

**Upper Mississippi River Restoration Program  
Coordinating Committee**

**Quarterly Meeting**

**February 24, 2016**

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**Agenda  
with  
Background  
and  
Supporting Materials**

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# UPPER MISSISSIPPI RIVER RESTORATION PROGRAM COORDINATING COMMITTEE

**February 23-24, 2016**

## AGENDA

### **Tuesday, February 23      Partner Quarterly Pre-Meetings**

- 3:45 – 5:30 p.m.      Corps of Engineers
- 3:45 – 5:30 p.m.      Department of the Interior
- 3:45 – 5:30 p.m.      States

### **Wednesday, February 24      UMRR Coordinating Committee Quarterly Meeting**

Time	Attachment	Topic	Presenter
8:00 a.m.		<b>Welcome and Introductions</b>	<i>Don Balch, USACE</i>
8:05	A1-21	<b>Approval of Minutes of November 18, 2015 Meeting</b>	
8:10		<b>Regional Management and Partnership Collaboration</b>	<i>Marv Hubbell, USACE</i>
	B1-4	▪ FY 2016 Fiscal Update and Scope of Work	
		▪ FY 2017 President's Budget	
	B5-6	▪ Major Steps Towards Achieving the Strategic Vision	
		– A Framework for Near Term Activities and Long Range Plans	
	B7-33	▪ 2015-2025 UMRR Strategic Operational Planning	
		– Recommended Draft Plan for Committee's Consideration of Endorsement	
		▪ Branding Design Concepts	<i>Kevin Bluhm, USACE</i>
		▪ USACE UMRR Database Update	<i>Michael Dougherty, USACE</i>
		▪ Public Involvement and Outreach Activities	<i>All</i>
10:45		<b>Break</b>	
11:00		<b>Long Term Resource Monitoring and Science</b>	
	C1-13	▪ FY 2016 2 <sup>nd</sup> Quarter Highlights	<i>Jeff Houser, USGS</i>
	C14-16	▪ 2016 Science Coordination Meeting	
		▪ Developing Ecological Resilience Conceptual Models	
		– January 5-7, 2016 Workshop	
		– Next Steps	
		▪ USACE Science Update	<i>Karen Hagerty, USACE</i>
		▪ A-Team Report	<i>Shawn Giblin, WI DNR</i>
	C17-19	▪ Science Highlight: Management-Relevant Fish Habitat Models for the UMRS	<i>Brian Ickes, USGS</i>
12:15 p.m.		<b>Lunch</b>	
(Continued)			

**Wednesday, February 24, 2016**  
**UMRR Coordinating Committee Quarterly Meeting**  
(Continued)

Time	Attachment	Topic	Presenter
<b>1:15 p.m.</b>		<b>Habitat Restoration</b>	
		<ul style="list-style-type: none"> <li>▪ District Reports</li> <li>▪ Lean Six Sigma Update</li> </ul>	<i>District HREP Managers</i>
	<b>D1-3</b>	<ul style="list-style-type: none"> <li>▪ Habitat Needs Assessment <ul style="list-style-type: none"> <li>– Draft Project Management Plan</li> </ul> </li> </ul>	<i>Marv Hubbell, USACE</i> <i>Sara Schmuecker, USFWS,</i> <i>Nate De Jager, USGS, and</i> <i>Tim Eagan, USACE</i>
	<b>D4</b>	<ul style="list-style-type: none"> <li>▪ USFWS’s Natural Resource Inventory</li> <li>▪ Planning New Project Starts <ul style="list-style-type: none"> <li>– Plans for Initiating the Process for Selecting the Next Generation of Habitat Projects</li> </ul> </li> </ul>	<i>Sara Schmuecker, USFWS</i> <i>Marv Hubbell, USACE</i>
<b>2:30</b>		<b>Other Business</b>	
	<b>E1</b>	<ul style="list-style-type: none"> <li>▪ Future Meeting Schedule</li> </ul>	
<b>2:45 p.m.</b>		<b>Adjourn</b>	

[See Attachment E for frequently used acronyms,  
UMRR authorization (as amended), and UMRR (EMP) operating approach.]

## **ATTACHMENT A**

**Minutes of the November 18, 2015**  
**UMRR Coordinating Committee Quarterly Meeting**  
*(A-1 to A-21)*

**DRAFT**  
**Minutes of the**  
**Upper Mississippi River Restoration Program**  
**Coordinating Committee**

**November 18, 2015**  
**Quarterly Meeting**

**InterContinental St. Paul Riverfront**  
**St. Paul, Minnesota**

Sabrina Chandler of the U.S. Fish and Wildlife Service called the meeting to order at 8:02 a.m. on November 18, 2015. Other UMRR Coordinating Committee representatives present were Don Balch (USACE), Mark Gaikowski (USGS), Dan Stephenson (IL DNR), Randy Schultz (IA DNR), Kevin Stauffer (MN DNR), Janet Sternburg (MO DoC), Jim Fischer (WI DNR), Ken Westlake (USEPA) via phone, and Marty Adkins (NRCS). A complete list of attendees follows these minutes.

**Minutes of the August 5, 2015 Meeting**

Randy Schultz moved and Dan Stephenson seconded a motion to approve the draft minutes of the August 5, 2015 UMRR Coordinating Committee meeting as provided. The motion carried unanimously.

**External Communications and Outreach**

Marv Hubbell recalled that Goal 3 of the FY 2015-2025 UMRR Strategic Plan is to “engage and collaborate with other organizations and individuals to help accomplish the UMRR vision.” An overarching need to help advance the Goal’s objectives and strategies is a standing communications committee to develop and implement an external engagement and outreach plan. An immediate need is a brand and imaging (logo) that will provide consistency and effectiveness in how UMRR is portrayed externally. According to Hubbell, a weakness of UMRR has been its ability to adequately tell the story of its accomplishments over time and highlight the continued need for investment to restore the river to a healthier and more resilient state. UMRR is working with partners to form the standing communications team, which would involve a mix of communications/marketing experts and UMRR experts. B-1 of the agenda packet also includes a written explanation from Hubbell to set up today’s discussion.

Kevin Bluhm reported that USACE awarded a contract to the Gulf South Research Corporation and Schneider Communications in September 2015 for the development of UMRR branding and imaging. Bluhm introduced the contracting team, including Bill Wittland of VoxStrategic, Kim Schneider of Schneider Communications, and Ann Guissinger of Gulf South Research Corporation. Bluhm said the team began conducting interviews with UMRR stakeholders in October and estimates they are about 75 percent finished. The questionnaire includes leading questions about connections to the river and how UMRR partners want external audiences to think and feel about the program. Bluhm anticipates having a suite of branding options for the UMRR Coordinating Committee to consider at its February 24, 2016 meeting.

*Branding and Logo Development*

Bill Wittland provided an overview of branding, its definition, value, and how to use it effectively. Wittland explained that a brand is not a name, logo, geographic presentation, slogan or tag line, nor a newsletter or report. Rather, a brand is an essence, promise, expectation, and loyalty that expresses a name, logo, geographic presentation, and so forth. By definition, a brand is “the convergence of a lived essence and the experience of that essence in and by the marketplace.” Wittland explained that UMRR

must consider “its marketplace.” The monetary value of a brand alone shows its importance. For example, Coca Cola’s brand is valued at \$50 billion. In addition, brands trigger values and other emotions simply by their imaging, such as Apple and Nike. Wittland described how brands are built on impressions. UMRR partners will eventually become “brand ambassadors” that will represent UMRR. The brand and images should illicit the desired values for getting various audiences to rally around UMRR’s endeavors.

Wittland, Schneider, and Guissinger led a facilitated discussion, where meeting participants broke into small groups to brainstorm how to describe UMRR in various scenarios. Today’s discussion is meant to generate ideas about how UMRR is perceived and how partners want to project the program externally. The results will be used to generate UMRR branding tag line and images. The small groups reported their results to the larger group. The list of questions and answers is as follows:

- Question: If the UMRR were a car, what car would it be and why?

Answers:

- Honda: Reliable, inexpensive, trendy, green
- GMC: “Home grown,” proven, reliable, excellence, initiative
- Ford: High quality customer service, reliable, inexpensive, trendy, green, domestic, proven, excellence, number one American-made truck (“UMRS is the most American river”), dependable, hardworking, durable, tough
- Chevy: “Heartbeat of America,” available range includes economy cars to SUVs and trucks, reliable, “like a rock” – solid and steady, high value, high utility
- Prius: Efficient, reliable, cost-effective, eco-friendly
- Lincoln: High quality, innovative, quintessentially Midwestern, captures essence of President Lincoln as it honest and hard working, local but with worldwide recognition, long-enduring
- Jeep/Truck: Dependable, “carries the load,” continuously produces expected results, color is green and blue, goes everywhere, not overboard, versatile
- Other: Color would be silver as it does not show dirt but is also the hardest car color to see on the road

- Question: If you went to the grocery store, in what aisle would you find UMRR and why?

Answers:

- Chips: Diversity of types
- Baking: None of the ingredients are worth anything alone, but together they make great things
- Produce: Healthy, fresh, vibrant colors (colorful), organic, natural, diverse, needs water and other inputs, direct contact/touch, raw, real (not synthetic)
- Books: Knowledge
- Meat: Fishing, recreational, heard-working, real, sustentative, need input and “management” by people
- Clearance: Efficient, effective
- Bakery/bread: Staple, innovation, reliable
- Beverage/water: Water-based, important resource
- Utensils: Uses tools to achieve goals, always there

- Question: If the UMRR were a hotel chain, what would it be and why?

Answers:

- Blackhawk in Iowa: Innovative, surprisingly elegant and sophisticated (televisions in bathroom mirrors like UMRR's science), historic, unique
- Holiday Inn: High quality/value, cost-effective, innovative, fresh ideas, "smart people stay there," rewards program, high customer loyalty, consistency in outcomes
- Stoney Creek: Woods-y, natural, rustic, stone fireplace, room variety, cozy/"feels like home," room variety, somewhat unknown
- "Choice hotels" (Radisson, Marriott): Range of options, diversity, "association with successful UMRR meetings that led to achievements"
- Bed and Breakfast: Individually customized and personalized and place-based
- Hyatt: Upscale and sophisticated, high quality service, high value for the money invested (like UMRR's sophisticated, high quality science and engineering)

- Question: What do you hope people are saying in 18 months about the UMRR?

Answers:

- Healthy river supporting our multiple uses (i.e., UMRR's vision)
- Progressive, new technologies
- Long-term vision
- This is the most important thing we can invest in; we need this!
- I never knew!
- It's amazing what we can do when we work together; it's energizing when that happens
- What a partnership!
- Good program; I support it
- How did they get all our money?
- Wow, I did not even know this program existed!
- Better understanding of 30 years of accomplishments
- Understanding of what was present before current system (historical conditions)
- Cohesive partnership; how well parties work together
- These accomplishments were achieved through collaboration, not conflict
- UMRR helps restore fish and wildlife
- UMRR uses science to inform habitat projects
- UMRR should be a model for all other programs; they are doing it right!
- Restoration has begun, but there is a long way to go.
- UMRS is a tremendous resource
- I feel drawn into river magic!
- UMRR needs support, how can I help?
- UMRR is a good investment

- I recognize UMRR/I know this program; I know the new acronym, UMRR!
- Research has led to projects
- I have heard about it (in a positive context)
- Ecological conditions on the system are improving
- Comprehensive integrated science and restoration program
- It is well-funded!
- The UMRS state Governors know about it
- UMRR is connected with cities and towns on the river, and k-12 schools using STEM
- UMRR is recognized as a world leader in applied river science and restoration
- UMRR is nationally recognized among similar programs like the Everglades
- There is transparency and accountability in using resources

Janet Sternburg asked if other government programs that have brands. Barb Kleiss said the Mississippi River Geomorphology and Potamology Program (MRG&P) uses consistent fonts, imagery, and formatting on all of its documents. Chris Erickson observed the success of the “Smokey the Bear” campaign. Wittland said Chesapeake Bay has developed an effective brand. Gretchen Benjamin said UMRR did some branding for its 20th and 25th Anniversaries. Kleiss said USACE’s Engineering Research and Development Center (ERDC) is currently exploring its own branding.

Olivia Dorothy asked if UMRR needs to reconsider its name. Wittland observed that Everglades has a more specific geographic identity, but not necessary a programmatic identity. Benjamin said the Everglades restoration project has a different name in the Administration’s and Congress’ budgets. Karen Hagerty said UMRR’s name provides both a place-based and activity-based association. Wittland explained that a name cannot say everything. Rather, a name is a hook to build an understanding. Bluhm said Everglades uses an egret and Chesapeake uses a serpent. The images and tag lines are consistent on all public documents. The programs’ actual names are rarely highlighted.

Wittland said the contracting team plans to schedule a web-based meeting in January 2016 to discuss initial draft logos and taglines, based on today’s discussions and the personal interviews.

## **Regional Management and Partnership Collaboration**

### *FY 2015 Report-Out*

Marv Hubbell reviewed UMRR’s FY 2015 work plan under its \$33.17 million appropriation, as follows:

- Regional Administration and Programmatic Efforts — \$861,000
- Regional Science and Monitoring — \$8,126,000
  - Long term resource monitoring — \$5,495,000
  - Regional science in support of restoration — \$1,907,000
  - Regional science staff support — \$69,000
  - Habitat project evaluations — \$655,000
- Habitat Restoration — \$24,183,000
  - Regional project sequencing — \$70,000
  - MVP — \$7,234,000
  - MVR — \$9,645,000
  - MVS — \$7,234,000



Hubbell reported that cost savings in FY 2015 provided \$50,000 to \$60,000 for the UMRR branding and logo effort. In response to a question from Sabrina Chandler, Hubbell said Pool 12 Overwintering Stage II's construction award was much less than estimated and resulted in the significant cost savings.

In response to a question from Olivia Dorothy, Hubbell said NESP's FY 2014-16 funds have been used on programmatic efforts and are not targeted specifically to either the program's navigation or ecosystem restoration components.

Hubbell reported that UMRR's FY 2015 obligation rate is 99.6 percent. According to Hubbell, this achievement underscores the incredible value of the program's collaborative, interagency partnership and the partnership's ability to quickly advance projects and activities that align with the program's strategic goals and objectives. Hubbell expressed appreciation to Division and District staff, UMESC, USFWS, and the state field stations for their contributions to FY 2015's effective implementation. Hubbell emphasized the necessity of having contingency plans to ensure cost savings are spent on high priority efforts. UMRR's ability to continually obligate at nearly 100 percent is an advantage for the program at a national scale when competing for federal funds.

#### *FY 2016 Appropriations Report*

Hubbell reported that, on September 30, 2015, Congress enacted a continuing resolution authority (CRA) for FY 2016 that is set to expire on December 11, 2015. District staff are directed to plan at the President's FY 2016 request for UMRR, which is \$19.787 million and is \$13.383 million less than the program received in FY 2015. This funding level was matched by the House in its FY 2016 energy and water appropriations bill. The Senate did not pass a FY 2016 energy and water appropriations measure.

Hubbell outlined UMRR's internal allocations under the \$19.787 million planning scenario, as follows:

- Regional Administration and Programmatic Efforts — \$741,000
- Regional Science and Monitoring — \$6,567,000
  - Long term resource monitoring — \$4,500,000
  - Regional science in support of restoration — \$963,000
  - Regional science staff support — \$129,000
  - Habitat project evaluations — \$975,000
- Habitat Restoration — \$12,479,000
  - Regional project sequencing — \$100,000
  - MVP — \$3,425,000
  - MVR — \$4,745,000
  - MVS — \$4,209,000

[Note: The District habitat restoration funds are not reflective of the historical split based on river mileage, and instead are reflective of the project priorities as identified in the budget process.]

#### *FY 2017 Funding*

Hubbell said the Corps is currently developing a proposed FY 2017 budget for its Civil Works programs and projects. MVD provided a budget request for UMRR in August. OMB is currently evaluating the Corps' proposed budget and is scheduled to provide a pass back to the Corps for input in December. The President typically releases budget requests in February for the following fiscal year. Hubbell explained that UMRR's budget is developed internally and cannot be shared externally until the President formally releases the budget request.

### *Principles of Efficient Execution*

In response to budget discussions with Headquarters, Hubbell said District staff are developing draft principles of efficient funding for UMRR's execution of its habitat projects. [Note: The request for efficient execution principles does not include the program's science efforts.] Hubbell recalled that, at the August 5, 2015 UMRR Coordinating Committee quarterly meeting, Dru Buntin and Gretchen Benjamin reported that Headquarters' requested that UMRR's non-federal partners describe the program's plans for efficient execution of its habitat projects when communicating the rational for funding needs.

Buntin said that, during visits in summer 2015, ASA(CW) Jo-Ellen Darcy's staff and Headquarters' staff emphasized the need for UMRR's non-federal partners to more actively communicate the funding levels needed to efficiently execute habitat projects, given contracts, availability of resources, and other considerations. ASA(CW) staff suggested that this would require working directly with District staff to define efficient funding. Buntin said the prohibition of earmarks (as currently defined) and the significant cut to UMRR in the President's FY 2016 budget clearly demonstrate the need to communicate directly to the Administration regarding funding needs.

Buntin reported that UMRBA and the UMRR Coordinating Committee's state members jointly sent an August 24, 2015 letter to OMB and ASA(CW) explaining the need to fund UMRR at \$33.17 million in FY 2017 and \$28.6 million in FY 2016, requiring an additional allocation to UMRR of \$8.813 million in the FY 2016 work plan. In addition, Buntin said he and Benjamin met with UMR delegates and the Administration in Washington, D.C. on November 3-4, 2015. Buntin and Benjamin met with Congressional members and Headquarters' staff on November 3. In the morning of November 4, they met with OMB staff. That afternoon, Representative Ron Kind hosted a meeting in his office with Buntin, Benjamin, ASA(CW) Jo-Ellen Darcy, and Let Mon Lee. Buntin said OMB staff were very interested in discussing UMRR's history, including events that led to its inception, and how the program is thinking strategically about restoring the ecosystem to a healthier and more resilient state. The meetings with OMB and ASA(CW) included an overview of how UMRR served as a compromise arising from conflicts regarding lock replacement and expansion at L&D 26. These events and the associated compromise resulted in multi-purpose management of the UMRS that has become a strong asset of the region. The program's upcoming 30<sup>th</sup> Anniversary celebration in 2016 was also discussed. According to Buntin, the meetings were productive in highlighting the value of UMRR to the nation and underscoring the importance of funding the program at productive levels.

Hubbell reported that District staff are developing principles to efficient execution. Those discussions have concluded that efficient funding requires that each District has two to four habitat projects in each phase (feasibility, planning, and construction) at all times. This balance is important for managing risk and ensuring a continuous flow of work. Efficient funding would support completing feasibility studies in an average of three years, planning that would immediately follow completion of feasibility, and construction that would immediately follow planning. In addition, efficient funding minimizes breaking projects into phases or stages. Funding construction through a single contract results in significant cost savings in comparison to several smaller contracts. In addition, efficient funding would allow for completing O&M manuals within a maximum of one year following project construction. Brian Johnson said optimal funding currently the greatest consideration in the Corps' budget decisions. The Administration is asking that the proposed funding level reflect most efficient implementation. For UMRR, optimal funding will not always amount to its full authorized level. Buntin recalled that partners discussed the principles of efficient funding throughout the development of the FY 2015-2025 UMRR Strategic Plan. He recognized that non-federal partners' attempt to insert themselves in the budget development process is challenging given Corps' internal policies, but that the ASA(CW)'s staff directed that non-federal partners work with District staff to obtain the efficient funding levels and associated planned work. Hubbell said Headquarters' guidance is that District staff can share information regarding capabilities, but not proposed budget information.

Mickelsen expressed appreciation to Olivia Dorothy for her efforts in engaging Upper Mississippi River public stakeholders and facilitating their advocacy efforts in support of UMRR. Dorothy worked through the Mississippi River Network to obtain over 10 agency letters to the Administration expressing the value of UMRR and their support for funding the program at its full annual authorized level of \$33.17 million in FY 2017. In addition, 112 “River Citizens” submitted funding requests to the Administration via the One Mississippi online action center. Mickelsen said DNR Directors from Illinois, Minnesota, and Wisconsin also sent letters to the Administration seeking \$33.17 million for UMRR in FY 2017.

#### *Colonel Craig Baumgartner Remarks*

Col. Craig Baumgartner reported that he recently spent a week in Washington D.C. visiting with several Congressional members, who asked many questions about UMRR’s historical context, its implementation thus far, and its strategic direction going forward. Col. Baumgartner acknowledged that answering questions about “where we [UMRR] are going” is sometimes challenging. He agreed with Buntin’s earlier comments that the Corps needs to frame its budget requests in the context of achieving efficient execution of habitat projects. He stressed the need to also frame UMRR’s budget in a long-term, strategic context, rather than solely on single-year execution capabilities, and defining implementation priorities based on that visionary context. Col. Baumgartner recognized that UMRR, along with other USACE’s programs and projects, is under increased scrutiny and challenges given the increasingly competitive budget environment. Col. Baumgartner suggested articulating the risks to the UMRS ecosystem associated with a “no action” alternative as well as how the program’s habitat projects are minimizing risk. Col. Baumgartner said he is asking District staff to expedite completion of project evaluation reports in order to analyze project performance and to have meaningful, measureable examples of benefits received from UMRR’s habitat projects that can be communicated in future budget justifications. The evaluations can be used to answer questions regarding where we [UMRR] have been, and estimates of “no action” risk can be used to answer questions regarding where we [UMRR] are going and why. Col. Baumgartner said the Corps’ environmental engineers elsewhere in the nation use UMRR as a model.

Sabrina Chandler expressed appreciation to Col. Baumgartner for his articulation of the need to develop a strategy based on risk to the ecosystem, and using that assessment to prioritize future habitat projects. Given that USFWS is a significant land owner along the UMRS, Chandler said the agency has a significant stake in the Corps’ ecosystem restoration strategy on the river. Col. Baumgartner recognized that defining long term strategies and priorities is not an easy task, but will be very important to justify UMRR’s budgets going forward.

Olivia Dorothy asked what information the Corps can share externally prior to the President’s budget release so that UMRR’s non-federal partners are communicating these strategic priorities and optimal funding needs relatively consistently to the Administration and Congress. Marv Hubbell said the Administration’s request to Buntin and Benjamin to articulate optimal funding needs is a new approach for District staff, who have not been able to share any information externally prior to the President’s budget formal publication. While District staff are prohibited from releasing any budget information externally, there may be allowances to share capability information based on the status of ongoing projects and assumptions regarding optimal execution. Hubbell committed to working with District and Division leadership to understand what type of information is shareable.

Mark Gaikowski asked how efficient execution of UMRR’s long term resource monitoring and science is being considered. Hubbell said District staff communicate the funding levels needed to maintain the field station infrastructure and capabilities for long term resource monitoring database management, as well as analysis and research for restoration purposes. He said District staff included increased funding for science relative to increased total budget increments.

### *FY 2015-2025 UMRR Strategic and Operational Planning Update*

Hubbell explained that, since the August 5, 2015 UMRR Coordinating Committee meeting, the FY 2015-2025 UMRR Operational Planning Team has been exploring a recommendation to create a new interagency habitat team that would be similar to the UMRR Analysis Team and would discuss systemic ecological restoration needs and implementation issues. Some proposed actions for the habitat team include identifying and recommending habitat projects, considering how to best integrate ecological goals and objectives into habitat projects, defining questions for scientific investigation, and providing a discussion forum for UMRR scientists and restoration practitioners. On an October 23, 2015 conference call, team members ultimately resolved to instead utilize existing interagency forums to consider systemic issues and facilitate dialogue and information exchange, including the UMRR Coordinating Committee and District-based river teams. In addition, UMRR has recently begun holding biennial in-person meetings to facilitate discussion and strategic planning among scientists and restoration practitioners and hosting joint conference calls among the Corps' UMR District river teams.

