very important. That may be partly due to the awareness of beneficial use and the role it plays in the ability to expand storage capacity at placement sites. Participants pointed to the need to reduce sediment inputs from the watershed. Suggestions included reducing the total amount dredged and to explain the term “beneficial use.”

- Where are the chronic dredging sites and how can we address them?

Participants found this action to be important. Participants acknowledged the need for a systemic plan for managing sediment, noting that there are substantial dredging needs in areas that have historically not been chronic dredging sites. This question might help to prioritize near-term work but not long term needs. It was suggested to expand this question to include anticipated dredging needs given climate and land use changes. Others noted the need to address the root problem – i.e., high volume of water and sediment from the watershed that is also causing in-channel erosion.

- What are the trends in sedimentation from the highest tributary contributors?

Participants found this question as important to address. Comments received included that sediment sources from within the river-floodplain needs to be addressed as well – e.g., bankline and island erosion. Again, this question mostly helps to aid near term work and not longer-term planning. Other suggested questions were as follows:

- Which parts of the watershed are the largest sediment contributors?
- What is causing the trends (direction and rate)?
- How are those contributions likely to change given a range of plausible future scenarios?
- Which areas of the watershed would be most responsive to management changes?

- When will the pools become “full” and what will that mean for channel management?

While about half of participants found this action to be important; the other half either found it not important or were unsure of its importance. This was likely due to the clarity of the question, including how “full” is defined. But also the need to dig deeper into the issue and solutions. Participants noted the relevance of this question to flood conveyance. The central issue is about whether sediment is entering the river at a rate that exceeds our ability to remove it. One participant commented that questions about thresholds and “what it means” does not seem useful.

- New question: At what rate is sediment accumulating in the river and floodplain?
- New question: Is it feasible to remove the sediment that is coming into the river-floodplain at a rate similar to which it is accumulating? If the answer is no, what are the range of possible future conditions for the river?

- Is there a tipping point (and what is it) whereby sediment conditions permanently degrade the navigation channel and/or ecosystem?

Participants mostly found this action to be important; although some participants were unsure of its importance. One participant noted that the Illinois River may have already passed the tipping point. Participants suggested that this question would benefit from greater specificity but that it also may be too difficult to answer. Again, work needs to be done in the watershed. There was also an acknowledgement that the navigation system and ecosystem would be affected in very different ways.

- New question: When does the rate of sedimentation become so great that the cost of channel maintenance is too expensive?

Participants acknowledged the need for a systemic plan for managing sediment, noting that there are substantial dredging needs in areas that have historically not been chronic dredging sites. This question might help to prioritize near-term work but not longer term needs. It was suggested to expand this question to include anticipated dredging needs given climate and land use changes. Others noted the need to address the root problem – i.e., high volume of water and sediment from the watershed that is also causing in-channel erosion.

- Other questions and comments were as follows:

- New question: What existing programs, funding, or policies can help encourage slowing water movement through the watershed?
- New question: How can land/soil management help to reduce sediment runoff?

Knowledge, Governance, and Policy Questions/Issues

January 31, 2020 and February 25-26, 2020 Meetings

In the conversations to-date regarding this planning effort, it was acknowledged that we will need to improve our knowledge of existing and future conditions as well as to better integrate that knowledge into management decisions. That we have an appropriate regional decision-making body that can ensure the ultimate planning recommendations are implemented and to maintain ongoing dialogue. And, that funding is available to implement the recommendations and that policies allow for effective implementation.

While there is energy to dig into knowledge, governance, funding, and policy questions, it was recognized that the planning goals, outcomes, and recommendations will inform the needs around those questions. We can begin to lay out different criteria and considerations, but any decisions regarding those needs now would be premature.