Kirsten Mickelsen recalled that the UMRR Coordinating Committee had agreed to the operational planning team's request to hold a partnership webinar to "roll out" the draft operational plan prior to the Committee's consideration of endorsement of the draft plan. The planning team's desire for this approach is to communicate consistent messages about the operational plan's direction and facilitate dialogue among all program implementation contributors about how they will collectively work towards achieving the Strategic Plan's goals and objectives. Mickelsen said she will send the UMRR Coordinating Committee a request for schedule information for that partnership call within the next week along with a revised draft operational plan for review prior to the call.

Hubbell expressed appreciation to the individuals who contributed time and resources in participating in the FY 2015-2025 UMRR strategic and operational planning efforts.

### *2016 UMRR Report to Congress*

Mickelsen provided an overview of the first round of partnership review on the working draft 2016 UMRR Report to Congress (RTC), dated September 11, 2015. Mickelsen provided a brief overview of the authorization requirements regarding UMRR's reports to Congress that occur on a six-year cycle. She said the draft 2016 report's overall outline and messages relate directly to the FY 2015-2025 UMRR Strategic Plan, and how the program's previous implementation and future strategies relate to the vision of "a healthier and more resilient UMR ecosystem that sustains multiple uses." Mickelsen said seven individuals submitted comments on the draft report. However, she anticipates this is largely because many partners were involved in developing messages and reviewing text respective to their contributions to program implementation.

Mickelsen said there were a few questions related to the definition of resilience; however, she said an interagency partnership led by USGS is currently examining the definition and application of resilience concepts to the UMR ecosystem. The report will be updated as that group fleshes out the concepts. One commenter noted that the various uses of "partners," "implementing partners," and "program partners" is confusing and should be differentiated and explicitly defined in the report. Mickelsen agreed with this comment and said it would be helpful to define these terms for consistency beyond just the 2016 RTC, noting that partnership is used in different contexts with different meanings. While the Corps intends to be as inclusive as possible and includes the interested public and others in references to UMRR partners, sometimes "implementing" or "program" partners are used to include only potential non-federal cost share sponsors or partners included UMRR's authorization and that have specific responsibilities to implement components of the program.

Mickelsen explained that she also agreed with another commenter who suggested that report should include a more accurate depiction of the science involved in selecting UMRR's earliest habitat projects, many of which were based on the scientific evaluation of the UMRS ecosystem and restoration needs in the series of GREAT reports. Many of UMRR's historical documents describe the program's earliest habitat projects as being selected based on land managers' knowledge of site-specific needs. However, there was also scientific justification for those projects that also related them to larger systemic ecosystem restoration needs. Over time, UMRR's scientific insights and tools have become more sophisticated and so too have the scientific applications and justifications in UMRR's habitat projects.

Mickelsen said a commenter asked about the ability and process for nonprofits to participate in identifying and selecting UMRR's habitat projects. Mickelsen said WRRDA 2007 expanded the definition of non-federal sponsors to include nonprofits and, in 2012, Headquarters issued guidance confirming that the provision applies to UMRR. Subsequently, the UMRR Coordinating Committee agreed in the 2013 UMRR Implementation Issues Assessment that it supports advancing habitat projects with nonprofits as cost share sponsors, subject to prioritization based on ecological considerations. Mickelsen said a commenter suggested that UMRR change its reference of Asian carp to invasive carp or some other term, noting that the current reference may be offensive. Mickelsen noted that Minnesota and other governmental entities have changed their reference to the species. In response to a question from Mickelsen, the UMRR Coordinating Committee agreed to continue referring to the fish as Asian carp.

Mickelsen said comments regarding specific asks to Congress were to 1) increase UMRR's annual authorized appropriation level and 2) restart monitoring components that have been terminated since the program's inception, such as navigation traffic and macroinvertebrates. Mickelsen observed that the current UMRR's annual authorized level is not a constraint to the program's implementation. Hubbell agreed and said the report lays a foundation for describing the program's resource needs in the future. Hubbell said the Corps monitors navigation traffic through other authorities and he does not see the rationale for allocating resources away from ecosystem restoration and monitoring. He said monitoring for macroinvertebrates is an internal program issue that can be addressed within the region. It does not need to be articulated to Congress. Olivia Dorothy said she provided the comments regarding restarting monitoring components and clarified that the purpose was to trigger thinking about what opportunities could be pursued with increased funding.

Fischer expressed appreciation to Mickelsen on her work developing the first draft of the 2016 UMRR RTC. He emphasized the importance of explaining the benefits associated with UMRR's recent science and restoration integration efforts while not minimizing the program's earlier habitat projects and scientific learning. Fischer asked if the inclusion of the UMRR-NESP Transition Plan is something that the partnership wants to describe as the future plan. Mickelsen said the Corps submitted the Transition Plan to Congress in 2012, as directed, and it includes the main themes as described in that Plan. It also describes communications regarding the Plan from most of the program's non-federal sponsors. The UMRR Coordinating Committee agreed to include the Transition Plan in the draft report.

Mickelsen said a revised draft 2016 UMRR Report to Congress will be distributed to the partnership in mid to late December. Headquarters and Division staff are included on the report's distributions and thus have access to review the report throughout its development. A formal review request will be sent to Headquarters in spring 2016, prior to incorporation of professional graphics.

## **Habitat Rehabilitation and Enhancement Projects**

### *Habitat Needs Assessment*

Marv Hubbell explained that, over the past few years, UMRR partners have repeatedly raised the need for a new habitat needs assessment (HNA) that incorporates the knowledge gained since 2000 and to inform the next generation of habitat projects. At its August 5, 2015 quarterly meeting, the UMRR

Coordinating Committee asked for a presentation at today's meeting about the content and process of developing the 2000 HNA as well as for a more detailed recommendation for developing the "HNA II," including the knowledge gained since 2000 that will expand and inform the next assessment's analyses.

Hubbell said he anticipates that the HNA II will build from the 2000 HNA and incorporate new analytical tools, updated and new data, other knowledge gained since 2000, and lessons learned in developing the 2000 HNA. Hubbell proposed forming a partnership-based, interagency team to develop the HNA II. The 2003 HREP Sequencing Framework would still be utilized to ultimately select and sequence future habitat projects. Hubbell said the HNA II would directly link the UMR's vision and mission statements to the program's ongoing work to define the UMR's ecological resilience. The HNA II would also be intended to strike an appropriate balance between the use of new tools and data within the context of policy and management sideboards.

Hubbell proposed that the HNA II team be tri-chaired by Tim Eagan (USACE), Sara Schmuecker (USFWS), and Nate De Jager (USGS). The tri-chairs said they intend to seek input from the UMR Coordinating Committee today in order to formulate a draft scope of work for the HNA II that they plan to present to the Committee at its February 24, 2016 meeting for consideration. Hubbell said he anticipates that the HNA II team will include representatives from the UMR Coordinating Committee's agencies as well as experts in areas of particular interest, and that the planning effort will evolve over 18 to 24 months. In response to a question from Randy Shultz, Hubbell said he plans to also ask the UMR Coordinating Committee to identify the HNA II group composition at its February 2016 quarterly meeting. Sabrina Chandler requested that the draft scope of work be provided to the Committee's members well in advance of the February quarterly meeting so that members have adequate time to coordinate internally within their respective agencies in selecting the staff person that is most appropriate to participate in the effort.

#### Overview of 2000 Habitat Needs Assessment

Bob Clevensine provided an overview of the 2000 HNA, including the historical context and development process. Clevensine recalled that the UMR partnership had long recognized the merits of having an eco-regional assessment for the UMR to formulate and select habitat projects, integrating monitoring information gathered since the program's inception. That led to a recommendation in the UMR's 1994 Report to Congress for the development of an HNA. Ultimately, Congress accepted this recommendation by including a provision in Section 509 of the 1999 WRDA that required the Corps to develop an HNA by September 30, 2000. The legislation also extended UMR's authorization to a continuing program authority. Given that the 1999 WRDA was enacted on August 17, 1999, this gave the UMR partnership one year to complete the first HNA. And, the Corps was provided \$1 million to complete this effort.

The Corps and USFWS developed the 2000 HNA's project management plan and used an interagency team to create the scope of work, which estimated the assessment's cost at \$935,000 to complete. The scope of work included plans for model development, forecasting future conditions, involving interested public, identifying desired future conditions and habitat needs, and creating a website for information sharing. Clevensine explained that challenges facing the 2000 HNA included time and fiscal constraints, simultaneous development of the UMR Navigation Study, conflicting thoughts among partners about using information from the Navigation Study to supplement long term resource monitoring data (given that there was no time to obtain new data), and disagreements regarding public engagement strategies.

In anticipation of the 1999 WRDA passage with the HNA provision, USGS staff essentially completed a query tool in August 1999 that the technical team was able to utilize substantially throughout the HNA 2000's development. Clevensine said the draft HNA was completed in September 2000 and subsequently approved by MVD in December 2000, following final input from the UMR Coordinating

Committee. The HNA was distributed in January 2000 and included a summary report, a technical report with appendices, a public information report, and a users' manual for the query tool.

Clevenstine recalled that partners stressed the need for various sources of new information when developing the 2000 HNA. Ultimately, the Assessment's summary report identified 13 information needs. The UMRR held 12 open meetings and 10 focus group meetings during the single year of the HNA's development. However, partners had strongly recognized the need to engage the public to an even greater extent than what had occurred.

### 2000 HNA Query Tool

Tim Fox gave an overview of the 2000 HNA query tool, including its structure and application. Fox said the query tool provided analytical support and content for the 2000 HNA, and has been used since then in other applications as it is essentially a decision support system that assesses habitat needs of various federal, state, and other partners. The query tool for the 2000 HNA was delivered in an ArcView 3.1 extension. The tool uses several habitat suitability models to generate bi-directional queries – i.e., users may query a specific or suite of species to obtain habitat information, or they may query a habitat to obtain species information. The models used were driven by suitability matrices that were based on expert opinion. The base layer included land cover from 1989, 1991, 1994, and 1998, as well as aquatic area maps from 1989 and 1991. The tool produced several useful outputs, including tables, charts, and layouts describing potential species occurrence, richness, and habitat. It generates zonal analyses by pool and provides suitability matrices for mammals, birds, amphibians and reptiles, fish, mussels, and invertebrates. Results from specific queries are presented in tables and figures embedded throughout the 2000 HNA report and appendices. Visualizations of queried information were used to create a common reference and communications tool throughout the public outreach efforts. Beyond the HNA, Fox said the query tool is used by various resource agencies to explore habitat needs and investigate alternative restoration scenarios.

Fox explained that the query tool has since evolved into LINK, which is a decision support system that incorporates a suite of ArcGIS tools to analyze habitat patterns across a landscape. LINK was initially created in response to a request for information by the USFWS Region 3. It incorporates data from the 2000 HNA query tool and raster data to model habitat over a much larger spatial extent by using habitat matrices to model potential species habitat and habitat diversity. LINK's main purpose is to make comparisons of conservation potential between management units and the surrounding landscape by summarizing potential species richness, habitat diversity, and habitat composition. Its end products include maps, tables, and graphs of potential species occurrence, potential species richness, Simpson's diversity index, and zonal composition. Fox explained that LINK's matrices contain habitat suitability values, source layers to define habitat types, species abundance maps to restrict and weight analyses, and zonal layers to provide spatial units for summarization and comparison. For example, Fox said a query objective may be to evaluate Minnesota counties for high priority, regularly breeding bird habitat. Fox showcased the various LINK outputs based on that example query.

Fox summarized comparisons between the 2000 HNA query tool and LINK. Both analytical tools are used summarize habitat distribution; however the HNA tool is bi-directional and LINK is unidirectional, meaning it only allows the user to query for species and not for habitat. Fox said both applications identify areas of conservation need, but they only superficially identify restoration need. They also both leverage generalized models for many species rather than using specific models for a few species.

In response to a question from Karen Hagerty, Fox said LINK is available online but requires an ArcGIS 9.0 license to use. Hubbell acknowledged that Fox's presentation shows the evolution of analytical capabilities since 2000 as well as the potential opportunities to advance these capabilities even further.

## Recent Products Relevant to HNA II

Nate De Jager summarized several important products that UMRR has developed since 2000 that would enhance analyses and outcomes generated in a next HNA, including by using connectivity and inundation information. De Jager described, as examples, the ability to use the database of discharge rates to get a better understanding of the landscape and habitat types; the user-defined query tools that provide information within a temporal and model value range; and models that use bathymetry, flow velocity, and connectivity as inputs; as well as how to relate species to various conditions.

De Jager said the tri-chair HNA II team would like input from the UMRR Coordinating Committee regarding several foundational questions necessary to begin formulating the framework and process for the HNA II. At a programmatic perspective, partners may want to compare new data to old data to determine the extent to which habitat projects have an impact on habitat or to demonstrate that UMRR is using new knowledge and data to improve the way the river is managed and studied. Researchers may view the HNA as an opportunity to develop or improve the way geomorphic and landscape changes over time are examined and modeled as well as to improve species-habitat relationship models. Resource managers may want to the HNA to generate new data layers that are useful for identifying areas for restoration actions or to provide a longer-term context for diagnosing “problem areas,” and to re-evaluate partners’ earlier understanding of the UMRS’s environmental problems. De Jager recalled that the 2000 HNA examined the differences between a desired future condition against the existing condition to identify habitat needs. That desired future condition involved a social undertaking that was identified by stakeholder groups. The existing condition was identified using a hybrid of land cover and aquatic areas coverage and assigning species preferences for different habitat classes using expert opinion. The query tool (discussed by Fox earlier) was developed to help extract information on the existing condition. Future conditions were also evaluated using best professional judgement. In addition, a simple forest succession model was developed.

De Jager said UMRR has much more detailed information to characterize river habitats since 2000 as well as a better approach to modeling forest succession. He overviewed the 13 information needs that partners identified in developing the 2000 HNA, including:

1. System-wide topographic data (available now)
2. System-wide bathymetric data (available now)
3. Numerical hydraulic models for all pools (not available, but connectivity is available and is a surrogate)
4. Substrate-type characterization (not available, but have aquatic areas identified as a surrogate)
5. Habitat spatial structure metrics (available now)
6. Floodplain inundation models (able to create)
7. Floodplain geomorphic classification and study (able to create)
8. Surveys of existing floodplain plant communities (able to create)
9. Characterization of existing and pre-impoundment hydrologic regime
10. Confirmation/validation of species using SRS LTRM data (available for fish)
11. Development of refined life history information (available for some)
12. Development of refined species-habitat models (available for some)
13. Analysis of seasonal habitat availability (available, such as overwintering for fish)



De Jager noted that, not only has UMRR obtained first two information needs (topographic and bathymetric data), the program has also integrated the two datasets into a seamless elevation layer, referred to as topobathy. De Jager explained that, even though many of the datasets are now available, it will take staff time and resources to apply the data in a meaningful way. In additions, partners will need to consider and make decisions regarding applications of the datasets.

De Jager said partners will need to consider several fundamental questions to set a framework for the next HNA, including:

1. Should the UMRR define a desired future condition, and if so, how should that process unfold?
2. How should we define the existing condition (spatial extent, etc.) and what information should be used to do so – e.g., land cover, topobathy?
3. How should we model relationships among species and habitat – e.g., what types of species classes are of interest? Are there species information models that should be improved? De Jager noted that there have been substantial improvements to the dabbling duck model, the fish AHAG, pool-wide mussels information, and bird information related to forest and landscape features.
4. How should the projected future conditions be defined? What information should be utilized and how – e.g., expert opinion, state-transition modeling, process-based models? De Jager said that, however this is done, projected future conditions provide a broad-scale picture of the distribution of habitats that are important to a broad array of species under different management or climate scenarios. He noted that this information is directly relevant to spatial and temporal resilience of the ecosystem.
5. What decision support tools are needed to generate the information desired? What do UMRR partners want as outputs? De Jager said that the option exists to compare species abundance data to mapped habitat data that will show areas of conservation verses restoration.

Specifically, De Jager asked that the UMRR Coordinating Committee members to provide answers to the following five questions:

1. Do we want an assessment of desired future conditions?
2. Do we want to improve our definitions of aquatic habitats using bathymetry data?
3. Do we want to improve our species-habitat models?
4. How do we want to make future projections?
5. What are the products going to be?

De Jager said he anticipates the tri-chair team's next steps will be to 1) consider feedback received from the UMRR Coordinating Committee on the five questions listed above and 2) draft a scope of work and budget for the HNA II effort to present to the UMRR Coordinating Committee for its consideration at its February 24, 2016 meeting.

Hubbell noted the challenges associated with defining a desired future condition. He said the effort to use long term resource monitoring information to define the status and trends of ecological health and resilience is intended to help to make statements about desired future conditions that are more scientifically based. Marty Adkins noted that there are some advantages to using principle-based statements. For example, increasing resilience also increases habitat diversity. Adkins suggested asking federal and state staff involved in Clean Water Act implementation to help identify principles of a desired future condition given that clean water is fundamental to ecological health as well as quality of life. Karen Hagerty said the UMRR's ecological health indicators may be able to provide a scientific foundation for making interim targets. Janet Sternburg mentioned that page 51 of the 2000 HNA

identifies interim targets. She said interim targets may be more meaningful and attainable than defining a desired future condition. Tim Schlagenhaft suggested defining a future condition without any habitat restoration or conservation actions. UMRR partners could use that condition to determine if that state would be acceptable to the public and, if not, come to some point where a certain level of action results in an acceptable ecological state. Ken Barr suggested that the HNA consider cumulative effects. Sabrina Chandler said modeling could be used to estimate Schlagenhaft's suggestion.

Mark Gaikowski asked whether future conditions should consider the effects of invasive species, including terrestrial species such as reed canary grass, climate change, or even the potential for harmful algal blooms (HABs). De Jager noted that the 2000 HNA did not include species interactions.

Hubbell observed that resource agencies are typically responsible for proposing potential habitat projects. He said it will be important to ensure that the priorities of UMRR's potential cost share sponsors (including potential nonprofit project sponsor candidates) are reflected in the HNA II's outcomes related to habitat restoration goals. Hubbell explained that he will want resource agencies' perspectives on the possibilities for incorporating HNA II outcomes into their respective land management plans. Sternburg said resource agencies will want to consider what land is currently available for restoration and what new land might become available in the future. However, she emphasized that the constraint on lands available should not preclude the HNA II from uncovering the most important areas for restoration.

In response to a question from Dru Buntin, Clevenstine said partners made the conscious decision not to estimate the habitat lost as a result of the construction and operation of the nine-foot navigation channel. De Jager said there are also data limitations to answering that question. Buntin pointed out that establishing a desired future condition is a fairly subjective process that can be contentious. Chandler suggested that the HNA II examine the ecosystem's future trajectory (where it wants to go) and evaluate how UMRR's habitat projects can work within that future trajectory to provide the fish and wildlife habitat requirements, rather than working to restore the river to a state that it might fight against. Fox said process-based models could potentially be developed that incorporate physical properties of water flow and other characteristics. Ken Westlake suggested determining an "achievable future condition," given the current state of the river ecosystem, ongoing and potential future stressors, and the restoration tools available. Westlake also suggested seeking input from river teams at the outset, especially in discussing these types of questions. Jim Fischer expressed agreement with Westlake's suggestions.

In response to a question from De Jager, Hubbell said floodplain reaches rather than District boundaries are a more appropriate division of the system for modeling and analysis purposes. Chandler noted that the HNA 2000 used floodplain reaches as the geographic boundary for defining habitat restoration goals. De Jager said the HNA 2000 used the same data for the entire system. He explained that certain data sets may be available and applicable for one floodplain reach and not the next, and suggested using different datasets and models among the reaches to their individual unique assessment needs. Hubbell said he agreed with De Jager's statement.

In response to a question from Chandler regarding next steps, Sternburg requested a copy of the 2000 HNA's scope of work for reference. Based on the requests of the tri-chair HNA II team and the UMRR Coordinating Committee, Kirsten Mickelsen said she would distribute De Jager's proposed questions to the Committee in the next day or two. The Committee agreed to provide the tri-chair team with their respective agency's perspectives related to those questions in two weeks. This would then provide the tri-chair team with the information needed and enough time to develop a scope of work for the UMRR Coordinating Committee to review at its February 24, 2016 meeting, as well as to select staff to participate on the HNA II development team. [Subsequent to the meeting, the tri-chair team and Hubbell proposed to the UMRR Coordinating Committee to instead first develop a project management plan that will include the questions proposed in the meeting's discussion. The team will seek input on that plan at the February 24, 2016 quarterly meeting before developing a scope of work.]

## *District Reports*

### St. Paul District

Tom Novak said North and Sturgeon Lakes is the St. Paul District's current planning priority, which planning is ongoing on Conway Lake and McGregor Lake. Novak said he anticipates that a dedication for Capoli Slough will be held on April 22, 2016 for Earth Day. The event will include a volunteer tree planting activity. Novak reported that nearly thirty percent of the construction on Harpers Slough was completed this summer, noting that river levels were very favorable for completing construction. He said Dave Potter is working on completing performance evaluation reports for Ambrough Slough, Island 42, Polander, Trempealeau, and Pool 8 Phase II.

### St. Louis District

Brian Markert expressed appreciation to the non-federal partners involved in MVS's UMRR habitat project execution last year, underscoring their contributions in advancing projects. Markert explained that MVD requested greater clarity on project features and required coordination with NRCS on Rip Rap Landing on the project's future designs due to a wetlands reserve program (WRP) easement on the site. Subsequently, the Division approved Rip Rap Landing's feasibility report. Markert said the District ran hydraulic modeling for Piasa and Eagles Nest Islands as part of its feasibility report, and is currently working with USFWS in evaluating plan alternatives for Harlow and Open River Islands. Markert reported that MVS is allocating \$150,000 of FY 2016 funding to completing performance evaluation reports. Clarence Cannon is MVS's primary design effort. Markert explained that prolonged high water this summer delayed construction on Ted Shanks. MVS worked with Missouri Department of Conservation to extend the construction season to take advantage of favorable construction conditions this fall due to a lack of rainfall later in the summer. District staff anticipate closing out Pools 25 and 26 Islands in FY 2017. Markert reported that, while only punch list items remain on Batchtown, the water control structure will need to be de-watered to do repair work.

### Rock Island District

Hubbell said MVR is currently planning three habitat projects, including Beaver Island that is schedule for completion in FY 2017, Keithsburg in FY 2018, and Boston Bay in FY 2019. Design work continues on Huron Island and Pool 12 Overwintering Stage III. Hubbell said the District continues to employ a large construction program. Eight different stages involving five different projects are in the construction phase. MVR is also working on completing performance evaluation reports for Bay Island, Analusia, and Brown's Lake. Hubbell reported that \$154,000 was allocated to USFWS for support services related to project monitoring, planning, Coordination Act reports, and other programmatic efforts.

## **Long Term Resource Monitoring and Science**

### *Science Highlight: A New Hypothesis of Submersed Aquatic Vegetation Dynamics in the UMR Based on UMRR Long Term Resource Monitoring*

Yao Yin presented on a "working hypothesis" of submersed aquatic vegetation (SAV) dynamics that have been observed in Pools 8 and 13 using UMRR's long term resource monitoring data. Yin explained the historical context of the river's ecological modifications due to the construction of the nine-foot navigation channel, including the progressive loss of islands and SAV abundance in the impounded area of the pools. He cited USFWS's Dr. William Green's observation in 1984 that, for several years after the nine-foot navigation channel's construction, there was tremendous response to impoundment and extensive beds of aquatic vegetation developed. However, once the pools became permanently established, the normal deterioration associated with stabilized water areas gradually began, although for over thirty years conditions remained excellent. Yin referenced Jim Fischer and

Tom Claflin's 1995 publication, which estimated that SAV frequency of occurrence in Pool 8 decreased from 83 percent to 11 percent between 1975 and 1991, and, at the same time, SAV mean biomass decreased from 90 to 1 g/m<sup>2</sup>.

Yin also illustrated the vegetation abundance and distribution over time based on interpreted aerial photographs. He showed that the distribution maps indicate that wild celery led the SAV recolonization of lower Pool 8, and that coontail lagged behind by about four years. Yin explained that wild celery have a root system and elongated stem that allow it to establish in moderate stress conditions.

With interpreted aerial images, Yin showed that an area sheltered by river flow from a newly construction UMR habitat project allowed for wild celery to quickly colonize and become the dominant SAV species. However, after other species gradually established, wild celery became only a minor component of the SAV community composition. Following a decadal-scale flood (in 2011), Yin illustrated that wild celery persisted in high stress conditions while other species, such as coontail, were washed away. Through these observations and information about the biology of wild celery and coontail, Yin said the working hypothesis explains that newly restored structures, such as islands, provide ripe conditions for wild celery to establish as it can anchor firmly in sediments and reach up high in the water column by its elongated leaves. Wild celery will remain strong in clear water and moderate flow conditions. Under slower water flows, wild celery will become overshadowed and replaced by macrophytes, filamentous algae, and duckweeds. Yin explains that long term resource monitoring shows extended drought is a bigger trigger for SAV crashes. When a drought is followed by a flood event, as wild celery will no longer be present and SAV communities are washed away. It can take up to ten years for sizable wild celery populations to support a steady SAV community. According to Yin, this research demonstrates the importance of UMR's restoration work to create sheltered areas for vegetation communities to establish and for water level management to support a diverse, abundant SAV community. Yin also emphasized the value of having long term resource monitoring data that allows for understanding these dynamics.

In response to a question from Jon Hendrickson, Yin said the drought of 1988 was much more intense than the drought-to-flood events that occurred between 2004 and 2009. Jim Fischer said Yin's research is incredibly important to informing restoration and management of the river, and it is dependent on having a continuous long term resource monitoring stream. Sabrina Chandler echoed Fischer's comments, and said this research is incredibly helpful to resource agencies in managing for waterfowl and avoiding a potential future SAV crash.

#### *A-Team Report*

Shawn Giblin provided a report of the A-Team since the August 5, 2015 UMR Coordinating Committee meeting. Giblin reported that the A-Team held a meeting on October 29, 2015 at the Mississippi Riverside Environmental Research Station in Fairport, Iowa. The meeting was held jointly with the UMRCC's Water Quality Tech Section. The morning session included presentations on water quality studies at Rock Creek and Shrickers Slough and overwintering fisheries dynamics within Iowa backwaters, both given by the Iowa Bellevue Field Station staff; and the use of continuous dissolved oxygen and temperature data to optimize connectivity within selected UMR backwaters, given by Wisconsin DNR staff. The afternoon session included programmatic updates and presentations about UMR Refuge inventory and monitoring to assess past restoration efforts and inform planning in the future by USFWS staff, progress in defining and developing ecological resilience concepts to the UMR by USGS staff, and a data-driven process to placing UMR habitat projects on the UMR by Wisconsin DNR staff. Illinois River Biological Field Station staff also updated the A-Team on the fish indicators project.

Giblin provided a brief summary of the connectivity presentation given at the October 2015 A-Team meeting. He said connectivity modification is one of the most effective restoration tools on the UMR.

Management goals will be to increase connectivity in some areas and to decrease connectivity in other areas. Giblin showed that continuous temperature and dissolved oxygen sensors can provide information about issues and restoration project performance in isolated areas, using Goose Island Complex and Johnson Island as examples. Giblin also provided an overview of research indicating a non-linear relationship between total suspended solids (TSS) and biomass. The research shows the significance of light coefficient related to desired TSS levels and biomass. It indicates that, in the St. Paul District, areas above Lake Pepin and between Pools 9 and 11 would benefit from improvements in light climate.

Giblin overviewed the same-day monitoring response to train derailment that occurred on November 7, 2015 in Alma, Wisconsin and expressed appreciation to Wisconsin DNR staff for mobilizing so quickly. Giblin said over 20,000 gallons of denatured ethanol were spilled, but that there were not found fish kills. Giblin also expressed appreciation to the incredible public volunteer response involved in removing water lettuce (also known as water hyacinth) at Lake Onalaska in Pool 7. Sabrina Chandler expressed her thanks to Wisconsin DNR staff Giblin, Brenda Kelly, and Michelle Marron for their expediency in both the derailment monitoring and water lettuce removal. Chandler said more than 50 volunteers helped on a Sunday afternoon to help eradicate water lettuce. Giblin acknowledged that there may be some remnants and that it remains to be seen whether water lettuce can overwinter.

#### *First Quarter LTRM Highlights*

Jennie Sauer reported that first quarter FY 2016 long term resource monitoring highlights include published manuscripts regarding:

- Flood pulse effects on nitrification in a floodplain forest impacted by herbivory, invasion, and restoration
- Flooding effects on ion exchange rates in a UMR floodplain forest impacted by herbivory, invasion, and restoration
- Spatial patterns of flood inundation and associated plant community distributions

Sauer reported that there were upticks in 2015 data for overall submerged aquatic vegetation found in Pools 4 and 8. Wild rice has increased dramatically in both pools since 2010. Sauer said USGS staff converted UMR's land cover/land use data from GIS to KMZ (or Google Earth) formats and illustrated the associated benefits with the increased technologies. This will enhance public usability of the data, which can be accessed at [http://www.umesc.usgs.gov/data\\_library/land\\_cover\\_use/2015\\_kmz\\_umesc.html](http://www.umesc.usgs.gov/data_library/land_cover_use/2015_kmz_umesc.html).

Sauer explained that Jeff Houser convened an October 8, 2015 meeting at UMESC involving a small partnership working group to develop a framework process for a larger interagency effort to create a conceptual model of UMR's ecological resilience. This included discussing how to provide and maintain a conduit for information flow, the appropriate composition of an interagency group with the relevant expertise, and how to keep the project focused on the relevant topic and applications. The intention is to keep the process open and inclusive while being manageable. Sauer said current members are Kristen Bouska, Nate De Jager, and Houser (USGS); Jon Hendrickson, Marv Hubbell, and Nate Richards (USACE); Stephen Winter (USFWS); Andy Casper (Illinois Natural History Survey); and Kirsten Mickelsen (UMRBA). [Note: Subsequent to the meeting, Yin (USGS), Bob Clevensine (USFWS), Dave Herzog (Missouri DoC); and Kevin Stauffer (Minnesota DNR) joined the resilience team.]

The resilience team is scheduled to meet at UMESC on January 5-7, 2016 to draft a conceptual model(s) for partners' consideration and develop an initial framework for assessing the UMR's ecological resilience. Two external ecological resilience experts will facilitate the January meeting. Sauer directed that any questions or comments be sent to Jeff Houser.

Sauer said the biennial UMRR science meeting is being planned for February 16-18, 2016. Staff are currently seeking schedule availability for the meeting and developing an agenda. Tentative objectives include sharing and discussing results from recent research as well as ideas and priorities for future research; and a presentation and discussion regarding the UMRS ecological resilience conceptual models and assessment framework. Sauer noted that upcoming events this spring include a multivariate statistical workshop and a component field day.

### *USACE Science Update*

Karen Hagerty reported that the total funds available for science in FY 2016 is \$5.776 million, including \$312,774 in FY 2014 and FY 2015 carry-over mostly due to unfilled vacancies. Hagerty said \$5.595 million is currently allocated in FY 2016 SOWs, with \$4.5 million for long term resource base monitoring and a \$963,000 SOW for science in support of restoration – i.e., analysis under base. This leaves \$180,745 unallocated. According to partner-endorsed priorities, Hager reported that she, Marv Hubbell, Mark Gaikowski, Jeff Houser, and Jennie Sauer agreed to allocate \$28,386 of that unallocated pool of funds to Pool 12 adaptive management and \$52,000 to defining ecological resilience. Hagerty said the HNA II is a priority for Headquarters and its SOW is currently being developed. Hagerty said she will work with the UMRR Coordinating Committee to consider FY 2016 allocations with the additional funding once proposals are more fully developed. She anticipates presenting recommendations for funding to the UMRR Coordinating Committee at its February 24, 2016 meeting.

Hagerty reported that Marv Hubbell distributed UMRR Crediting Guidance Policy, dated September 9, 2015, to the UMRR Coordinating Committee and UMRR partners via email on October 20, 2015. The policy was created to avoid misunderstanding and increase consistency in describing the program. It is provided on pages E-13 to E-15 of the agenda packet.

Mark Gaikowski said USGS received over 70 applications for the long term resource monitoring water quality component leader position, held by Jeff Houser.

### **Public Outreach and Engagement**

Jim Fischer announced Ruth Nissan's recent publication in the October 2015 edition of the Wisconsin Natural Resources magazine. The article describes swans' use of the UMRS in their journey from the tundra to their wintering grounds along the mid-Atlantic coast. Sabrina Chandler said USFWS received many inquiries following the publication about the timing of the swans visit to Brownsville. USFWS held two public events this fall for swan observation. Brownsville has displays that highlight UMRR's habitat restoration projects.

### **Other Business**

#### *Future Meetings*

The upcoming quarterly meetings are as follows:

- **February 2016—Rock Island**
  - UMRBA —February 23
  - **UMRR Coordinating Committee — February 24**
- **May 2016 — St. Louis**
  - UMRBA —May 24
  - **UMRR Coordinating Committee — May 25**

- **August 2016 — La Crosse**
  - UMRBA —August 9
  - **UMRR Coordinating Committee — August 10**

With no further business, the meeting adjourned at 3:27 p.m.

**UMRR Coordinating Committee Attendance List**  
**August 5, 2015**

**UMRR Coordinating Committee Members**

Don Balch	U.S. Army Corps of Engineers, MVD
Sabrina Chandler	U.S. Fish and Wildlife Service, UMR Refuges
Mark Gaikowski	U.S. Geological Survey, UMESC
Dan Stephenson	Illinois Department of Natural Resources
Randy Shultz	Iowa Department of Natural Resources
Kevin Stauffer	Minnesota Department of Natural Resources
Janet Sternburg	Missouri Department of Conservation
Jim Fischer	Wisconsin Department of Natural Resources
Marty Adkins	Natural Resources Conservation Service
Ken Westlake	U.S. Environmental Protection Agency, Region 5[On the phone]

**Others In Attendance**

Thatch Shepard	U.S. Army Corps of Engineers, MVD
Barb Kleiss	U.S. Army Corps of Engineers, MVD
Chris Erickson	U.S. Army Corps of Engineers, MVP
Terry Birkenstock	U.S. Army Corps of Engineers, MVP
Tom Novak	U.S. Army Corps of Engineers, MVP
Kevin Bluhm	U.S. Army Corps of Engineers, MVP
Jon Hendrickson	U.S. Army Corps of Engineers, MVP
Shahin Khazrajafari	U.S. Army Corps of Engineers, MVP
Nathan Meisgeier	U.S. Army Corps of Engineers, MVP
Dave Potter	U.S. Army Corps of Engineers, MVP
Col. Craig Baumgartner	U.S. Army Corps of Engineers, MVR
Ken Barr	U.S. Army Corps of Engineers, MVR
Marvin Hubbell	U.S. Army Corps of Engineers, MVR
Karen Hagerty	U.S. Army Corps of Engineers, MVR
Angie Freyermuth	U.S. Army Corps of Engineers, MVR [On the phone]
Deanne Strausser	U.S. Army Corps of Engineers, MVS
Brian Johnson	U.S. Army Corps of Engineers, MVS
Brian Markert	U.S. Army Corps of Engineers, MVS
Tim Eagan	U.S. Army Corps of Engineers, MVS
Kat McCain	U.S. Army Corps of Engineers, MVS
Larry Shepard	U.S. Environmental Protection Agency, Region 7 [On the phone]
Bob Clevenstine	U.S. Fish and Wildlife Service, UMR Refuges
Tim Yager	U.S. Fish and Wildlife Service, UMR Refuges
Sara Schmuecker	U.S. Fish and Wildlife Service, RIFO
Scott Morlock	U.S. Geological Survey, Midwest Region
Nate De Jager	U.S. Geological Survey, UMESC
Tim Fox	U.S. Geological Survey, UMESC
Jennie Sauer	U.S. Geological Survey, UMESC
Randy Hines	U.S. Geological Survey, UMESC [On the phone]
Brian Ickes	U.S. Geological Survey, UMESC
Jim Rogala	U.S. Geological Survey, UMESC
Yao Yin	U.S. Geological Survey, UMESC
Robert Stout	Missouri Department of Natural Resources
Lorisa Smith	Missouri Department of Natural Resources
Shawn Giblin	Wisconsin Department of Natural Resources [On the phone]



Olivia Dorothy	American Rivers
Tim Schlagenhaft	Audubon, Minnesota
Tom Boland	AMEC Foster Wheeler
Ann Guissinger	Gulf South Research Corporation
Kim Schneider	Schneider Communications
Don Powell	SEH Inc.
Gretchen Benjamin	The Nature Conservancy
Bill Wittland	VoxStrategic/Gulf South Research Corporation
Dru Buntin	Upper Mississippi River Basin Association
Dave Hokanson	Upper Mississippi River Basin Association
Kirsten Mickelsen	Upper Mississippi River Basin Association

## **ATTACHMENT B**

### **UMRR Regional Management**

- **UMRS Congressional Members' Letter to POTUS re FY 16 UMRR Funding (2/1/2016)** *(B-1 to B-2)*
- **UMRS Congressional Members' Letter to POTUS re FY 17 UMRR Funding (11/23/2015)** *(B-3 to B-4)*
- **2015-2025 UMRR Strategic Vision, Mission, and Supporting Implementation Provisions (1/27/2015)** *(B-5 to B-6)*
- **Draft 2015-2025 UMRR Strategic Operational Plan (1/29/2016)** *(B-7 to B-33)*

**Congress of the United States**  
**Washington, DC 20515**

February 1, 2016

President Barack Obama  
The White House  
Washington, D.C. 20500

Dear Mr. President:

We are writing to respectfully request that you consider allocating an additional \$8.8 million in discretionary ecosystem restoration funding to the Upper Mississippi River Restoration (UMRR) program in the U.S. Army Corps of Engineers FY 2016 work plan. As you know, we were pleased to work with the Administration to fund the UMRR program at its full authorized level of \$33.131 million in FY 2015. While still appreciative of Administration support, we were disappointed to see funding for the program reduced to \$19.787 million in the FY 2016 enacted budget.

The FY 2016 Consolidated Appropriations Act makes significant additional funding available for the U.S. Army Corp of Engineers, including \$20 million for discretionary ecosystem restoration funding. While we understand that competition for limited funding is fierce, we respectfully submit that the UMRR is worthy of your favorable consideration. While the additional \$8.8 million we are requesting would not restore the program to its full authorized amount, we believe it would allow for the most efficient continued implementation of habitat restoration projects and scientific monitoring on the Upper Mississippi.

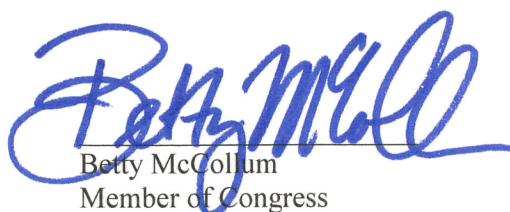
As it approaches its 30<sup>th</sup> anniversary, the UMRR has a proven track record of successfully constructing innovative habitat restoration projects that have improved over 110,000 acres of important habitat while positively contributing to improvements in the health and resilience of the ecosystem. The programs' long term monitoring, research and analyses are also critically important for continuing to increase understanding of the status and trends occurring in the Upper Mississippi River specifically as well as big river ecosystems in general. The science aspects of the program are also critical to appropriately tailoring future restoration approaches. The UMRR program also enjoys the tremendous support of residents of the Upper Mississippi as they flock to restoration sites to witness bird migrations, catch bluegill, largemouth bass or walleye, or generally enjoy the river. These activities also generate direct and indirect economic value to the communities along the river.

While the UMRR program has been extremely successful, the Upper Mississippi River ecosystem remains under considerable stress. Challenges relating to sedimentation, nutrient loading, invasive species, altered hydrology and floodplain isolation continue to need attention. We respectfully urge you to recognize the inherent value of the Upper Mississippi River by allocating \$8.8 million in discretionary funding to the UMRR program in the FY 2016 work plan. Thank you for your favorable consideration of our request.

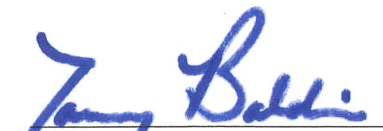
Sincerely,



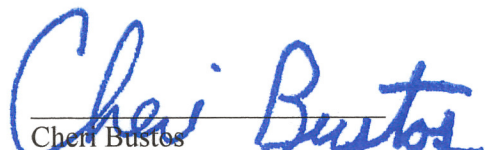
Ron Kind  
Member of Congress

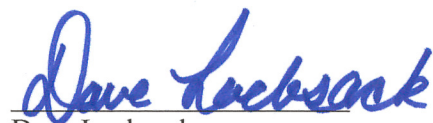


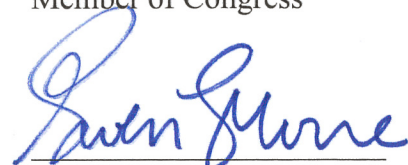
Betty McCollum  
Member of Congress


  
Tammy Baldwin  
United States Senator

  
Al Franken  
United States Senator

  
Cheri Bustos  
Member of Congress

  
Dave Loebsack  
Member of Congress

  
Gwen Moore  
Member of Congress

  
Rick Nolan  
Member of Congress

  
Mark Pocan  
Member of Congress

  
Tim Walz  
Member of Congress

CC: Shaun Donovan, Director of the Office of Management and Budget  
Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works

**Congress of the United States**  
**Washington, DC 20515**

November 23, 2015

President Barack Obama  
The White House  
Washington, D.C. 20500

Dear Mr. President:

As you prepare the FY 2017 budget, we respectfully request that the annual authorized level of \$33.17 million is included for the U.S. Army Corps of Engineers' Upper Mississippi River Restoration (UMRR) program. This investment serves in our nation's best interest as UMRR continues to ensure that the Upper Mississippi River System remains a "nationally significant ecosystem and navigation system."

The Upper Mississippi River System is a large dynamic floodplain that has been greatly altered by commercial navigation, flood control, and land use throughout its watershed. Yet the river is unique in that it still retains many of its natural floodplain ecosystem characteristics including flood pulses, floodplain forests, backwaters, and floodplain lakes. This is in part because of the balanced management, as well as the restoration, monitoring, and research efforts of federal, state, and local governments, nonprofits, and the general public.

For nearly 30 years, UMRR has effectively and efficiently constructed important habitat restoration projects that improve the ecosystem's health and resilience. In addition, the UMRR's long term monitoring, research, and analysis provide essential knowledge of the Upper Mississippi River System. UMRR has a proud history serving as a pioneer and national and international leader in large river aquatic ecosystem restoration and science. The U.S. Army Corps of Engineers and partner organizations celebrate the successful interagency and interdisciplinary program management that provides the foundation for making scientifically-based restoration improvements to this national ecological treasure.

The ecosystem remains under considerable stress and still faces many challenges, including sedimentation, nutrient loading, invasive species, altered hydrology, and floodplain isolation. Although great strides have been made, important work remains to enhance the river's ecological health and resilience to these stressors. We urge the Administration to recognize the inherent value of the Upper Mississippi River System by supporting a funding level of \$33.17 million for the UMRR program. Thank you for considering our request.

Sincerely,



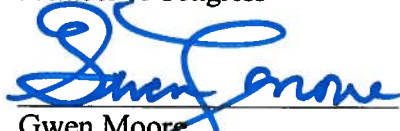
Ron Kind  
Member of Congress



Betty McCollum  
Member of Congress



Al Franken  
Member of Congress



Gwen Moore  
Member of Congress



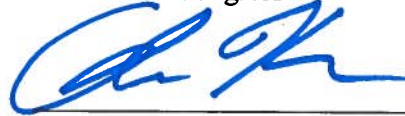
Tim Walle  
Member of Congress



Mark Pocan  
Member of Congress



Dave Loebsack  
Member of Congress



Adam Kinzinger  
Member of Congress

CC: Shaun Donovan, Director of the Office of Management and Budget  
Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works



## VISION

A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM  
THAT SUSTAINS THE RIVER'S MULTIPLE USES

## MISSION

TO WORK WITHIN A PARTNERSHIP AMONG FEDERAL AND STATE AGENCIES  
AND OTHER ORGANIZATIONS; TO CONSTRUCT HIGH-PERFORMING HABITAT  
RESTORATION, REHABILITATION, AND ENHANCEMENT PROJECTS; TO PRODUCE  
STATE-OF-THE-ART KNOWLEDGE THROUGH MONITORING, RESEARCH, AND  
ASSESSMENT; TO ENGAGE OTHER ORGANIZATIONS TO ACCOMPLISH THE  
UPPER MISSISSIPPI RIVER RESTORATION PROGRAM'S VISION

## GOALS

1. Enhance habitat for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem
2. Advance knowledge for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem
3. Engage and collaborate with other organizations and individuals to help accomplish the Upper Mississippi River Restoration vision
4. Utilize a strong, integrated partnership to accomplish the Upper Mississippi River Restoration vision

## ASSUMPTIONS

Assumptions that provide an underlying foundation for this Strategic Plan's goals and objectives:

1. Conditions in the Upper Mississippi River result from a combination of tributary inputs from the watershed, natural and man-made structures within the river corridor, and management of river flow. Human actions over time, within the river and its watershed, have produced stresses to the river's condition and degraded its ecological health.
2. Existing stresses (e.g., point and nonpoint source pollution, navigation, flood control structures, invasive species) are likely to remain, and new stressors are likely to emerge. Thus the river will continue to degrade without continued management and rehabilitation designed to minimize the effects of stresses. Managing stresses that originate within the watershed will require coordination with other relevant agencies, programs, and land managers to address these challenges at their sources.
3. The man-made infrastructure within the river corridor that supports navigation and other human uses will remain in place for the foreseeable future, but modifications to structures or operations may occur.
4. Upper Mississippi River Restoration's datasets (and other information) will be used to evaluate progress in advancing ecosystem and management objectives, identify future restoration needs, and determine if the Upper Mississippi River is recovered to a quality sufficient to support a healthy and resilient river ecosystem.

## GUIDING PRINCIPLES

Core principles to guide implementation of this Strategic Plan:

1. Deliver innovative, high quality projects, products, and services that create value to the Upper Mississippi River Restoration program partners and serve as a knowledge base for the Upper Mississippi River and other river systems nationally and internationally.
2. Promote focused research and analyses of monitoring data to predict how management actions will affect river structure and function and use habitat projects to help evaluate those predictions and improve management capabilities.
3. Make decisions using the best available science, data, and other information that will benefit current and future generations of humans and biota.
4. Routinely disseminate information about program activities and outcomes to program partners and other organizations and individuals to promote transparency and knowledge sharing.
5. Apply the principles of adaptive management to continually learn and improve as a program and in implementing restoration and science techniques.
6. Maintain and support the effective interagency and interdisciplinary partnership through communication and collaboration of the Upper Mississippi River Restoration Coordinating Committee, Analysis Team, and habitat project planning and sequencing teams to ensure high quality program delivery.
7. Serve as a dedicated partner to other agencies and programs in the integrated, multi-purpose management of the Upper Mississippi River and its watershed.

## DEFINING SUCCESS

Criteria for evaluating success in achieving this Strategic Plan are as follows:

1. Restoration projects that enhance the health and resilience of the Upper Mississippi River and demonstrate progress in achieving this Strategic Plan's goals and objectives.
2. A highly integrated program in which research and monitoring informs restoration and management efforts and in which restoration efforts are readily available for scientific use.
3. The ability to detect and communicate the status and trends of the Upper Mississippi River as related to indicators of ecosystem health and resilience as well as management objectives.
4. A highly engaged regional partnership that is supportive of the program and its outputs.
5. The Upper Mississippi River Restoration is recognized as a premier program in large river restoration and science and is a source of guidance for similar programs nationally and internationally.





# *Enhancing Restoration and Advancing Knowledge of the Upper Mississippi River*

## A GUIDING DOCUMENT FOR IMPLEMENTING THE STRATEGIC PLAN FOR THE UPPER MISSISSIPPI RIVER RESTORATION PROGRAM 2015 – 2025



DRAFT January 29, 2016  
(Reflects January 13, 2016 Partnership Call)

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## ACKNOWLEDGEMENTS

The U.S. Army Corps of Engineers would like to extend its sincere appreciation to the partners involved in developing this guideline for implementing the 2015-2025 Upper Mississippi River Restoration Strategic Plan.

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## **PREAMBLE**

### **Purpose**

On November 19, 2014, the Upper Mississippi River Restoration (UMRR) Coordinating Committee endorsed the 2015-2025 UMRR Strategic Plan, and agreed to convene an operational planning team to identify implementation actions necessary to best achieve the Strategic Plan's goals and objectives. Those actions are presented in the goal tables in this document and will serve as a guiding framework for implementing the Strategic Plan. This operational plan will facilitate coordination among partners and provide for consistent implementation approaches, while still allowing for innovation and flexibility. Through this plan, UMRR partners should be able to identify how they will contribute to achieving the program's goals and objectives, as well as overall mission and vision. The UMRR Coordinating Committee will consider implementation strategies throughout the Strategic Plan's duration.

### **Annual Scopes of Work**

UMRR develops annual scopes of work for its habitat restoration, long term resource monitoring, and science work. In consultation with the UMRR Coordinating Committee, program managers and staff will use the operational plan to further refine tasks and set objectives for each fiscal year. The scopes of work will provide specific direction for each fiscal year, connecting directly to the Strategic Plan through the operational plan. Individual habitat project timelines and administrative factors, as well as research frameworks, will continue to serve as tools for developing the annual scopes of work. The UMRR Program Manager will consult with the UMRR Coordinating Committee regarding more overarching programmatic efforts and approaches to implementation, such as outreach and engagement and communication and coordination among implementing partners and stakeholders.

The 2015-2025 Strategic Plan, and the implementation actions identified in this operational document, envisions a fully integrated restoration and science program that efficiently and effectively creates a healthier and more resilient Upper Mississippi River ecosystem. This approach calls for continued growth in the program's restoration and scientific capabilities and enhanced communication and coordination internally and with external partners throughout the watershed. The operational plan includes actions that will be new, additional work for the program and will require additional resources to be implemented. The annual scopes of work will sequence the actions that will lead to achieving this 10-year vision, considering administrative factors (e.g., appropriations and staffing availability) and various dynamics for optimal implementation such as necessary restoration learning opportunities and the development of analytical tools.

### **UMRR's Interagency Coordination Mechanisms**

Through interagency consultative and coordination bodies, the program partnership works together to consider and address a range of program policy and budget issues, define program priorities and direction, and raise and resolve technical questions. Habitat projects are selected, planned, and designed in a collaborative manner among project planners, engineers, habitat managers, and scientists. Long term resource monitoring, research, and analysis are implemented in coordination among the program's partners. The UMRR Joint Charter for the program's advisory groups describes the roles and responsibilities of the UMRR Coordinating Committee, Analysis Team, and Habitat Planning and Sequencing Framework Teams. The Charter is available at:

[http://www.mvr.usace.army.mil/Portals/48/docs/Environmental/EMP/HREP/EMP\\_Documents/EMP-CC%20A-Team%20HPSF%20Charter%20combined%205-15-13.pdf](http://www.mvr.usace.army.mil/Portals/48/docs/Environmental/EMP/HREP/EMP_Documents/EMP-CC%20A-Team%20HPSF%20Charter%20combined%205-15-13.pdf)

This operational planning team recognized the value of the interagency, interdisciplinary Corps District river teams in providing an appropriate forum for partners to identify site-specific habitat restoration needs per UMRR that will advance ecological goals and objectives at larger spatial scales. The operational planning team recommends that UMRR utilize the four river teams to discuss concepts related to habitat project selection, design, evaluation, and lessons learned from innovative restoration approaches. The river teams will be convened jointly to consider how habitat projects are selected and designed to best restore the Upper Mississippi River System’s ecological health and resilience, as well as to identify scientific investigation needs to inform restoration placement and design. In addition, UMRR’s restoration practitioners and scientists are formally convened biennially in-person to exchange information and discuss program priorities and implementation.

## Operational Plan Format

The Operational Planning Team gave considerable thought to the level of detail and organization of this operational plan. There is a delicate balance between providing enough guidance for achieving the Strategic Plan’s goals and objectives while not being overly prescriptive so that flexibility and innovation in program implementation is encouraged. The plan is organized via tables for each Strategic Plan goal and then at a categorical level relating to the goal’s objectives. Next, implementing needs associated with each category are described, and implementing actions necessary to achieve the respective need are identified. The operational plan was built directly from the Strategic Plan’s goals and objectives, and therefore the operational goal tables must be referenced with the Plan. This operational plan integrates excerpts of the respective Strategic Plan goal and objectives.

Coordinating leads are the “points-of-contact” or parties responsible for organizing partner coordination in implementing the actions as well as for completing, and reporting to program partners about, the actions. Action contributors are the individuals, organizations, or interagency groups directly involved in implementing the actions. The coordination entities are those individuals, organizations, or interagency groups that serve in an advisory role for the associated actions.

## A “Who’s Who”

The operational plan’s goal tables include coordinating leads, action contributors, and coordinating entities (see above). A who’s who of those agencies, coordinating bodies, or defined areas of expertise are as follows:

District Ecological Teams	The District Ecological Teams (DETs) consist of various river managers, including restoration practitioners, and consider habitat needs at the pool and reach scales within their respective jurisdictions. These teams are essentially the District river teams, but are referred to as DETs in the HREP Sequencing Framework.
System Ecological Team	The HREP Sequencing Framework directs a System Ecological Team (SET) to considers the DETs’ recommendations regarding habitat project priorities and compiles a systemic-wide sequencing, based on ecological needs while also considering other related federal and state river priorities.
Candidate project sponsors	Cost share sponsors of individual habitat projects, including USFWS, states, nonprofits, and potentially other federal agencies such as the Forest Service.
Project delivery team	For each habitat project, an interagency and multidisciplinary project delivery team of technical specialists is convened to assists in planning and design.

UMRR Coordinating Committee	The UMRR Coordinating Committee is the primary consultative body used to discuss and seek consensus on UMRR budgetary and policy issues. In this role, the Committee provides USACE with the partner agencies' perspectives on UMRR policy, budget, and implementation.
Field stations	Six UMRR field stations conduct the program's long term resource monitoring data collection, as well as scientific analysis and research.
Component specialist	A component specialist is the individuals responsible for leading the scientific analysis and research involving a long term resource monitoring component – e.g., fish, submersed aquatic vegetation, water quality.
Communications team	New team resulting from the strategic plan; membership is TBD.
District river teams	These interagency district-based rivers coordinating various river management activities, including UMRR restoration planning. These teams include the River Resources Forum (St. Paul District), the River Resources Coordination Team and Illinois River Coordinating Council (Rock Island District), and the River Resources Action Team (St. Louis District). These groups also have corresponding interagency teams that discuss and address technical aspects of river management.
Analysis Team	The Analysis Team (A-Team) provides science and technical advice and recommendations on UMRR's long term resource monitoring work priorities, annual work plans, and scientific investigations.
Restoration practitioners	The operational planning team uses the term "restoration practitioners" to refer broadly to the many partners involved in habitat restoration, including planners, engineers, project sponsors (including nonprofits), federal and state wildlife/park/refuge managers.

## 2015-2025 UMRR Strategic Plan: Goal 1

### GOAL 1

#### ENHANCE HABITAT FOR RESTORING AND MAINTAINING A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM

- Objective 1.1**      **Address key ecological needs at various spatial scales through habitat projects that reflect best available knowledge and advance UMRR’s vision**
- Strategy 1      Identify and select habitat projects that will most effectively and efficiently advance UMRR’s vision, utilizing an interagency, science-driven, systemic planning approach
- Strategy 2      Plan, design, and construct habitat projects to best, and most efficiently, address their defined objectives and advance the UMRR’s vision, using structural and non-structural measures and considering ecological benefits at various spatial scales
- Strategy 3      Perform operation and maintenance on UMRR’s habitat projects to ensure key features are working properly and effectively advancing the projects’ goals and UMRR’s vision
- 
- Objective 1.2**      **Apply adaptive management principles to address risk and uncertainty and continually enhance restoration and knowledge of the Upper Mississippi River ecosystem**
- Strategy 1      Refine and implement a framework to operationalize UMRR’s adaptive management efforts, including when and how to apply certain adaptive management techniques and documenting, communicating, and integrating the results and conclusions
- Strategy 2      Apply monitoring and adaptive management principles to set learning objectives (for select projects), adjust project designs based on ecological models, evaluate the ecological responses to project features, modify constructed project features if not performing as intended or to enhance effectiveness, assess operation and maintenance activities, and enhance future restoration efforts
- Strategy 3      Employ deliberate and explicit adaptive management analyses (hypothesis testing) using selected habitat projects to explore priority science questions or learning objectives and evaluate the effects of UMRR’s restoration efforts on the Upper Mississippi River ecosystem’s health and resilience
- Strategy 4      Communicate and integrate learned information into future restoration alternatives and scientific investigations to guide and optimize UMRR’s investment in enhancing restoration and knowledge of the Upper Mississippi River ecosystem

# GOAL 1

## ENHANCE HABITAT FOR RESTORING AND MAINTAINING A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 1.1</b>	A) Selection	1) Identify habitat opportunities based on their potential contribution to increasing the UMR ecosystem's health and resilience	a) Update and expand the Habitat Needs Assessment to identify habitat enhancement and protection opportunities b) Incorporate insights gained from partner expertise and the UMRR Environmental Design Handbook c) Utilize best available science d) Consult UMRR science experts e) Use existing, or develop new, analytical tools (e.g., models) f) Involve project sponsors in identifying and formulating projects g) Outreach to potential candidate nonprofit organizations to inform them of the potential to cost share and solicit input	USACE	District ecological teams; System Ecological Team; Candidate project sponsors  Actions c-e: UMESC; Field stations	Key individuals and organizations; General public
		2) Consider state and federal agencies' UMR-related plans and strategies (watershed and in-river)	a) Define a process for incorporating UMR-related habitat plans and strategies b) Develop a reference list of UMR-related habitat plans and strategies (e.g., Landscape Conservation Cooperatives, state wildlife action plans) c) Document and communicate the incorporation of any such ancillary plans and strategies	USFWS	District ecological teams; System Ecological Team; Project sponsors; Project delivery teams	Relevant program/project leads (including watershed)

<sup>1</sup> The Coordinating Lead is the point of contact that is responsible for organizing partner coordination in implementing the task as well as for ultimately completing the actions. The Action Contributors are those individuals or organizations involved in implementing the task. The Coordination Entities are those individuals, organizations, or interagency groups that serve in an advisory role for the associated actions.



Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
Strategic Plan Objective 1.1	A) Selection (continued)	3) Ensure proper coordination among all program partners and relevant experts	a) Update the Habitat Planning and Sequencing Framework, including ways to more formally involve key individuals and organizations (e.g., UMRR scientists, nonprofit organizations) b) Use the Habitat Planning and Sequencing Framework to guide interagency coordination and decision-making	USACE	UMRR Coordinating Committee	Program partners; Key individuals and organizations (e.g., District river teams, nonprofits)
		4) Maintain flexibility in sequencing projects to optimize execution	a) Consider administrative factors, such as availability of resources and a project sponsor, regional needs, learning opportunities, and other issues supported by the partnership	USACE	UMRR Coordinating Committee; District ecological teams; Project sponsors	
	B) Planning and Design	1) Design project features to most effectively advance project goals and objectives	a) Incorporate insights gained from partner expertise and the UMRR Environmental Design Handbook b) Utilize best available science c) Consult UMRR science experts where appropriate d) Use existing, or develop new analytical tools; use tools that can also be used in project evaluation e) Continue to innovate project design and construction f) Define appropriate temporal and spatial scales for determining physical and biotic response of habitat project objectives	USACE	Project sponsors; Project delivery teams; UMESC; Field stations	Relevant program/project leads (including watershed)

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 1.1</b>	B) Planning and Design (continued)	2) Develop analytical tools to better estimate future conditions	a) Describe any new modeling needs for the UMRR b) Identify required expertise c) Form working groups containing said expertise d) Develop and evaluate models	USACE and UMESC	Project delivery teams; Component specialists; Field stations	
		3) Engage public interests and seek their input	a) Implement the Communications Plan and Implementation Framework (see Goal 3)	USACE	Communications team; Project delivery teams	UMRR Coordinating Committee
	C) Operation and Maintenance	1) Perform operation and maintenance to ensure key features are effectively advancing project goals and objectives	a) Seek adequate resources to implement operation and maintenance b) Improve reporting operation and maintenance costs and activities into the individual project evaluation reports and the UMRR Database c) Conduct project evaluation reports in five or ten years	a) Project sponsors b) USACE c) Project sponsors and USACE	a) Project sponsors b) USACE c) Project sponsors and USACE	
		2) Evaluate options to better enable project sponsors to completely and effectively implement operation and maintenance	a) Incorporate lessons learned about operation and maintenance needs of various restoration techniques b) Design project features that minimizes both operation and maintenance and first construction costs	USACE	Project sponsors; Project delivery teams	

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
Strategic Plan Objectives 1.1 and 1.2	A) Partner Coordination	Enhance and formalize interagency and interdisciplinary coordination and dialogue about habitat project planning, techniques, and adaptive management, among other things	a) Hold annual in-person meetings of the UMRS Corps District river teams and occasional conference calls when appropriate b) Conduct at least one annual information exchange meeting between UMRR scientists and restoration practitioners; biennial meetings held in-person c) Develop and maintain a habitat project status summary that includes reference to critical decision points for project development and adaptive management	USACE	USFWS; States; UMESC; Analysis Team chair; District river team chairs	UMRR Coordinating Committee
	B) Integration	Enhance integration among the program's various restoration and science efforts	a) Facilitate the inclusion of health and resilience concepts and applications into all aspects of the program b) Enhance internal communications and coordination among all partners (see Goal 4) c) Evaluate where better guidance would help restoration practitioners optimize and appropriately utilize the long term resource monitoring database	USACE; UMESC	All program partners	UMRR Coordinating Committee

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objectives 1.1 and 1.2</b>	C) Database	Centralize databases of project monitoring and evaluation data and other habitat project information	a) Input habitat project monitoring data and insights gained into a central database that is publically accessible b) Standardize database inputs of project goals, objectives, planning area, project area, project assessments, models uses, and features (e.g., project as-builts)	USACE	Project sponsors	
	D) Data Integrity	Ensure project monitoring methods are consistent through time and among projects	a) Review any supplemental, external data to ensure high quality b) Document methods used in all project monitoring	USACE	All partners	
<b>Strategic Plan Objective 1.2</b>	Operationalizing Adaptive Management <sup>2</sup>	1) Operationalize and focus UMRR's adaptive management efforts in an implementation framework	a) Consider when and how to apply certain adaptive management techniques b) Develop a system for documenting and communicating results and conclusions c) Notify partners when habitat project performance reports are published d) Create a central database for habitat project monitoring data that is accessible to all partners e) Integrate results and conclusions in future habitat projects to gain efficiencies f) Estimate and communicate the efficiencies gained through learning	USACE	UMRR Coordinating Committee; Analysis Team; Project delivery teams; Component specialists; Field station scientists	

<sup>2</sup> The UMRR Coordinating Committee approved two flow diagrams describing the program's adaptive management approaches, at the project scale as well as broader hypothesis testing. These flow charts are available at: [web site coming soon.]

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 1.2</b>	Operationalizing Adaptive Management (continued)	1) Operationalize and focus UMRR's adaptive management efforts in an implementation framework (continued)	g) Use a habitat project to examine adaptive management implementation questions h) Document and communicate the value of learning, including monetizing efficiencies gained			
		2) Implement, and refine as needed, the UMRR's adaptive management framework	a) Establish connections among habitat project planners and scientists	USACE; UMESC	UMRR Coordinating Committee; Analysis Team; Project delivery teams; Component specialists; Field station scientists	
		3) Identify important science questions regarding the UMR ecosystem that can be tested at completed and/or future habitat projects (Strategy 3)	a) Define and sequence critical ecological uncertainties at various spatial scales b) Develop and use standardized habitat project monitoring protocols to the extent possible c) Include potential learning opportunities in project fact sheets and feasibility reports	USACE; UMESC	UMRR Coordinating Committee; Analysis Team; Project delivery teams; Component specialists; Field station scientists	

## 2015-2025 UMRR Strategic Plan: Goal 2

### GOAL 2

#### ADVANCE KNOWLEDGE FOR RESTORING AND MAINTAINING A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM

- Objective 2.1**      **Assess, and detect changes in, the fundamental health and resilience of the Upper Mississippi River ecosystem by continuing to monitor and evaluate its key ecological components of aquatic vegetation, bathymetry, fish, land use/land cover, and water quality**
- Strategy 1      Evaluate the Upper Mississippi River’s ecological status and trends through comprehensive, integrated analyses of key ecological indicators using UMRR’s long term data
- Strategy 2      Conduct scientific analysis, research, and modeling using UMRR’s long term data, and any necessary supplemental data, to gain knowledge about the Upper Mississippi River ecosystem status and trends and process, function, structure, and composition
- Strategy 3      Continue to improve the effectiveness of long term data collection, analysis, storage, and dissemination to maintain the data’s integrity, long-term consistency, relevance, and usability<sup>1</sup>
- Strategy 4      Evaluate additional ecological components as priorities and resources allow to gain an even broader understanding of the Upper Mississippi River ecosystem and expand possibilities for important scientific analyses
- 
- Objective 2.2**      **Provide critical insights and understanding regarding a range of key ecological questions through a combination of monitoring, additional research, and modeling in order to inform and improve management and restoration of the Upper Mississippi River ecosystem**
- Strategy 1      Conduct focused research and analyses to gain critical, management-relevant information about the Upper Mississippi River ecosystem’s process, function, structure, and composition as well as the dynamics and interactions among system components
- Strategy 2      Conduct research projects that improve our understanding of critical ecological conditions and processes by examining the effects of select habitat restoration projects on those conditions and processes
- Strategy 3      Utilize other information, as needed, to augment UMRR’s long term data sets for comprehensive analyses of the river’s health and resilience
- Strategy 4      Develop and improve ecological models and other decision support tools to enhance science capabilities and understandings, and improve understanding of the potential effects of future management actions
- Strategy 5      Effectively communicate to habitat project planners and managers regarding how research findings may be applied to habitat projects

<sup>1</sup> More information on the long term resource monitoring sampling effort and statistics can be found at <http://www.umesc.usgs.gov/ltrmp.html>.

## GOAL 2

### ADVANCE KNOWLEDGE FOR RESTORING AND MAINTAINING A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 2.1</b>	Assessing Ecosystem Health and Resilience	1) Apply resilience concepts to UMRR implementation	a) Identify UMR ecosystem resilience definitions based on conceptual models, focused research, and public input b) Develop conceptual models for applying resilience concepts to the UMR c) Use the conceptual models to guide development of indices of resilience and evaluation of connections between restoration efforts and resilience d) Consult UMR restoration experts e) Test hypotheses derived from conceptual models through focused research and monitoring of habitat projects	UMESC	Component specialists; Field stations; Analysis Team; Restoration practitioners; Project sponsors	UMRR Coordinating Committee

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Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 2.1</b>	Assessing Ecosystem Health and Resilience	2) Assess and detect changes in UMR ecosystem health and resilience	a) Continue long term resource monitoring, including land cover/land use every ten years b) Use the long term resource monitoring data and analysis for assessment purposes c) Refine definitions of indicators of ecological health d) Evaluate the status and trends of indicators of ecological health and resilience at appropriate scales (Status and Trends Report and other publications) e) Maintain the long term resource monitoring database in order ensure its availability to the public in perpetuity f) Evaluate effects of selected restoration techniques and approaches on selected indicators of ecological health and resilience at appropriate scales	Action a, b, e: UMESC; Field stations  Actions c, d, f: UMESC; Field stations Analysis Team Chair; USACE	Component specialists; Field stations; Analysis Team; Restoration practitioners	UMRR Coordinating Committee
		3) Conduct scientific analysis, research, and modeling to gain knowledge about the UMR's ecological health and resilience	a) Develop research frameworks that link science monitoring, research, analyses, and where appropriate, restoration efforts b) Consult with UMR restoration practitioners as appropriate c) Identify additional monitoring components needed to better understanding key ecological processes, functions, structures, and composition d) Continue to develop novel, informative, analytical methods for understanding the health and resilience of the UMR e) Use existing, or develop new, analytical tools (e.g., models)	UMESC; Field station leaders	Component specialists; Field stations; Analysis Team; USACE; Restoration practitioners; Project sponsors	UMRR Coordinating Committee



Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objectives 2.1 and 2.2</b>	A) Integration	Enhance integration among the program's various restoration and science efforts	a) Facilitate the inclusion of health and resilience concepts and applications into all aspects of the program b) Improve internal communications and coordination (see Goal 4) c) Provide learning sessions regarding accessibility and usability of the long term resource monitoring database d) Facilitate the appropriate use of available data in habitat project planning and evaluation by improving communication between restoration practitioners and UMRR scientists e) Evaluate where better guidance would help restoration practitioners optimize and appropriately utilize the long term resource monitoring database	USACE; UMESC	Component specialists; Field stations; Analysis Team; Restoration practitioners; Project sponsors; Project delivery teams	
	B) Data Integrity	Ensure methods remain consistent through time	a) Field stations and UMESC LTRM PIs meet in-person regularly to ensure consistency in methods b) Hold biennial component meetings	UMESC; Field stations	UMESC; Field stations	
<b>Strategic Plan Objective 2.2</b>	Knowledge to Improve and Inform UMR Ecosystem Management and Restoration	1) Address restoration and UMR ecosystem management questions through science analysis and research	a) Continue to develop novel, informative, analytical methods for understanding the health and resilience of the UMR b) Identify and better understand current and emerging stressors (or drivers) to the UMR ecological health and resilience	UMESC	Component specialists; Field stations; Analysis Team; Restoration practitioners; Project sponsors	
		2) Continue improvement of management actions and restoration approaches	a) Conduct well-designed studies of select habitat projects and management actions that examine their effects in the context of ecological health and resilience b) Define appropriate temporal and spatial scales for determining physical and biotic response of habitat project objectives	USACE; UMESC	Component specialists; Field stations; Analysis Team; Restoration practitioners; Project sponsors	

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 2.2</b>	Knowledge to Improve and Inform UMR Ecosystem Management and Restoration (continued)	3) Effectively communicate relevant research findings to habitat project planners and river managers	a) See Goal 4 for interactions between science- and habitat-related implementing partners b) Distribute clear, concise summaries of scientific findings to program partners	UMESC; USACE	Component specialists; Field stations; Analysis Team; Restoration practitioners; Project sponsors	

## 2015-2025 UMRR Strategic Plan: Goal 3

### GOAL 3

ENGAGE AND COLLABORATE WITH OTHER ORGANIZATIONS AND INDIVIDUALS  
TO HELP ACCOMPLISH THE UPPER MISSISSIPPI RIVER RESTORATION VISION

- |                          |   |
|--------------------------|---|
| <b>Objective 3.1</b>     | <b>Work with key organizations and individuals in the Upper Mississippi River watershed</b>   |
| Strategy 1               | Ensure rich collaboration with key organizations and individuals in the Upper Mississippi River watershed in advancing complementary visions, missions, and goals               |
| Strategy 2               | With key watershed programs and projects, jointly develop and communicate common messages about the restoration and knowledge needs of the Upper Mississippi River              |
| Strategy 3               | Seek knowledge from other organizations and individuals for the purposes of being aware of activities that may influence UMRR's work and enhancing programmatic efforts         |
| Strategy 4               | Directly engage relevant organizations or individuals in implementing UMRR's efforts, as appropriate  |
| <br><b>Objective 3.2</b> | <br><b>Provide information to organizations and individuals whose actions and decisions affect the Upper Mississippi River ecosystem</b>  |
| Strategy 1               | Enhance the delivery and utility of UMRR's knowledge in order to increase understanding of the Upper Mississippi River's ecosystem drivers and means to achieve the UMRR vision |
| Strategy 2               | Provide decision makers with timely, relevant, understandable, and usable knowledge about the needs and tools available to advance the UMRR's vision                            |
| <br><b>Objective 3.3</b> | <br><b>Exchange knowledge with other organizations and individuals nationally and internationally</b>   |
| Strategy 1               | Serve as a resource for similar programs nationally and internationally   |
| Strategy 2               | Seek knowledge from other organizations and individuals nationally and internationally to enhance UMRR's efforts in advancing its vision  |

## GOAL 3

### ENGAGE AND COLLABORATE WITH OTHER ORGANIZATIONS AND INDIVIDUALS TO HELP ACCOMPLISH THE UPPER MISSISSIPPI RIVER RESTORATION VISION

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objectives 3.1, 3.2, and 3.3</b>	Communications Plan	Coordinate and commit resources to UMRR's external engagement and outreach	a) Establish a standing communications team to implement Goal 3	UMRR Coordinating Committee		All partners
		Develop a UMRR external communications plan	a) Focus external outreach efforts based on prioritized ecological drivers that affect the Upper Mississippi River ecosystem health b) Assess external users' information and engagement needs and preferred delivery methods c) UMRR Coordinating Committee and A-Team agendas regularly include opportunities to discuss outreach and external engagement ideas d) Review and update UMRR web sites at least quarterly	UMRR Communications Team	UMRR Coordinating Committee; All partners	

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Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 3.1</b>	Strategic Engagement and Outreach (Collaborating with others to optimize and leverage UMRR's resources)	Focus and enhance engagement and collaboration and dialogue in a communications plan and implementation framework	<ul style="list-style-type: none"> <li>a) Identify key organizations and individuals to directly engage and seek knowledge</li> <li>b) Assess information and engagement needs of key organizations and individuals</li> <li>c) Determine preferred information delivery methods of key organizations and individuals</li> <li>d) Develop compelling messages and various tools for communicating with key audiences (See Objective 3.2 actions)</li> <li>e) Prioritize external engagement and collaboration</li> <li>f) Create collaborative exchanges with other basin restoration programs to improve outcomes for all programs, especially NRCS-RCPP, and potentially USEPA</li> <li>g) Promote both program elements and develop a message that conveys the value of their integration</li> </ul>	UMRR Communication Team; USACE; UMESC	Partner agencies' public affairs specialists and congressional liaisons; Select partners with program knowledge; Target watershed and instream program, project, initiative leads	UMRR Coordinating Committee

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 3.2</b>	External Communication and Dialogue (Outreach to public, elected officials, etc.)	Focus and enhance external communication in a communications plan and implementation framework	a) Facilitate dialogue to solicit public input on Goals 1 and 2 implementation (e.g., habitat project planning, resilience concepts) b) Develop compelling messages and tools (e.g., brochures) for communicating with key audiences c) Utilize innovative technologies/communicating mechanisms to better reach audiences (e.g., instagram) d) Develop concise, overarching messages about UMRR's accomplishments and programmatic efforts (i.e., "elevator speech") e) Make available current talking points f) Develop directory of partner expertise to reference specific inquiries g) Address challenges with crediting the program in short sound bites h) Share internally (within the program) about upcoming public engagement opportunities i) Promote both program elements and the value of their integration j) Evaluate effectiveness in external communications and dialogue k) Track significant successes in outreach techniques	UMRR Communication Team; USACE; UMESC	UMRR Communication Team; Partner agencies' public affairs specialists and congressional liaisons; Select partners with program knowledge	UMRR Coordinating Committee

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 3.3</b>	National and International Exchanges	Focus and enhance knowledge exchange with other organizations and individuals nationally and internationally in a communications plan and implementation framework	<ul style="list-style-type: none"> <li>a) Target distribution of key materials as appropriate</li> <li>b) Collaborate with other related large aquatic ecosystem/water resources efforts in the nation and world</li> <li>c) Incorporate insights gained from other national and international programs/efforts as applicable to enhance program implementation, increase knowledge, and create cost-efficiencies, and so on</li> <li>d) Promote the program's national and international significance</li> </ul>	USACE; UMESC	Partner agencies' public affairs specialists; UMRR-affiliated personnel attending conferences, etc.; Program experts and knowledgeable partners that can promote program success	UMRR Coordinating Committee

## 2015-2025 UMRR Strategic Plan: Goal 4

### GOAL 4

#### UTILIZE A STRONG, INTEGRATED PARTNERSHIP TO ACCOMPLISH THE UPPER MISSISSIPPI RIVER RESTORATION VISION

**Objective 4.1      Promote a common vision and sense of purpose, transparency, and accountability among UMRR partners**

- Strategy 1      Partners carry a strong, unified message regarding UMRR's value, accomplishments, and importance to the region and nation
- Strategy 2      Partners work in collaboration to enhance restoration and knowledge of the Upper Mississippi River to advance UMRR's vision
- Strategy 3      Continually learn and improve as a program and in implementing restoration and science techniques
- Strategy 4      Improve transparency and accountability within the partnership regarding program priorities and budgets
- Strategy 5      Organize and maintain institutional knowledge of UMRR's policy and programmatic efforts

**Objective 4.2      Implement the UMRR as outlined in the program's adopted Joint Charter for the UMRR Coordinating Committee, Analysis Team, and Habitat Planning and Sequencing Framework Teams, as well as the FY 2015-2025 UMRR Strategic Plan**

- Strategy 1      Partner agencies implement program activities in accordance to the adopted Joint Charter
- Strategy 2      Partner agencies collaboratively develop and implement the strategic plan



## GOAL 4

### UTILIZE A STRONG, INTEGRATED PARTNERSHIP TO ACCOMPLISH THE UPPER MISSISSIPPI RIVER RESTORATION VISION

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 4.1</b>	A) Partnership Vision	Partners communicate compelling and consistent messages about the program to their respective agencies	a) Develop broad unified messages about the value of the program, including the program's economic value b) Make these messages readily accessible to all UMRR partners for their own uses	Communications team	Individuals serving on UMRR's coordinating groups	UMRR Coordinating Committee
	B) Partner Communication	1) Enhance internal communication among all partners	a) Identify communications needs and solutions b) Hold biennial meetings among restoration and science staff c) Communicate restoration and science knowledge in meaningful, relevant, timely, and useful ways – One page fact sheets, brown bag lunch webinars, etc. d) Develop reports that showcase UMRR accomplishments, including partner contributions, and major policy changes	USACE; UMESC	District-based interagency coordinating committee chairs (RRF, FWVG, FWIC, RRCT, RRAT Exec, RRAT Tech, both IL River Groups); Component specialists; Field stations; Restoration practitioners	UMRR Coordinating Committee

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Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 4.1</b>	B) Partner Communication (continued)	2) Maintain, and make readily available, programmatic information	a) Input habitat project and science information in program databases in a timely manner b) Make databases available to all partners to the extent possible c) Identify and make electronically accessible historic documents and other priority data (e.g., aerial photos, historic fish, mussel and wildlife surveys, water quality data, GREAT studies, etc.)	USACE; UMESC	Database experts from partner agencies; Restoration practitioners; Component specialists; Monitoring staff	UMRR Coordinating Committee
<b>Strategic Plan Objectives 4.1 and 4.2</b>	Transparency and Accountability	1) Maintain good, working relationships among partners that foster trust and collaboration	a) Clearly communicate and coordinate decision-making b) When released to the public, share information about the federal budget process as it relates to UMRR c) Partner agencies provide timely financial information clearly and as appropriate	USACE; UMESC	UMRR Coordinating Committee; Field stations; USFWS; UMESC staff; Project delivery teams	All partners
		2) Provide relevant and timeline information necessary to allow for effective and efficient resource planning	a) Provide partner agencies with timely information about out-year budgets for their respective planning b) Scopes of work and related budget information are shared in a timely manner to assist in budget developments	USACE; UMESC	Project managers; Partners with Congressional involvement; Field stations	All partners

Objective	Category	Needs	Actions	Coordinating Lead <sup>1</sup>	Action Contributors <sup>1</sup>	Coordination Entities <sup>1</sup>
<b>Strategic Plan Objective 4.2</b>	Partner Coordination	Ensure all partners are provided with information needed to implement UMRR as described in program planning documents	<ul style="list-style-type: none"> <li>a) Members of coordinating teams provide respective agency staff with updates on policies and program implementation</li> <li>b) Create and maintain a directory and organizational chart of individuals who work directly in implementing the program</li> <li>c) Encourage and facilitate engagement among UMRR's interagency coordinating groups</li> <li>d) Facilitate more frequent exchanges between UMRR partners and various coordinating entities, including restoration practitioners, scientists, the A-Team, and District river teams</li> <li>e) Employ continuous process improvement evaluations on priority aspects of program implementation</li> </ul>	USACE; UMESC	Project delivery teams; Restoration practitioners; Scientists	All partners

## **ATTACHMENT C**

### **Long Term Resource Monitoring and Science**

- **Base Monitoring Scope of Work thru 1<sup>st</sup> Quarter of FY 16 (2/5/2016) (C-1 to C-4)**
- **FY 14 UMRR Science Activities in Support of Restoration and Management (2/4/2016) (C-5 to C-7)**
- **FY 15 UMRR Science Activities in Support of Restoration and Management (2/4/2016) (C-8 to C-9)**
- **FY 16 UMRR Science Activities in Support of Restoration and Management (2/5/2016) (C-10 to C-13)**
- **Agenda for the February 16-18, 2016 UMRR Science Meeting (C-14 to C-16)**
- **Abstract of Spatially Explicit Habitat Models for 28 Fishes from the UMRS (AHAG 2.0) Technical Report (7/2014) (C-17 to C-19)**

Upper Mississippi River Restoration  
Long Term Resource Monitoring Element  
FY2016 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Aquatic Vegetation Component</b>						
2016A1	Complete data entry and QA/QC of 2015 data; 1250 observations.					
	a. Data entry completed and submission of data to USGS	30-Nov-15		30-Nov-15		Moore, Drake, Vogeler
	b. Data loaded on level 2 browsers	15-Dec-15		15-Dec-15		Schlifer
	c. QA/QC scripts run and data corrections sent to Field Stations	28-Dec-15		28-Dec-15		Sauer, Schlifer
	d. Field Station QA/QC with corrections to USGS	15-Jan-16		15-Jan-16		Moore, Drake, Vogeler
	e. Corrections made and data moved to public Web Browser	30-Jan-16		21-Jan-16		Yin, Sauer, Schlifer, Caucutt
2016A2	Web-based: Creating surface distribution maps for aquatic plant species in Pools 4, 8, and 13; 2014 data	31-Jul-16				Yin, Rogala, Schlifer
2016A3	Wisconsin DNR annual summary report 2015 that combines current year observations from LTRM with previous years' data, for the fish, aquatic vegetation, and water quality components.	30-Sep-16				Drake, Bartels, Hoof, Kalas
2016A4	Complete aquatic vegetation sampling for Pools 4, 8, and 13 (Table 1)	31-Aug-16				Yin, Moore, Drake, Vogeler
2016A5	Graphical summary and maps of aquatic vegetation current status and long-term trends.	30 Oct. 2015		12-Oct-15		Moore
<b>Intended for distribution</b>						
LTRM Technical Report: Ecological Assessment of High Quality UMRS Floodplain Forests (2007APE12; Chick, Guyon, Battaglia) (in USGS review)						
LTRM Technical Report; Experimental and Comparative Approaches to Determine Factors Supporting or Limiting Submersed Aquatic Vegetation in the Illinois River and its Backwaters (2008APE5, Sass) (in USGS review)						
LTRM completion report: FY05-07 data--Analysis and support of aquatic vegetation sampling data in Pools 6, 9, 18, and 19 (2008APE4a; Yin) (in USGS review)						
Manuscript: Have the recent increases in aquatic vegetation in Pools 5 and 8 been the result of water level management drawdowns, HREPs, or natural fluctuations? (2009APE1a; Yin) (in USGS review)						
Manuscript: A statistical model of species occupancy using the LTRM aquatic vegetation data (2013A7; Yin) (in USGS review)						
<b>Fisheries Component</b>						
2016B1	Complete data entry, QA/QC of 2015 fish data; ~1,590 observations					
	a. Data entry completed and submission of data to USGS	31-Jan-16				DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Pendleton
	b. Data loaded on level 2 browsers; QA/QC scripts run and data corrections sent to Field Stations	15-Feb-16				Ickes, Schlifer
	c. Field Station QA/QC with corrections to USGS	15-Mar-16				DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Pendleton
	d. Corrections made and data moved to public Web Browser	30-Mar-16				Ickes, Sauer, and Schlifer
2016B2	Update Graphical Browser with 2015 data on Public Web Server.	31-May-16				Ickes, Sauer, DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Pendleton, Schlifer
2016B3	Complete fisheries sampling for Pools 4, 8, 13, 26, the Open River Reach, and La Grange Pool (Table 1)	31-Oct-16				Ickes, DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Pendleton
2016B4	Summary Letter: Floodplain fisheries sampling	31-Oct-16				West, Sobotka
2016B5	IDNR Fisheries Management State Report: Fisheries Monitoring in Pool 13, Upper Mississippi River, 2015	30-Jun-16				Bowler

Upper Mississippi River Restoration  
Long Term Resource Monitoring Element  
FY2016 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
2016B6	Sample collection, database increment, Summary letter on Asian carp age and growth: collection of cleithral bones	31-Jan-16				Solomon, Pendleton, Casper
2016B7	Sample collection, database increment, letter summary: Collection and archiving of age and growth structure for selected species in the La Grange Reach of the Illinois River	31-Jan-16				Solomon, Pendleton, Casper
2016B8(D)	Database increment: Stratified random day electrofishing samples collected in Pools 9–11	30-Sep-16				Bowler
2016B9(D)	Database increment: Stratified random day electrofishing samples collected in Pools 16–18	30-Sep-16				Bowler
2016B10	Summary Letter: Open River Chevron Dike monitoring	31-Oct-16				West, Sobotka
Intended for distribution						
Completion report: LTRM Fisheries Component collection of six darter species from 1989–2004. (2006B13; Ridings) (in USGS review)						
LTRM technical report; Setting quantitative fish management targets for LTRM monitoring (2008APE2; Sass) (in USGS review)						
LTRM Completion report, compilation of 3 years of sampling: Fisheries (2009R1Fish; Chick et al.) (in USGS review)						
Manuscript: Determining environmental history of three sturgeon species in the Upper, Middle, and Lower Mississippi Rivers. (2013B22; Phelps) (in review Journal of Fish Biology)						
Manuscript: Age-0 sturgeon habitat associations in the free flowing portion of the Upper Mississippi River (2012B5; Tripp, Phelps, Herzog) (in review Journal of Fish Biology)						
LTRM Fact Sheet: Tree map tool for visualizing fish data, with example of native versus non-native fish biomass (2013B16) (in USGS review)						
<b>Water Quality Component</b>						
2016D1	Complete calendar year 2015 fixed-site and SRS water quality sampling	31-Dec-15		31-Dec-15		Houser, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D2	Complete laboratory sample analysis of 2015 fixed site and SRS data; Laboratory data loaded to Oracle data base.	15-Mar-16				Yuan, Schlifer
2016D3	1st Quarter of laboratory sample analysis (~12,600)	30-Dec-16				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Cook, Sobotka
2016D4	2nd Quarter of laboratory sample analysis (~12,600)	30-Mar-16				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D5	3rd Quarter of laboratory sample analysis (~12,600)	29-Jun-16				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D6	4th Quarter of laboratory sample analysis (~12,600)	28-Sep-16				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D7	Complete QA/QC of calendar year 2015 fixed-site and SRS data.					
	a. Data loaded on level 2 browsers; QA/QC scripts run; SAS QA/QC programs updated and sent to Field Stations with data.	30-Mar-16				Schlifer, Rogala, Houser
	b. Field Station QA/QC; USGS QA/QC.	15-Apr-16				Houser, Rogala, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
	c. Corrections made and data moved to public Web Browser	30-Apr-16				Rogala, Schlifer, Houser
2016D8	Complete FY2015 fixed site and SRS sampling for Pools 4, 8, 13, 26, Open River Reach, and La Grange Pool	30-Sep-16				Houser, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka

Upper Mississippi River Restoration  
Long Term Resource Monitoring Element  
FY2016 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
2016D9	WEB-based annual Water Quality Component Update w/ 2015 data on Server.	30-May-16				Rogala
2016D10	Draft Completion report: Evaluation of water quality data from automated sampling platforms	30-Sep-16				Soeken-Gittinger,
2016D11	Operational Support to the UMRR LTRM Element. Serve as in-house Field Station for USGS for consultation and support on various LTRM-wide topics	30-Sep-16				Kalas, Hoff, Bartel, Drake
2015D11	Draft report/manuscript: Developing continuous water quality monitoring methods in the UMR	1-Sep-16				Chick, Houser
2015D12	Final report/manuscript: Developing continuous water quality monitoring methods in the UMR	1-Sep-17				Chick, Houser
Intended for distribution						
Completion report: Examining nitrogen and phosphorus ratios N:P in the unpounded portion of the Upper Mississippi River (2006D9; Hrabik & Crites) (in USGS review)						
LTRM report: Main channel/side channel report for the Open River Reach. (2005D7; Hrabik) (in USGS review)						
Manuscript: Lateral contrasts in nutrients, chlorophyll, and suspended solids within the Upper Mississippi River System (2012D10; Houser) (Accepted for publication)						
Completion report, compilation of 3 years of sampling: Water Quality (2009R1WQ; Giblin, Burdis) (in USGS review)						
Manuscript: Trends in suspended solids, nitrogen, and phosphorus in select upper Mississippi River tributaries, 1991-2011 (Kreiling and Houser, 2013D14) (in USGS review)						
Manuscript: Relationship between the temporal and spatial distribution, abundance, and composition of zooplankton taxa and hydrological and limnological variables in Lake Pepin (2013D17; Burdis)(ready for submission to Journal)						
Manuscript: Nutrients and dissolved oxygen in the UMRS: improving our understanding of winter conditions and their implications for structure and function of the river (2014D12; Houser) (in USGS review)						
Land Cover/Land Use with GIS Support						
2016LC1	Maintenance ArcGIS server	30-Sep-16				Hlavacek, Fox, Rohweder
2016LC2	Aerial Photo scanning; year 1 key pools	30-Sep-16				Ruhser
2016LC3	Bathymetry footprint	30-Sep-16				Stone, Hanson
2016LC4	Updates on progress for land cover products listed.	New progress reported in the quarterly activities. Percent complete updated 30 Sept 2016.				Robinson
Data Management						
2016M1	Update vegetation, fisheries, and water quality component field data entry and correction applications.	30-May-16				Schlifer
2016M2	Load 2015 component sampling data into Oracle tables and make data available on Level 2 browsers for field stations to QA/QC.	30-Jun-16				Schlifer
2016M3	Update Graphical Water Quality SRS Data browser from java applet based to html5 JavaScript plugin free version.	1-Nov-15		1-Nov-15		Schlifer
2016M4	Update Graphical Fisheries Data browser from java applet based to html5 JavaScript plugin free version.	25-Jan-16				Schlifer
2016M5	Update Aquatic Vegetation Graphical SRS Data browser from java applet based to html5 JavaScript plugin free version.	1-Mar-16				Schlifer
2016M6	Rewrite Fisheries Data Download Query to increase efficiency and performance	1-Jun-16				Schlifer

Upper Mississippi River Restoration  
Long Term Resource Monitoring Element  
FY2016 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Quarterly Activities</b>						
2016QR1	Submittal of quarterly activities	30-Jan-16				All LTRM staff
2016QR2	Submittal of quarterly activities	13-Apr-16				All LTRM staff
2016QR3	Submittal of quarterly activities	13-Jul-16				All LTRM staff
2016QR4	Submittal of quarterly activities	12-Oct-16				All LTRM staff
<b>Equipment Inventory</b>						
2016ER1	Property inventory and tracking	15-Nov-16				LTRM staff as needed



**UMRR Science in Support of Restoration and Management**  
**FY2014 Scope of Work**  
**January 2016 Status**

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Seamless Elevation Data</b>						
2014LB1	LiDAR Tier 1, processing and meta data, data on line: Pools 15-19, Pool 25 – Open River, Kaskaskia, IL River all pools	30-Mar-15		18-Dec-14		Dieck, Rohweder, Nelson, Fox
2014LB2	LiDAR Tier 3, processing and meta data, data on line: Pools 4, 5, 7, 8, 9, 10, 13, and 21	30-Mar-15		7-Apr-15		Dieck, Rohweder, Nelson, Fox
<b>Land Cover / Land Use data and Accuracy Assessment/Validation for UMRS</b>						
2014V2	Complete remaining 70% of the 2010/11 LCU database for UMR Open River North	30-Sep-14	30-Jan-15	21-Jan-15		Robinson, Hoy, Hanson, Langrehr, Ruhser, Nelson
2014V4	Final LTRMP Completion Report on Accuracy Assessment	30-Sep-14		17-Nov-14	In USGS SPN for Publication	Ruhser, Jakusz
<b>Standardized HREP Non-forested Wetland Plant Sampling Protocol</b>						
2014NFW1	draft NFW monitoring protocol	28-Feb-14		28-Feb-14		McCain
2014NFW2	Final draft NFW monitoring protocol	30-Mar-14		31-Mar-14		McCain
2014NFW3	A-Team review	1-Apr-14		7-Apr-14		McCain
2014NFW4	completed NFW monitoring protocol available	30-Sep-14		completed		McCain
<b>Standardized HREP Forested Wetland Plant Sampling Protocol</b>						
2014FW1	draft FW monitoring protocol	30-Nov-13		30-Nov-13		McCain
2014FW2	Final draft FW monitoring protocol	30-Mar-14		31-Mar-14		McCain
2014FW3	A-Team review	1-Apr-14		7-Apr-14		McCain
2014FW4	completed FW monitoring protocol available	30-Sep-14		completed		McCain
<b>Predictive Model for Aquatic Cover Types</b>						
2014AQ1	Complete hydraulic model of existing conditions	30-Apr-14	11-Jul-14	11-Jul-14		Hendrickson
2014AQ2	Compile vegetation data and develop empirical equations, Stoddard as pilot	31-Aug-14		31-Aug-14		Yin, Rogala, Ingvalson, Potter
2014AQ3	Apply equations to Pool 3 for pre-existing conditions, North & Sturgeon	30-Sep-14	28-Nov-14	completed		Yin, Rogala, Ingvalson, Potter
2014AQ4	Final model and outputs	31-Dec-14		completed		Yin, Rogala, Ingvalson, Potter
<b>UMRS Vegetation Handbook</b>						
2014VH1	Acquire new field images for handbook	30-Sep-14		30-Sep-14		Dieck, Langrehr, Hoy, Robinson, Ruhser
2014VH2	Draft updates to technical sections and vegetation descriptions	31-Dec-14		31-Dec-14		Dieck, Langrehr, Hoy, Robinson, Ruhser
2014VH3	Finalize handbook and submit for USGS review	31-Mar-15		31-Mar-15	In USGS SPN for Publication	Dieck, Langrehr, Hoy, Robinson, Ruhser
<b>Phase 2 Geospatial Data Upgrades</b>						
2014GDU1	Complete geodatabases by pool for the entire UMRS	30-Sep-14	30-Apr-15	4-May-15		Nelson, Robinson
2014GDU2	Complete KMZ files for river miles, levees, boat access points, wing dams, aquatic areas, and remaining land cover data	30-Sep-14	31-Jul-15	30-Sep-15		Nelson, Robinson

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Spatial Data Query Tool</b>						
2014SDQ1	Compile all LTRMP sampling data collected through 2013 and convert to a useable format	1-Aug-14		1-Aug-14		Rohweder, Fox
2014SDQ2	Create a web-based platform that contains all spatial data; convert all queries to ArcGIS	31-Dec-14	30-Aug-15	30-Sep-15		Rohweder, Fox
2014SDQ3	SDQT beta tested and ready for USGS review	31-Mar-15	30-Nov-15	21-Dec-15	New ArcGIS server was needed, original server was taken offline because of compliance issue	Rohweder, Fox
<b>UMRS Data Map</b>						
2014DM1	Include all UMRR-EMP data created at UMESC in the data map	30-Sep-14	30-Nov-14	31-Dec-14	UMESC will update as new datasets come online in the future	Nelson, Ruhser
2014DM2	Include all UMRR-EMP publications from <a href="http://umesc.usgs.gov/reports_publications/ltrmp_rep_list.html">http://umesc.usgs.gov/reports_publications/ltrmp_rep_list.html</a> in the data map	31-Dec-14	9/31/2015	31 Sep 15	The tool still needs UMRR branding, waiting to get logo or something official from Karen. Modifications and updates will continue. Tool will also be linked to the UMESC web page	Nelson, Ruhser
2014DM3	Include additional state and federal data references in the data map	31-Mar-15		30-Jun-15	Not all state and federal data sources have the same metadata available making it more difficult than initially expected. New OMB guidelines will correct this. UMESC will continually updated site as new metatadata are made available	Nelson, Ruhser
<b>Assessing System-wide Hydrodynamic Model Availability</b>						
2014SHM1	Kick off Email to workshop participants	30-Apr-14		21-Apr-14		Theiling
2014SHM2	Compile list of UMR-IWW hydrologic models	31-May-14		31-May-14		Theiling
2014SHM3	Complete read-aheads	15-Jun-14	14-Jul-14	14-Jul-14		Theiling
2014SHM4	Conduct workshop/webinar	1-Jul-14	12-Aug-14	21-Aug-14	July dates did not work for attendees	Theiling
2014SHM5	Summarize webinar	31-Jul-14	31-Aug-14	30-Sep-14		Theiling
2014SHM6	Draft white paper	31-Aug-14	15-Aug-14	30-Sep-14		Theiling
2014SHM7	<i>draft</i> Final white paper	30-Sep-14	31-Dec-14	31-Dec-14	draft final submitted 31 Dec 14. Addit	Theiling
2014SHM8	final white paper	1-Apr-15		4-Apr-15		Theiling
<b>Development of Mussel Vital Rates</b>						
2014MVR1	Brief summary report	30-Sep-15		30-Sep-15	completed, in UMESC review	Newton, Zigler, Davis
2014MVR2	Brief summary report	30-Sep-16				Newton, Zigler, Davis
2014MVR3	Completion report on a vital rates of native mussels at West Newton Chute, UMRS	30-Sep-17				Newton, Zigler, Davis

**UMRR Science in Support of Restoration and Management**  
**FY2014 Scope of Work**  
**January 2016 Status**

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Validation of Mussel Community Assessment Tool</b>						
2014MCA1	Workshop of mussel experts in UMRS	1-May-15		19-Feb-15		Newton, Zigler, Dunn, Duyvejonck
2014MCA2	Draft completion report on a validated mussel community assessment tool for use by river managers	1-Dec-15	1-Mar-16		state biologists are still ranking beds as part of validation	Newton, Zigler, Dunn, Duyvejonck
2014MCA3	Final completion report on a validated mussel community assessment tool for use by river managers	1-Mar-16	1-Jun-16			Newton, Zigler, Dunn, Duyvejonck
<b>Effects of Nutrient Concentrations on Zoo- and Phytoplankton</b>						
2014NC1	Counting of phytoplankton samples	13-Mar-15		2-Mar-15		Giblin, Campbell, Houser, Manier
2014NC2	Database completed and analysis completed	13-Mar-16				Giblin, Campbell, Houser, Manier
2014NC3	Full manuscript completed	13-Mar-17				Giblin, Campbell, Houser, Manier
<b>Ecological Shifts Turbid to Clear States</b>						
2014ES1	Literature review and initial analyses completed	13-Mar-15		15-Nov-14		Giblin, Ickes, Langrehr, Bartels
2014ES2	Refined analyses and draft manuscript prepared	13-Mar-16			All analyses complete, manuscript in draft and co-author review 2 April 2015	Giblin, Ickes, Langrehr, Bartels
2014ES3	Manuscript submitted for publication	13-Mar-17				Giblin, Ickes, Langrehr, Bartels
<b>Invasive Carp Population Demographics (#1)</b>						
2014CPD1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014CPD2	Manuscript	31-Mar-16		1-Jul-15	Management of Biological Invasions (2015) Volume 6; <a href="http://www.reabic.net/journals/mbi/2015/Accepted.aspx">http://www.reabic.net/journals/mbi/2015/Accepted.aspx</a>	Phelps, McCain
<b>Asian Carps Recruitment Sources (#2)</b>						
2014CRS1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014CRS2	Manuscript	31-Mar-16				Phelps, McCain
<b>Effects of Asian Carps on Native Piscivore Diets (#3)</b>						
2014NPD1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014NPD2	Manuscript	31-Mar-16				Phelps, McCain
<b>Early Life History of Invasive Carps (#4)</b>						
2014CLH1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014CLH2	Manuscript	31-Mar-16				Phelps, McCain

**UMRR Science in Support of Restoration and Management**  
**FY2015 Scope of Work**  
**January 2016 Status**

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Seamless Elevation Data</b>						
2015LB1	Tier 2 LiDAR for Pools 14-19	31-Mar-15		15-Apr-15		Dieck, Hanson
2015LB2	Tier 2 LiDAR for Pool 25-OR & Kaskaskia	30-Jun-15		30-Jun-15	All pools but Pool 26 are complete.	Dieck, Hanson
2015LB2b	Tier 2 LiDAR for Pool 26	30-Jun-15	30-Nov-15	30-Nov-15	It has been discovered that Pool 26 lidar has serious problems. Still working to resolve. Separate line item created.	
2015LB3	Tier 2 LiDAR for the Illinois River	30-Sep-15	30-Nov-15	30-Nov-15	The lidar was not classed to ASPRS specifications, resulting in the need to reclassify a lot of the data	Dieck, Hanson
2015LB4	All remaining Bathymetry	30-Sep-15		1-Apr-15		Dieck, Hanson
2015LB5	Seamless Elevation for Pools 2, 5a, 6, 10-12, St Croix, and Pool 14	31-Dec-15	31-Jan-16		Slightly behind from issues that arose from Tier 2 processing	Dieck, Hanson
2015LB6	Seamless Elevation for Pools 15-19, 20, and 22-24	31-Mar-16				Dieck, Hanson
2015LB7	Seamless Elevation for Pools 25-OR & Kaskaskia	30-Jun-16				Dieck, Hanson
2015LB8	Seamless Elevation for the Illinois River	30-Sep-16				Dieck, Hanson
<b>Producing NED ready LiDAR products</b>						
2015NED1	Perry County, MO	31-Jul-15		30-Sep-15		Nelson, Dieck
2015NED2	Remaining portions of the middle Mississippi (OR1 & 2)	31-Jul-15		30-Sep-15		Nelson, Dieck
2015NED3	Area of the Upper Mississippi (Pool 25-26)	30-Sep-15	6-Nov-15	22-Jan-16	Data are being hand delivered to the Rolla office 1-29-2016	Nelson, Dieck
2015NED4	Illinois River area	30-Sep-15	11-Dec-15	22-Jan-16	Data are being hand delivered to the Rolla office 1-29-2016	Nelson, Dieck
<b>Pool 12 AM monitoring (crappie telemetry)</b>						
2015AM1	Capture fish and affix radio tags to white crappies in study lakes	1-Nov-14		2-Apr-15		Bierman, Hansen, Bowler, Theiling
2015AM2	Location of tagged fish and update in-house project database	Ongoing through FY		30-Sep-15		Bierman, Hansen, Bowler, Theiling
2015AM3	Complete tracking portion of study	30-Sep-15		30-Sep-15		Bierman, Hansen, Bowler, Theiling
<b>Fish Indicators of Ecosystem Health</b>						
2015FI1	Preliminary set of species identified for the different assemblages by study reach submitted to A-Team as status update and for review	30-Aug-15	10-Feb-16		Post doc hiring delay resulted in project delayed	Anderson, Casper, McCain
2015FI2	Draft recommendation for the best attainable or target for each assemblage by study reach submitted to A-Team for Review	1-Oct-15	10-Feb-16		For presentation at 2016 UMRR Science Mtg in La Crosse briefing	Anderson, Casper, McCain
2015FI3	Initial draft Project Report submitted to A-Team for review	1-Dec-15	15-Mar-16		Incorporate feedback from 2016 UMRR Science Mtg presentation into La Crosse A-team briefing	Anderson, Casper, McCain
2015FI4	Final draft Project Report submitted to A-Team for review and endorsement at April meeting	1-Mar-16	1-Jun-16			Anderson, Casper, McCain
2015FI5	Final draft Project Report submitted to UMRR CC for endorsement at August meeting	15-Jul-16	15-Jul-16			Anderson, Casper, McCain
2015FI6	Final Report	1-Jun-16	30-Aug-16			Anderson, Casper, McCain
<b>Plankton community dynamics in Lake Pepin</b>						
2015LPP1	Phytoplankton processing; species composition, biovolume	30-Dec-15		22-Oct-15		Burdig
2015LPP2	draft manuscript: Plankton community dynamics in Lake Pepin	30-Sep-16				Burdig
<b>Estimating trends in UMRR fish and vegetation levels using state-space models</b>						
2015SST1	Draft completion report: Evaluation of trend estimation methods for LTRM fish and vegetation indices	30-Sep-15	15-Dec-15	29-Jan-16	Project delayed by computing challenges.	Gray
2015SST2	Final completion report: Evaluation of trend estimation methods for LTRM fish and vegetation indices	31-Dec-15	15-Mar-16			Gray
2015SST3	Provide trend estimates for fish and vegetation web browser pages	30-Sep-16				Gray, Schlifer

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Generating and serving presumptive habitat maps for 28 UMRS fish species</b>						
2015FI1	Assemble requisite data resources	28-Feb-15		15-Jan-15		Ickes
2015FI2	Generate “point” maps of predictions	30-Mar-15	15-May-15	15-May-15		Hlavacek
2015FI3	Generate “splines with barriers” interpolated maps	15-May-15	30-Jul-15	on schedule		Hlavacek
2015FI4	Post maps to the UMRR LTRM fish component homepage	15-Jun-15	15-Sep-15	15-Sep-15		Ickes
2015FI5	Issue/publish a brief communication on their availability and prospective usage	15-Sep-15	31-Oct-15	21-Dec-15		Ickes
<b>Predictive Aquative Cover Type Model - Phase 2</b>						
2015AQ1	Develop 2-D hydraulic model of upper Pool 4	30-Sep-15		30-Sep-15		Libbey (MVP H&H)
2015AQ2	Apply model to Pool 4 and resolve discrepancies	31-Dec-15	31-Mar-16			Yin, Rogala
2015AQ3	Detailed summary of work for Phases I & II	31-Dec-15	31-Mar-16			Yin, Rogala, Ingvalson
<b>Landscape Pattern Research on the UMRS: synthesis and significance, FY16-18</b>						
	Milestones will be coordinated through the UMRR annual scope of work process					De Jager
<b>Developing and Applying Indicators of Ecosystem Resilience to the UMRS</b>						
	Milestones will be coordinated through the UMRR annual scope of work process					work group, post doc

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Developing and Applying Indicators of Ecosystem Resilience to the UMRS</b>						
2016R1	Updates provided at each quarterly UMRR-CC meeting and A team meeting	Various				Bouska, Houser
2016R2	Initial meeting of full Resilience Working Group	1-Oct-15		5-Jan-16		Bouska, Houser
2016R3	Draft conceptual model	30-May-16				Bouska, Houser
<b>Landscape Pattern Research and Application</b>						
2016L1	Draft Manuscript: Changes in land cover and land use 2000-2010.	30-Sep-16				De Jager & Rohweder (UMESC)
2016L2	Draft Manuscript: Effects of flooding, invasion by reed canarygrass, and increased nitrogen deposition on decomposition and nitrogen cycling along the UMR Floodplain	30-Sep-16				Swanson, Strauss, Thomsen (UW-L) &
2016L3	Draft Manuscript: Review of Landscape Ecology on the UMR	30-Sep-16				De Jager (UMESC)
2016L4	Draft Manuscript: Reed canarygrass abundance and distribution in the UMR.	30-Sep-16				Miller & Thomson (UW-L), De Jager and Yin (UMESC)
2016L5	Draft Manuscript: Linking flood inundation, ecosystem functions, and ecosystem services: the state of the art.	30-Sep-16				De Jager (UMESC), Morlock (USGS), Johnson (TNC)
2016L6	Data Analysis and Presentation: Spatial patterns of the invasive faucet snail <i>Bithynia tentaculata</i> in Pool 8 of the UMR	30-Sep-16				Weeks & Haro (UW-L), De Jager (UMESC)
<b>On-Going</b>						
2015L6	Presentation: Developing methods to map floodplain functions and ecosystem services	30-Jul-16				Morlock (USGS), Johnson, De Jager
2015L6a	Draft Manuscript: Developing methods to map floodplain functions and ecosystem services	30-Sep-16				Morlock (USGS), Johnson, De Jager
<b>Intended for distribution</b>						
Manuscript: De Jager, N.R., Swanson, W., Strauss, E.A., Thomsen, M., Yin, Y. Flood pulse effects on nitrification in a floodplain forest impacted by herbivory, invasion, and restoration. <i>Wetlands Ecology and Management</i> . (2014L1). <b>(Completed DOI 10.1007/s11273-015-9445-z)</b>						
Manuscript: De Jager, N.R., Houser, J.N., Ickes, B.S. Patchiness in a large floodplain river: associations among hydrology, nutrients, and fish communities. <i>River Research and Applications</i> . (2014L3) <b>(in USGS Review)</b>						
Fact Sheet: De Jager, N.R. 2014. Landscape Ecology on the Upper Mississippi River: lessons learned, challenges, opportunities (2013L3). <b>(In press)</b>						
Manuscript: De Jager, N.R., Rohweder, J., Yin, Y., Hoy, E. 2015. The Upper Mississippi River floodscape: spatial patterns of flood inundation and associated plant community distributions. <i>Applied Vegetation Science</i> (2015L2). <b>(Completed doi: 10.1111/avsc.12189)</b>						
Manuscript: Kreiling, R.M., De Jager, N.R., Swanson, W., Strauss, E.A., Thomsen, M. 2015. Effects of flooding on ion exchange rates in an Upper Mississippi River floodplain forest impacted by herbivory, invasion, and restoration. <i>Wetlands</i> (2015L3). <b>(in USGS Review)</b>						
Manuscript: Scown, M., Thoms, M. and De Jager, N. R. 'Measuring spatial pattern in floodplains: A step towards understanding the complexity of floodplain ecosystems'. <i>In Press: River Science: Research and Applications for the 21st Century</i> . D. J. Gilvear, M. Greenwood, M. Thoms and P. Wood (eds). John Wiley and Sons, UK (2015L7)						
Manuscript: Scown, M. W., Thoms, M. C. and De Jager, N. R. The effects of survey technique and vegetation type on measuring floodplain topography from DEMs. <i>Earth Surface Processes and Landforms</i> . (2015L8) <b>(in USGS Review)</b>						
Manuscript: Scown, M. W., Thoms, M. C. and De Jager, N. R. An index of floodplain surface complexity. <i>Hydrology and Earth Systems Science</i> . (2015L11). <b>(in USGS Review)</b>						

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Mussel Research Framework</b>						
2015MRF1	Spatial patterns of native mussels in the UMRS: Establish selection criteria, identify existing data sets, and re-format to a common data suitable for spatial analysis	1-Apr-16				Ries, Newton, De Jager, Zigler
2015MRF22	Spatial patterns of native mussels in the UMRS: brief summary letter, including complied dataset, GIS layers, map	1-Jun-16				Ries, Newton, De Jager, Zigler
<b>Intended for distribution</b>						
Manuscript: Reis, P., De Jager, N.R., Newton, T., Ziegler, S. Spatial patterns of native freshwater mussels in the UMR. Freshwater Science. (in USGS Review)						
<b>Pool 12 Overwintering HREP Adaptive Management Fisheries Response Monitoring</b>						
2016P13a	Collect annual increment of pool-wide electrofishing data	1-Nov-15		1-Nov-15		Bierman and Bowler
2016P13b	Collect annual increment of fyke netting data from backwater lakes	15-Nov-15		15-Nov-15		Bierman and Bowler
2016P13c	Perform otolith extraction from bluegills for aging	1-Dec-15		1-Dec-15		Bierman and Bowler
2016P13d	Age determination of bluegills collected in Fall 2014	1-Feb-16				Bierman and Bowler
2016P13e	In-house project databases updated	31-Mar-16				Bierman and Bowler
2016P13f	Summary report compiled and made available to program partners	30-Sep-16				Bierman and Bowler
<b>Statistical Evaluation</b>						
2016E1	Draft manuscript: Trends in summer water temperatures in the LTRM study reaches	30-Sep-16				Gray
2016E2	How well do trends in LTRM percent frequency of occurrence SAV statistics track trends in true occurrence?	30-Sep-16				Gray, Erickson
<b>Intended for distribution</b>						
Completion report that describes methods of estimating variance components from LTRMP water quality data (2008E1; Gray) (In USGS review)						
Manuscript: Inferring decreases in among- backwater heterogeneity in large rivers using among-backwater variation in limnological variables (2010E1, Rogala, Gray, Houser) (In USGS review)						
Completion Report: Summer water temperature in the Upper Mississippi River (2012E2). Gray, Robertson, Houser, Rogala. Completed						
Completion report: An assessment of trends in water temperature in La Grange Pool (2012E3; Gray, Robertson, Rogala, Houser) Completed						
<b>Aquatic Vegetation Component</b>						
2016A6	Analysis: Aquatic Plant Response to Large-Scale Island Construction in	30-May-16				Drake and Gray
2016A6a	Draft manuscript: Aquatic Plant Response to Large-Scale Island	30-Sep-16				Drake and Gray
2016A7	Draft completion report: How many years did the effects of the 2001-	30-May-16				Yin
<b>On-Going</b>						
2015A7	Data compilation and analysis: Aquatic macrophyte communities and their potential lag time in response to changes in physical and chemical variables	30-Jun-16				Moore
2015A8	Draft completion report or manuscript: Aquatic macrophyte	30-Jun-17				Moore

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<b>Fisheries Component</b>						
2016B12	Draft Manuscript: Benefits of Collaboration among Long Term Fish Monitoring Programs in Large Rivers (Fisheries Journal)	31-Dec-15		22-Oct-15		Counihan, Ickes, Casper, Sauer
2016B13	Draft Manuscript: An Assessment of Long Term Changes in Fish Communities within Large Rivers of the United States (Environmental Monitoring journal)	31-Dec-15		7-Dec-15		Counihan, Ickes, Casper, Sauer
2016B14	Draft completion report: Exploring Years with Low Total Catch of Fishes in Pool 26	30-Sep-16				Gittinger, Ratcliff, Lubinski, Chick
2016B15	Summary letter: Technical Support to River Managers Investigating UMR Walleye Dynamics	30-Sep-16				Andy Bartels, Kraig Hoff, Fish Managers from WI, MN, and IA
<b>On-Going</b>						
2015B5	Letter summary: Exploring years with low total catch of fishes in Pool 26	15-Nov-15			Summary Letter Template being developed by LTRM Management Team	Gittinger, Ratcliff, Lubinski, Chick
2015B17	Draft Manuscript: Fish Trajectory Analysis	30-Sep-16				Ickes, Minchin
2014B10	Presentations, draft completion report: Paddlefish population characteristics in the Mississippi river Basin	1-Dec-15		1-Dec-15	Manuscript in review in Fisheries	Hupfeld, Phelps
2006B6	Draft manuscript: Spatial structure and temporal variation of fish communities in the Upper Mississippi River. (Dependent on 2008B9 acceptance into journal)	30-Sep-15	30-Sep-16			Chick
2008B9	Draft manuscript: Standardized CPUE data from multiple gears for community level analysis (a previous manuscript was submitted and not accepted by the journal, 2006B5; 2008B9 is a revised manuscript) (Chick)	15-Dec-15		21-Dec-15		Chick
<b>Water Quality Component</b>						
2016D17	Draft manuscript: Relationship between the temporal and spatial distribution, abundance, and composition of zooplankton taxa and hydrological and limnological variables in Lake Pepin (Reformatting for submission to River Research and Applications)	30 Sept. 2016				Burdis
<b>On-Going</b>						
2015D13	Initial analysis and draft manuscript: Coherence in temporal variation of select water quality parameters across strata and study reaches	1-Sep-16				Houser
2015D14	Draft manuscript: Coherence in temporal variation of select water quality parameters across strata and study reaches	1-Sep-17				Houser
2015D15	Analysis of Lake Pepin rotifers; data from 2012-2014	30-Mar-16				Burdis
2015D16	Draft manuscript: Trends in water quality and biota in segments of Pool 4, above and below Lake Pepin	31-Dec-15	30-Jun-16			Burdis
2014D13	Presentations, draft completion report: A Comparison of Side and Main Channel Fish Community and Water Quality Characteristics	1-Dec-15				Sobotka, West, Phelps



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LTRM Science in Support of Restoration  
FY2016 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
<b>Development of 2010–2011 Land Cover/Land Use GIS Database and Aerial Photo Mosaics</b>						
2015V1	Complete 2010/11 LCU database for UMR Pools 1, 2, 11, 15-17, the Illinois River's Lockport, Brandon, and Dresden Pools, and the Lower Minnesota, Lower St. Croix, and Lower Kaskaskia Rivers.	31-Aug-15		31-Aug-15	Data in review	Robinson, Hoy, Hanson, , Ruhser, Nelson, Jakusz
<b>USACE UMRR LTRM Technical Support</b>						
2016COE1	Quarterly update submitted to the LTRM Management Team	30-Dec-15				McCain, Theiling, Potter
2016COE2	Quarterly update submitted to the LTRM Management Team	30-Mar-16				McCain, Theiling, Potter
2016COE3	Quarterly update submitted to the LTRM Management Team	30-Jun-16				McCain, Theiling, Potter
2016COE4	Quarterly update submitted to the LTRM Management Team	30-Sep-16				McCain, Theiling, Potter
<b>Science Coordination Meeting</b>						
2016N1	Science Planning Meeting	Feb. 2016				Houser, Sauer, Lowenberg, Hubbell, and Hagerty
<b>A-Team and UMRR-CC Participation On-going</b>						

# **Agenda for the 2016 UMRR Science Meeting.**

16 – 18 February.

USGS Upper Midwest Environmental Sciences Center. La Crosse, Wisconsin

Date	Time	Topic	Presenter(s)
<b>Tues 2/16/2016</b>	12:45 – 1:15	Opening remarks and Introductions	Houser/Hubbell
	1:15 – 2:00	Synthesis of flood-plain vegetation and soil research: linking large-scale observational studies with small-scale experiments.	De Jager
	2:00 – 2:20	The forest or the trees: songbird habitat associations and UMR floodplain forest	Kirsch
	2:20 – 2:40	Identification of maximal flow velocity threshold for colony of <i>Vallisneria americana</i> along the channel border of the Upper Mississippi River	Yin
	2:40 – 2:55	Break	
	2:55 – 3:15	Aquatic plant response to large-scale island construction in the Upper Mississippi River	Drake
	3:15 – 3:35	GREON update: Continuous water quality monitoring on the UMRS: initial findings	Chick
	3:35 – 3:55	Main channel vs. side channel contrasts in the Open River reach	Sobotka
	3:55 – 4:15	“Topobathy”. What it is and how it can be used.	Rogala
	4:15 – 4:45	Open discussion and wrap up.	all
<b>Wed 2/17/2016</b>	8:00 – 8:15	Opening remarks and discussion: Opportunity to share comments / perspectives on Tuesday’s presentations and discussion	Houser/Hubbell
	8:15--8:55	Management relevant presumptive fish habitat models for the Upper Mississippi River System & <i>Summa Pisces Miscellania</i>	Ickes
	8:55 – 9:15	Fish Indicators of ecosystem health	Anderson
	9:15 – 9:40	Fish indicators discussion	All
	9:40 – 10:00	Variation in the community structure of fishes from main channel border habitat among reaches of the Mississippi and Illinois Rivers	Lubinski

Date	Time	Topic	Presenter(s)
	10:00 – 10:20	Part 1. Monitoring chevron dike fish assemblages in the Middle Mississippi River Part 2. Fish assemblages in a rare connected backwater habitat in the Middle Mississippi River	West
	10:20 – 10:35	BREAK	
	10:35 – 10:50	Past, Present, and Future: Asian Carp in the Mississippi River	Phelps
	10:50 - 11:05	Recent progress in Asian Carp studies	Solomon & Pendleton
	11:05 – 11:20	Asian carp recruitment in the Illinois River	Gibson
		<b>HREPs as learning opportunities: case studies</b>	
	11:20 – 11:50	Pool 12 Overwintering: What we've learned so far.	Bierman
	11:50 – 12:45	<b>Lunch (on site)</b>	
	12:45 – 1:15	Huron Island: case study in learning opportunities	Richards
	1:15 – 1:45	General discussion on expanding use of HREPs as learning opportunities	All
		<b>Research Framework updates and potential future studies</b>	
	1:45 – 2:15	Freshwater mussel framework (~10 – 15 minutes for discussion)	Zigler
	2:15 – 2:45	Vegetation framework (~10 – 15 minutes for discussion)	Yin
	2:45 – 3:00	BREAK	
	3:00 – 3:30	Landscape ecology framework (~10 – 15 minutes for discussion)	De Jager
	3:30 - 4:00	Sediment and sedimentation (~10 – 15 minutes for discussion)	Rogala
	4:00 – 4:20	Understanding biological shifts in the UMR due to invasion by <i>Potamogeton crispus</i>	Drake
	4:20 – 4:40	Preparing the UMRR field stations network for sampling under stochastic events.	Herzog
	6:00pm	Group Dinner. Location TBD	

Date	Time	Topic	Presenter(s)
<b>Thurs. 2/18/2016</b>	8:00 – 9:30	Assessing the resilience of the UMRS. Presentation of progress to date followed by time for questions, comments and group discussion	Houser & Bouska
	9:30 – 9:45	Break	
	9:45 – 10:30	HNA 2. Initial plans and approach. Followed by group discussion	Eagen & De Jager
	10:30 – 11:30	Time available for break out groups / small group discussions	
	11:30 – 12:00	Wrap up, concluding remarks, and parting comments/questions	Houser Hubbell

# Spatially Explicit Habitat Models for 28 Fishes from the Upper Mississippi River System (AHAG 2.0)

By Brian S. Ickes,<sup>1</sup> J.S. Sauer, N. Richards, M. Bowler, and B. Schlifer

## Abstract

Environmental management actions in the Upper Mississippi River System (UMRS) typically require pre-project assessments of predicted benefits under a range of project scenarios. The U.S. Army Corps of Engineers (USACE) now requires certified and peer-reviewed models to conduct these assessments. Previously, habitat benefits were estimated for fish communities in the UMRS using the Aquatic Habitat Appraisal Guide (AHAG v.1.0; AHAG from hereon). This spreadsheet-based model used a habitat suitability index (HSI) approach that drew heavily upon Habitat Evaluation Procedures (HEP; U.S. Fish and Wildlife Service, 1980) by the U.S. Fish and Wildlife Service (USFWS). The HSI approach requires developing species response curves for different environmental variables that seek to broadly represent habitat. The AHAG model uses species-specific response curves assembled from literature values, data from other ecosystems, or best professional judgment.

A recent scientific review of the AHAG indicated that the model's effectiveness is reduced by its dated approach to large river ecosystems, uncertainty regarding its data inputs and rationale for habitat-species response relationships, and lack of field validation (Abt Associates Inc., 2011). The reviewers made two major recommendations: (1) incorporate empirical data from the UMRS into defining the empirical response curves, and (2) conduct post-project biological evaluations to test pre-project benefits estimated by AHAG.

Our objective was to address the first recommendation and generate updated response curves for AHAG using data from the Upper Mississippi River Restoration-Environmental Management Program (UMRR-EMP) Long Term Resource Monitoring Program (LTRMP) element. Fish community data have been collected by LTRMP (Gutreuter and others, 1995; Ratcliff and others, 2014) for 20 years from 6 study reaches representing 1,930 kilometers of river and >140 species of fish. We modeled a subset of these data (28 different species; occurrences at sampling sites as observed in day electrofishing

samples) using multiple logistic regression with presence/absence responses. Each species' probability of occurrence, at each sample site, was modeled as a function of 17 environmental variables observed at each sample site by LTRMP standardized protocols. The modeling methods used (1) a forward-selection process to identify the most important predictors and their relative contributions to predictions; (2) partial methods on the predictor set to control variance inflation; and (3) diagnostics for LTRMP design elements that may influence model fits.

Models were fit for 28 species, representing 3 habitat guilds (Lentic, Lotic, and Generalist). We intended to develop "systemic models" using data from all six LTRMP study reaches simultaneously; however, this proved impossible. Thus, we "regionalized" the models, creating two models for each species: "Upper Reach" models, using data from Pools 4, 8, and 13; and "Lower Reach" models, using data from Pool 26, the Open River Reach of the Mississippi River, and the La Grange reach of the Illinois River. A total of 56 models were attempted. For any given site-scale prediction, each model used data from the three LTRMP study reaches comprising the regional model to make predictions. For example, a site-scale prediction in Pool 8 was made using data from Pools 4, 8, and 13. This is the fundamental nature and trade-off of regionalizing these models for broad management application.

Model fits were deemed "certifiably good" using the Hosmer and Lemeshow Goodness-of-Fit statistic (Hosmer and Lemeshow, 2000). This test post-partitions model predictions into 10 groups and conducts inferential tests on correspondences between observed and expected probability of occurrence across all partitions, under Chi-square distributional assumptions. This permits an inferential test of how well the models fit and a tool for reporting when they did not (and perhaps why). Our goal was to develop regionalized models, and to assess and describe circumstances when a good fit was not possible.

<sup>1</sup>Principal investigator, UMRR-EMP LTRMP Fisheries Component, La Crosse, Wisconsin, and corresponding author.

Seven fish species composed the Lentic guild. Good fits were achieved for six Upper Reach models. In the Lower Reach, no model produced good fits for the Lentic guild. This was due to (1) lentic species being much less prominent in the Lower Reach study areas, and (2) those that do express greater prominence principally do so only in the La Grange reach of the Illinois River. Thus, developing Lower Reach models for Lentic species will require parsing La Grange from the other two Lower Reach study areas and fitting separate models. We did not do that as part of this study, but it could be done at a later time.

Nine species comprised the Lotic guild. Good fits were achieved for five Upper Reach models and six Lower Reach models. Four species had good fits for both regions (flathead catfish, blue sucker, sauger, and shorthead redhorse). Three species showed zoogeographic zonation, with a good model fit in one of the regions, but not in the region in which they were absent or rarely occurred (blue catfish, rock bass, and skipjack herring).

Twelve species comprised the Generalist guild. Good fits were achieved for seven Upper Reach models and eight Lower Reach models. Six species had good fits for both regions (brook silverside, emerald shiner, freshwater drum, logperch, longnose gar, and white bass). Two species showed zoogeographic zonation, with a good model fit in one of the regions, but not in the region in which they were absent or rarely occurred (red shiner and blackstripe topminnow).

Poorly fit models were almost always due to the diagnostic variable “field station,” a surrogate for river mile. In these circumstances, the residuals for “field station” were non-randomly distributed and often strongly ordered. This indicates either fitting “pool scale” models for these species and regions, or explicitly model covariances between “field station” and the other predictors within the existing modeling framework. Further efforts on these models should seek to resolve these issues using one of these two approaches.

In total, nine species, representing two of the three guilds (Lotic and Generalist), produced well-fit models for both regions. These nine species should comprise the basis for AHAG 2.0. Additional work, likely requiring downscaling of the regional models to pool-scale models, will be needed to incorporate additional species. Alternately, a regionalized AHAG could be comprised of those species, per region, that achieved well-fit models. The number of species and the composition of the regional species pools will differ among regions as a consequence. Each of these alternatives has both pros and cons, and managers are encouraged to consider them fully before further advancing this approach to modeling multi-species habitat suitability.

## Introduction

Environmental management actions in the Upper Mississippi River System (UMRS; fig. 1) typically require pre-project assessments of predicted benefits for a range of project scenarios. The U.S. Army Corps of Engineers (USACE) now

requires certified and peer-reviewed models to conduct these assessments. Previously, habitat benefits were estimated for fish communities in the UMRS using the Aquatic Habitat Appraisal Guide (AHAG v.1.0; AHAG from hereon). This spreadsheet-based model used a habitat suitability index (HSI) approach that drew heavily upon methods developed by the U.S. Fish and Wildlife Service (USFWS) in the 1980's, commonly referred to as Habitat Evaluation Procedures (HEP; U.S. Fish and Wildlife Service, 1980). The HSI approach requires developing species-response curves (typically using abundance as the biological response) for different environmental variables that seek to broadly represent habitat. The AHAG model uses species-specific response curves assembled from literature values, data from other ecosystems, or best professional judgment.

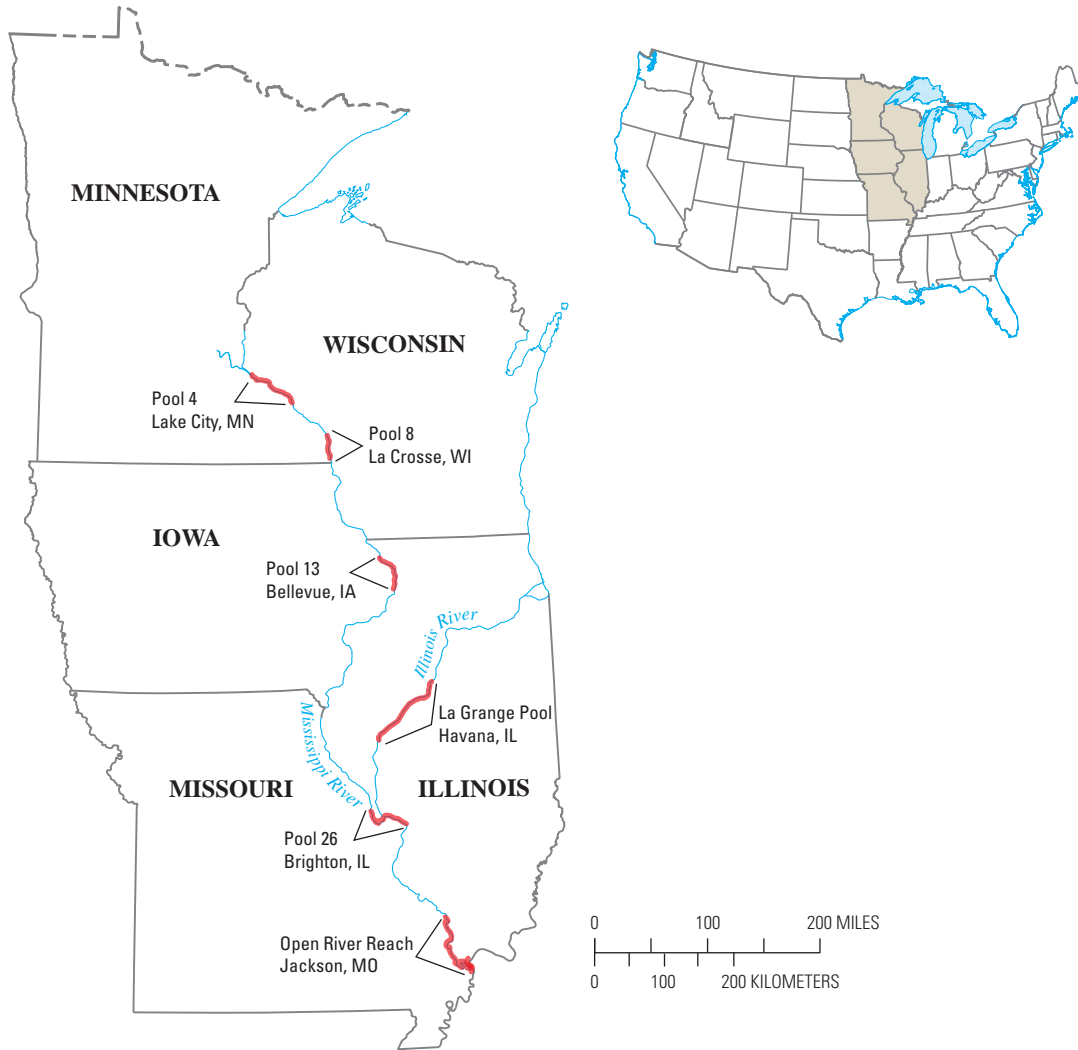
A recent scientific review of the AHAG was performed to assess the degree to which the AHAG model can be certified for regional use as a planning tool within the UMRS (Abt Associates Inc., 2011). The reviewers' findings indicated that the model's effectiveness is reduced by its dated approach to large river ecosystems, uncertainty regarding its data inputs and rationale for habitat-species response relationships, and lack of field validation. The reviewers made two major recommendations: (1) incorporate empirical data from the UMRS into defining the empirical response curves, and (2) conduct post-project biological evaluations to test pre-project benefits estimated by AHAG.

Prior to stating study objectives, it is necessary to reflect upon the theoretical underpinnings of habitat suitability modeling as exercised in AHAG, the fundamental nature of the problem domain, and some issues that arise as a consequence. These are provided both to help judge the inherent limitations and potential utility of these approaches for estimating habitat quality and to improve its application to the UMRS.

## Theoretical Underpinnings of AHAG

The underpinnings of AHAG have their foundation in G. Evelyn Hutchinson's concept of the ecological niche (Hutchinson, 1957). Earlier, Charles Elton had originated the concept of a niche, but in a functional way (Elton, 1927). The Eltonian niche describes a species “profession” or functional role within an ecosystem (zooplanktivore, herbivore, piscivore, etc.). In contrast, the Hutchinsonian concept attempts to redefine the niche as the “place or habitat” a species occupies, or otherwise, its address. The Hutchinsonian view has carried the day for nearly 70 years. As a “place based” or habitat centric construct, the AHAG approach has its roots in the Hutchinsonian concept and subsequent theoretical advances that have followed since 1957.

The core concept of the Hutchinsonian model is the hyper-volume, in which a set of multiple environmental factors determine the place, or habitat, that a species occupies. As such, it regards habitat as a species, space, and perhaps time-specific thing.



**Figure 1.** The Upper Mississippi River System and the locations of six study reaches in the Upper Mississippi River Restoration–Environmental Management Program Long Term Resource Monitoring Program element from which models were developed as part of this study.

AHAG evolved from a series of theoretical and applied advancements that have followed directly from this concept of defining habitat from a species point of view. The lineage is long, and often winding, but includes various approaches conceived to relate a species to its environment with the benefit of environmental observations. Some of these past efforts centered on water flow as the singular or predominant controlling variable (Physical HABitat SIMulation [PHABSIM] and Instream Flow Incremental Methodology [IFIM]), while others simply tried to capture and express species responses to a wider set of seemingly important habitat occupancy determinants (Habitat Evaluation Procedures [HEP] and Habitat Suitability Indexes [HSI]). AHAG shares a lineage with this latter class, which is a more applied management lineage wherein the environment is sampled for important variables suspected or known to contribute towards habitat occupancy, resulting in

a family of species-specific response curves that can be used in management assessments (HEP; U.S. Fish and Wildlife Service, 1980). Under the HEP approach, each species is represented by a singular “model” composed of some number of species-response curves.

As used within the UMRS, AHAG is essentially a multi-species HEP, executed in a spreadsheet. It uses primarily best professional judgment to define each species:environmental association, as opposed to actual field data. Our primary goal was to update the existing AHAG model using LTRMP data to empirically define the species:environmental relationships. In addition, we also explicitly modeled these relationships as a way to determine the principal environmental determinants of habitat occupancy and to gain spatially explicit predictions. As such, this represents a sizeable leap in the way AHAG will work and how it could be used.

## **ATTACHMENT D**

### **Habitat Restoration**

- **Proposed Habitat Needs Assessment II Planning Framework (2/24/2016) (D-1 to D-3)**
- **USFWS Natural Resources Inventory Fact Sheet (2015) (D-4)**



**Upper Mississippi River Restoration Program (UMRR) —  
Habitat Needs Assessment II  
Planning Framework  
24 February 2016**

**Background:**

The Habitat Needs Assessment (HNA) is a component of the Upper Mississippi River Restoration (UMRR) Program. The HNA is an integral part of the program as identified in the 2015 UMRR Strategic Plan, it specifically addresses Goal #2 Advance Knowledge for Restoring and Maintaining a Healthier and More Resilient Upper Mississippi River Ecosystem. The first Habitat Needs Assessment (HNA-I) for the Upper Mississippi River was completed in 2000. The purpose of HNA-I was to identify habitat needs by comparing historical, existing, forecast, and desired future conditions. In November 2015, the Habitat Needs Assessment II (HNA-II) effort was kicked off and presented to the UMRR-CC at the Quarterly Meeting on 18 November 2015. The team nominated for leading HNA-II was identified as Nate DeJager USGS, Sara Schmuecker USFWS, and Tim Eagan USACE. Initially presented to the UMRR-CC was a group of questions that were to aid in defining the direction of the effort. After discussion following the quarterly meeting the team decided to focus on development of a Project Management Plan that would define the framework for the project. The team has a draft document in place and is now seeking input from the UMRR-CC to identify team members for the HNA-II Technical Group. The Technical Group will initially focus on defining the purpose, goals, and objectives of HNA-II. The Technical Group will represent the UMRR-CC; therefore, it is anticipated that one representative from each organization would be nominated to the team.

The below information outlines in greater detail the Plan's purpose, framework, general schedule, and request for decision by the UMRR-CC. This will be presented to the UMRR-CC for consideration at its 24 February 2016 meeting.

**Purpose:**

The HNA-II will:

- 1) Incorporate findings from the Resiliency Team into its process;
- 2) Identify historic conditions;
- 3) Identify current conditions;
- 4) Identify problems and opportunities;
- 5) Identify future conditions without restoration efforts;
- 6) Identify desired future conditions with restoration efforts; and
- 7) Document all the above information into a product to be used in next phase of the Strategic Plan Process, Identification of new HREPs

**Major Assumptions:**

1. Resiliency Team data will be available and ready for use in HNA-II when it is needed
2. HNA-II will utilize the same concept of analyzing the system by reach which was used in HNA-I
3. HNA-I process and data will be reviewed and incorporated into HNA-II where applicable
4. HNA-II will provide information to be used for future identification of projects but not replace current process
5. Basic administrative provisions and program infrastructure will remain in place, specifically UMRR continues receiving Congressional Appropriations for these efforts

**UMRR CC Decisions:**

- 1.) The Management Team is soliciting input from the UMRR-CC in the identification of team members for the HNA-II Technical Group.

**Resource Groups:**

**UMRR Coordinating Committee:** The Coordinating Committee will provide executive direction and guidance and decision making for the HNA-II. They will work directly with the Management Team.

**Management Team / Tri Chair:** The Management Team role will be to develop and lead the project delivery team through the HNA-II project. They will provide Project Management and Technical Leadership oversight. Members: Nate DeJager USGS, Sara Schmuecker USFWS, and Tim Eagan USACE.

**Technical Group:** Each organization comprising the UMRR CC will have one representative on the Technical Group. This representative will be the voice of the respective organization and involved in providing technical guidance and help in the establishment of the efforts of the working group. The representative will also be responsible for informing their organization of the progress of the assessment.

**Working Group:** The working group will be involved in the actual work involved in analyzing the system. This group will be highly technical and have experts from many technical fields that will help in completing the assessment and writing the report. If possible, HNA-II will utilize team members from the Resiliency Group.

**River Resource POC:** The Management Team will be soliciting input from the River Resource Teams to identify one representative from each USACE-District based coordinating group. Their responsibility will be to coordinate with the River Resource Teams and represent their respective group during the process. Due to this requirement they will be part of the overall process and involved with meetings with the technical group and working group.

**River Resource Teams:** The River Resource Teams are geographic groups of federal, state, local, and non-governmental organizations that have an interest in ecosystem efforts within the Mississippi River Watershed. Team members within the organizations provide expertise in biology, river engineering, and general ecosystem restoration within the local region. Their expertise and input will be solicited throughout the process as a sounding board.

**Estimated Costs & Funding:**

Total project cost will be developed during formulation of the Project as part of the development of the Project Management Plan. Labor funding for this effort is still being identified at this time but it is anticipated that there will be funding available for this effort when applicable.

**Tentative Schedule:**

**Duration:** 18 to 24 month effort

**Meeting Expectations:**

- Bi-weekly meetings for Project Management Team
- Technical Group will meet frequently over the next four months, after the Working Group begins its efforts, the Technical Group will meet less frequently since only general oversight will be necessary
- UMRR CC Quarterly Meeting Project Review Presentations
- Public Meetings

<b>Date</b>	<b>Meeting</b>	<b>Subject</b>
24 Feb 2016	UMRR-CC Quarterly	Solicit participants for HNA-II Technical Group
08 Mar 2016	C.C. Meeting	<b>Meeting 1</b> – Confirm team members for Technical Group, discuss schedule, meetings, and begin formulating purpose, goals, and objectives from each agency. Additionally discuss format of report and report writing.
15 Mar 2016	C.C. Meeting	<b>Meeting 2</b> - Meeting with the River Resource Teams to begin coordination.
29 Mar 2016	Email	<b>Project Management Plan Review by Technical Group, emphasis on scope, purpose, goals, objectives</b>
12 Apr 2016	Email	<b>Project Management Plan Review For Approval by UMRR CC</b>
03 May 2016	I.P. (2 Day)	<b>Meeting 2</b> – Management Team and Technical Group <ul style="list-style-type: none"> <li>• Identify Past Efforts</li> <li>• Review HNA-I and determine what will be carried forward and what gaps can be closed</li> <li>• Identify process for conducting Assessment <ul style="list-style-type: none"> <li>◦ Historic Conditions, Current Conditions, System Needs, Future Without, Desired Future</li> </ul> </li> <li>• Identify key technical areas for development of the Working Group</li> <li>• Develop Communication Plan, which includes Public Outreach</li> </ul>
Fall 2016	I.P. (3 Day )	<b>Meeting 3</b> – Workshop / Charrette
Winter 2016	I.P.	<b>Meeting 4</b> – 1 <sup>st</sup> Public Meeting, Presenting current status and path forward
TBD	TBD	<b>TBD</b>
Nov 2017	UMRR CC Quarterly	<b>Final Review and Acceptance of Habitat Needs Assessment II</b>

\* C.C. — Conference Call; I.P. — In-person meeting

\*Schedule to be updated after development of Technical & Working Group Teams

## Natural Resource Inventory – 2015 Version

This database is a product of information gathered from existing literature, survey documents, and from over 100 natural resource professionals representing federal, state, educational institution, non-profit, and commercial entities, who participated in a series of workshops and in the technical review process. The U.S. Fish and Wildlife Service Rock Island Field Office (RIFO) gathered all data and compiled into the final ArcGIS Online format.

The ArcGIS Online version of the Natural Resource Inventory (2015 Version) is ready for use.

To access the database you do not need to have ArcGIS installed on your desktop, but you will need to create a Collaborator Account to access the database online. Please see the instructions provided below for setting up a Collaborator Account.\*

The previous versions of the Natural Resource Inventory (NRI) database, upon which this update was built, were completed in partial fulfillment of the Fish and Wildlife Coordination Act responsibilities for the Army Corps of Engineers Upper Mississippi River – Illinois Waterway System Navigation Study, and through a collaborative effort between the RIFO, U.S. Army Corps of Engineers, and U.S. Geological Survey. Historic information was retained throughout this update effort, reaffirmed where possible, and supplemented with more than 3,000 new data points.

Natural resources inventoried in the NRI include mussel beds and sanctuaries, fish spawning and over-wintering areas, commercial and sport fisheries, mammal habitat, reptile and amphibian habitat, rookeries, bald eagle nesting and roosting areas, migratory and resident bird habitat, waterfowl habitat, and other unique areas. Additional information includes wingdams (USACE), bankline armoring (USACE), updated barge fleeting (USACE), UMRR project boundaries (USACE), important bird areas (Audubon), current and historic dredge cuts and dredged material placement (USACE), and FWS property/ refuge boundaries.

We extend our thanks to all who participated in the development of this project. Although the Service has no immediate plans to update and maintain the database on a system-wide scale, we are interested in partnering with others to accomplish this important task at some point in the future. Anyone interested in creating such a partnership is invited to contact our office.

### **If you have already set up your Collaborator Account you now have access to the database.**

Copy and paste the following link into your web browser and sign in.

<http://fws.maps.arcgis.com/apps/Viewer/index.html?appid=bfe0920d9f984eb1b98830cfa4e83e30>

Agencies that have their own ArcGIS Online access will need to first log-in to their existing account and accept the Group invitation. Then use the link above to access the database moving forward.

### **To set up your Collaborator Account:**

Please send an email to [sara\\_schmuecker@fws.gov](mailto:sara_schmuecker@fws.gov) containing the following:

- Subject Line: NRI Collaborator Account
- In the text include your **First Name, Last Name, Work Station, and Email Address** you would like associated with your account. NOTE: Please indicate if you have an existing ArcGIS Online account through your respective agencies, and send the email address registered to the account.
- Names of individuals at your work station that NRI information may be shared with.
- A short description of what types of projects you plan to use the NRI for.
- In the following weeks you will receive an email from USFWS ArcGIS Online with instructions for setting up the rest of your account, username, and password. Please note: Once you have created your account you will not be able to search for and add the NRI yourself. The NRI is a closed database that is accessed by invitation only.

\*We request that Collaborator Accounts be created on a need-to-know basis. Due to the sensitivity of the material and data license agreements, we would like to constrain access to a limited number of individuals per work station, to the extent practicable. To protect sensitive data, we reserve the right to limit use and request additional information.

## **ATTACHMENT E**

### **Additional Items**

- **Future Meeting Schedule** *(E-1)*
- **Frequently Used Acronyms (11/2/2015)** *(E-2 to E-8)*
- **UMRR Authorization, As Amended (1/27/15)**  
*(E-9 to E-12)*
- **UMRR (EMP) Operating Approach (5/06)** *(E-13)*

**QUARTERLY MEETINGS  
FUTURE MEETING SCHEDULE**

<b>MAY 2016</b>	
<u>St. Louis, Missouri</u>	
May 24	UMRBA Quarterly Meeting
May 25	UMRR Coordinating Committee Quarterly Meeting

<b>AUGUST 2016</b>	
<u>La Crosse, Wisconsin</u>	
August 9	UMRBA Quarterly Meeting
August 10	UMRR Coordinating Committee Quarterly Meeting

## **Acronyms Frequently Used on the Upper Mississippi River**

AAR	After Action Report
A&E	Architecture and Engineering
ACRCC	Asian Carp Regional Coordinating Committee
AFB	Alternative Formulation Briefing
AHAG	Aquatic Habitat Appraisal Guide
AHRI	American Heritage Rivers Initiative
AIS	Aquatic Invasive Species
ALC	American Lands Conservancy
ALDU	Aquatic Life Designated Use(s)
AM	Adaptive Management
ANS	Aquatic Nuisance Species
AP	Advisory Panel
APE	Additional Program Element
ARRA	American Recovery and Reinvestment Act
ASA(CW)	Assistant Secretary of the Army for Civil Works
A-Team	Analysis Team
ATR	Agency Technical Review
AWI	America's Watershed Initiative
AWO	American Waterways Operators
AWQMN	Ambient Water Quality Monitoring Network
BA	Biological Assessment
BATIC	Build America Transportation Investment Center
BCR	Benefit-Cost Ratio
BMPs	Best Management Practices
BO	Biological Opinion
CAP	Continuing Authorities Program
CAWS	Chicago Area Waterways System
CCC	Commodity Credit Corporation
CCP	Comprehensive Conservation Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CG	Construction General
CIA	Computerized Inventory and Analysis
CMMP	Channel Maintenance Management Plan
COE	Corps of Engineers
COPT	Captain of the Port
CPUE	Catch Per Unit Effort
CRA	Continuing Resolution Authority
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSP	Conservation Security Program
CUA	Cooperative Use Agreement

CWA	Clean Water Act
DALS	Department of Agriculture and Land Stewardship
DED	Department of Economic Development
DEM	Digital Elevation Model
DET	District Ecological Team
DNR	Department of Natural Resources
DO	Dissolved Oxygen
DOA	Department of Agriculture
DOC	Department of Conservation
DOER	Dredging Operations and Environmental Research
DOT	Department of Transportation
DPR	Definite Project Report
DQC	District Quality Control/Quality Assurance
DSS	Decision Support System
EA	Environmental Assessment
ECC	Economics Coordinating Committee
EEC	Essential Ecosystem Characteristic
EIS	Environmental Impact Statement
EMAP	Environmental Monitoring and Assessment Program
EMAP-GRE	Environmental Monitoring and Assessment Program-Great Rivers Ecosystem
EMP	Environmental Management Program [Note: Former name of Upper Mississippi River Restoration Program.]
EMP-CC	Environmental Management Program Coordinating Committee
EO	Executive Order
EPA	Environmental Protection Agency
EPR	External Peer Review
EQIP	Environmental Quality Incentives Program
ER	Engineering Regulation
ERDC	Engineering Research & Development Center
ESA	Endangered Species Act
EWMN	Early Warning Monitoring Network
EWP	Emergency Watershed Protection Program
FACA	Federal Advisory Committee Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FDR	Flood Damage Reduction
FFS	Flow Frequency Study
FONSI	Finding of No Significant Impact
FRM	Flood Risk Management
FRST	Floodplain Restoration System Team
FSA	Farm Services Agency
FTE	Full Time Equivalent
FWCA	Fish & Wildlife Coordination Act
FWIC	Fish and Wildlife Interagency Committee
FWS	Fish and Wildlife Service
FWWG	Fish and Wildlife Work Group



FY	Fiscal Year
GAO	Government Accountability Office
GEIS	Generic Environmental Impact Statement
GI	General Investigations
GIS	Geographic Information System
GLC	Governors Liaison Committee
GLC	Great Lakes Commission
GLMRIS	Great Lakes and Mississippi River Interbasin Study
GPS	Global Positioning System
GREAT	Great River Environmental Action Team
GRP	Geographic Response Plan
HEL	Highly Erodible Land
HEP	Habitat Evaluation Procedure
HNA	Habitat Needs Assessment
HQSACE	Headquarters, USACE
H.R.	House of Representatives
HREP	Habitat Rehabilitation and Enhancement Project
HU	Habitat Unit
HUC	Hydrologic Unit Code
IBA	Important Bird Area
IBI	Index of Biological (Biotic) Integrity
IC	Incident Commander
ICS	Incident Command System
ICWP	Interstate Council on Water Policy
IDIQ	Indefinite Delivery/Indefinite Quantity
IEPR	Independent External Peer Review
IIA	Implementation Issues Assessment
ILP	Integrated License Process
IMTS	Inland Marine Transportation System
IRCC	Illinois River Coordinating Council
IRPT	Inland Rivers, Ports & Terminals
IRTC	Implementation Report to Congress
IRWG	Illinois River Work Group
ISA	Inland Sensitivity Atlas
IWR	Institute for Water Resources
IWRM	Integrated Water Resources Management
IWTF	Inland Waterways Trust Fund
IWUB	Inland Waterways Users Board
IWW	Illinois Waterway
L&D	Lock(s) and Dam
LC/LU	Land Cover/Land Use
LDB	Left Descending Bank
LERRD	Lands, Easements, Rights-of-Way, Relocation of Utilities or Other Existing Structures, and Disposal Areas
LiDAR	Light Detection and Ranging
LMR	Lower Mississippi River

LMRCC	Lower Mississippi River Conservation Committee
LOI	Letter of Intent
LTRMP	Long Term Resource Monitoring Program
M-35	Marine Highway 35
MAFC	Mid-America Freight Coalition
MARAD	U.S. Maritime Administration
MARC 2000	Midwest Area River Coalition 2000
MICRA	Mississippi Interstate Cooperative Resource Association
MIPR	Military Interdepartmental Purchase Request
MMR	Middle Mississippi River
MMRP	Middle Mississippi River Partnership
MNRG	Midwest Natural Resources Group
MOA	Memorandum of Agreement
MoRAST	Missouri River Association of States and Tribes
MOU	Memorandum of Understanding
MRAPS	Missouri River Authorized Purposes Study
MRBI	Mississippi River Basin (Healthy Watersheds) Initiative
MRC	Mississippi River Commission
MRCTI	Mississippi River Cities and Towns Initiative
MRRC	Mississippi River Research Consortium
MR&T	Mississippi River and Tributaries (project)
MSP	Minimum Sustainable Program
MVD	Mississippi Valley Division
MVP	St. Paul District
MVR	Rock Island District
MVS	St. Louis District
NAS	National Academies of Science
NAWQA	National Water Quality Assessment
NCP	National Contingency Plan
NEBA	Net Environmental Benefit Analysis
NECC	Navigation Environmental Coordination Committee
NED	National Economic Development
NEPA	National Environmental Policy Act
NESP	Navigation and Ecosystem Sustainability Program
NETS	Navigation Economic Technologies Program
NGO	Non-Governmental Organization
NGRREC	National Great Rivers Research and Education Center
NICC	Navigation Interests Coordinating Committee
NPDES	National Pollution Discharge Elimination System
NPS	Non-Point Source
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRDAR	Natural Resources Damage Assessment and Restoration
NRT	National Response Team
NSIP	National Streamflow Information Program

NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O&M	Operation and Maintenance
OHWM	Ordinary High Water Mark
OMB	Office of Management and Budget
OMRR&R	Operation, Maintenance, Repair, Rehabilitation, and Replacement
OPA	Oil Pollution Act of 1990
ORSANCO	Ohio River Valley Water Sanitation Commission
OSC	On-Scene Coordinator
OSE	Other Social Effects
OSIT	On Site Inspection Team
P3	Public-Private Partnerships
PA	Programmatic Agreement
PAS	Planning Assistance to States
P&G	Principles and Guidelines
P&R	Principles and Requirements
P&S	Plans and Specifications
P&S	Principles and Standards
PCA	Pollution Control Agency
PCA	Project Cooperation Agreement
PCX	Planning Center of Expertise
PDT	Project Delivery Team
PED	Preliminary Engineering and Design
PgMP	Program Management Plan
PILT	Payments In Lieu of Taxes
PIR	Project Implementation Report
PL	Public Law
PMP	Project Management Plan
PORT	Public Outreach Team
PPA	Project Partnership Agreement
PPT	Program Planning Team
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RCP	Regional Contingency Plan
RCPP	Regional Conservation Partnership Program
RDB	Right Descending Bank
RED	Regional Economic Development
RIFO	Rock Island Field Office
RM	River Mile
RP	Responsible Party
RPT	Reach Planning Team
RRAT	River Resources Action Team
RRCT	River Resources Coordinating Team
RRF	River Resources Forum
RRT	Regional Response Team
RST	Regional Support Team

RTC	Report to Congress
S.	Senate
SAV	Submersed Aquatic Vegetation
SDWA	Safe Drinking Water Act
SEMA	State Emergency Management Agency
SET	System Ecological Team
SONS	Spill of National Significance
SOW	Scope of Work
SRF	State Revolving Fund
SWCD	Soil and Water Conservation District
T&E	Threatened and Endangered
TEUs	twenty-foot equivalent units
TIGER	Transportation Investment Generating Economic Recovery
TLP	Traditional License Process
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSS	Total Suspended Solids
TVA	Tennessee Valley Authority
TWG	Technical Work Group
UMESC	Upper Midwest Environmental Sciences Center
UMIMRA	Upper Mississippi, Illinois, and Missouri Rivers Association
UMR	Upper Mississippi River
UMRBA	Upper Mississippi River Basin Association
UMRBC	Upper Mississippi River Basin Commission
UMRCC	Upper Mississippi River Conservation Committee
UMRCP	Upper Mississippi River Comprehensive Plan
UMR-IWW	Upper Mississippi River-Illinois Waterway
UMRNWFR	Upper Mississippi River National Wildlife and Fish Refuge
UMRR	Upper Mississippi River Restoration Program [Note: Formerly known as Environmental Management Program.]
UMRS	Upper Mississippi River System
UMRSHNC	Upper Mississippi River Sub-basin Hypoxia Nutrient Committee
UMWA	Upper Mississippi Waterway Association
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VTC	Video Teleconference
WCI	Waterways Council, Inc.
WES	Waterways Experiment Station (replaced by ERDC)
WHAG	Wildlife Habitat Appraisal Guide
WHIP	Wildlife Habitat Incentives Program
WLMTF	Water Level Management Task Force
WQ	Water Quality
WQEC	Water Quality Executive Committee

WQTF	Water Quality Task Force
WQS	Water Quality Standard
WRDA	Water Resources Development Act
WRP	Wetlands Reserve Program
WRRDA	Water Resources Reform and Development Act

## **Upper Mississippi River Restoration Program Authorization**

**Section 1103** of the Water Resources Development Act of 1986 (P.L. 99-662) as amended by Section 405 of the Water Resources Development Act of 1990 (P.L. 101-640), Section 107 of the Water Resources Development Act of 1992 (P.L. 102-580), Section 509 of the Water Resources Development Act of 1999 (P.L. 106-53), Section 2 of the Water Resources Development Technical Corrections of 1999 (P.L. 106-109), and Section 3177 of the Water Resources Development Act of 2007 (P.L. 110-114).

## **Additional Cost Sharing Provisions**

**Section 906(e)** of the Water Resources Development Act of 1986 (P.L. 99-662) as amended by Section 221 of the Water Resources Development Act of 1999 (P.L. 106-53).

### **SEC. 1103. UPPER MISSISSIPPI RIVER PLAN.**

(a)(1) This section may be cited as the "Upper Mississippi River Management Act of 1986".

(2) To ensure the coordinated development and enhancement of the Upper Mississippi River system, it is hereby declared to be the intent of Congress to recognize that system as a nationally significant ecosystem and a nationally significant commercial navigation system. Congress further recognizes that the system provides a diversity of opportunities and experiences. The system shall be administered and regulated in recognition of its several purposes.

(b) For purposes of this section --

(1) the terms "Upper Mississippi River system" and "system" mean those river reaches having commercial navigation channels on the Mississippi River main stem north of Cairo, Illinois; the Minnesota River, Minnesota; Black River, Wisconsin; Saint Croix River, Minnesota and Wisconsin; Illinois River and Waterway, Illinois; and Kaskaskia River, Illinois;

(2) the term "Master Plan" means the comprehensive master plan for the management of the Upper Mississippi River system, dated January 1, 1982, prepared by the Upper Mississippi River Basin Commission and submitted to Congress pursuant to Public Law 95-502;

(3) the term "GREAT I, GREAT II, and GRRM studies" means the studies entitled "GREAT Environmental Action Team--GREAT I--A Study of the Upper Mississippi River", dated September 1980, "GREAT River Environmental Action Team--GREAT II--A Study of the Upper Mississippi River", dated December 1980, and "GREAT River Resource Management Study", dated September 1982; and

(4) the term "Upper Mississippi River Basin Association" means an association of the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, formed for the purposes of cooperative effort and united assistance in the comprehensive planning for the use, protection, growth, and development of the Upper Mississippi River System.

(c)(1) Congress hereby approves the Master Plan as a guide for future water policy on the Upper Mississippi River system. Such approval shall not constitute authorization of any recommendation contained in the Master Plan.

(2) Section 101 of Public Law 95-502 is amended by striking out the last two sentences of subsection (b), striking out subsection (i), striking out the final sentence of subsection (j), and redesignating subsection "(j)" as subsection "(i)".

(d)(1) The consent of the Congress is hereby given to the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, or any two or more of such States, to enter into negotiations for agreements, not in conflict with any law of the United States, for cooperative effort and mutual assistance in the comprehensive planning for the use, protection, growth, and development of the Upper Mississippi River system, and to establish such agencies, joint or otherwise, or designate an existing multi-State entity, as they may deem desirable for making effective such

agreements. To the extent required by Article I, section 10 of the Constitution, such agreements shall become final only after ratification by an Act of Congress.

(2) The Secretary is authorized to enter into cooperative agreements with the Upper Mississippi River Basin Association or any other agency established under paragraph (1) of this subsection to promote and facilitate active State government participation in the river system management, development, and protection.

(3) For the purpose of ensuring the coordinated planning and implementation of programs authorized in subsections (e) and (h)(2) of this section, the Secretary shall enter into an interagency agreement with the Secretary of the Interior to provide for the direct participation of, and transfer of funds to, the Fish and Wildlife Service and any other agency or bureau of the Department of the Interior for the planning, design, implementation, and evaluation of such programs.

(4) The Upper Mississippi River Basin Association or any other agency established under paragraph (1) of this subsection is hereby designated by Congress as the caretaker of the master plan. Any changes to the master plan recommended by the Secretary shall be submitted to such association or agency for review. Such association or agency may make such comments with respect to such recommendations and offer other recommended changes to the master plan as such association or agency deems appropriate and shall transmit such comments and other recommended changes to the Secretary. The Secretary shall transmit such recommendations along with the comments and other recommended changes of such association or agency to the Congress for approval within 90 days of the receipt of such comments or recommended changes.

(e) Program Authority

(1) Authority

(A) In general. The Secretary, in consultation with the Secretary of the Interior and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, may undertake, as identified in the master plan

- (i) a program for the planning, construction, and evaluation of measures for fish and wildlife habitat rehabilitation and enhancement; and
- (ii) implementation of a long-term resource monitoring, computerized data inventory and analysis, and applied research program, including research on water quality issues affecting the Mississippi River (including elevated nutrient levels) and the development of remediation strategies.

(B) Advisory committee. In carrying out subparagraph (A)(i), the Secretary shall establish an independent technical advisory committee to review projects, monitoring plans, and habitat and natural resource needs assessments.

(2) REPORTS. — Not later than December 31, 2004, and not later than December 31 of every sixth year thereafter, the Secretary, in consultation with the Secretary of the Interior and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, shall submit to Congress a report that —

- (A) contains an evaluation of the programs described in paragraph (1);
- (B) describes the accomplishments of each of the programs;
- (C) provides updates of a systemic habitat needs assessment; and
- (D) identifies any needed adjustments in the authorization of the programs.

(3) For purposes of carrying out paragraph (1)(A)(i) of this subsection, there is authorized to be appropriated to the Secretary \$22,750,000 for fiscal year 1999 and each fiscal year thereafter.

(4) For purposes of carrying out paragraph (1)(A)(ii) of this subsection, there is authorized to be appropriated to the Secretary \$10,420,000 for fiscal year 1999 and each fiscal year thereafter.

(5) Authorization of appropriations.—There is authorized to be appropriated to carry out paragraph (1)(B) \$350,000 for each of fiscal years 1999 through 2009.

(6) Transfer of amounts.—For fiscal year 1999 and each fiscal year thereafter, the Secretary, in consultation with the Secretary of the Interior and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, may transfer not to exceed 20 percent of the amounts appropriated to carry out clause (i) or (ii) of paragraph (1)(A) to the amounts appropriated to carry out the other of those clauses.

(7)(A) Notwithstanding the provisions of subsection (a)(2) of this section, the costs of each project carried out pursuant to paragraph (1)(A)(i) of this subsection shall be allocated between the Secretary and the appropriate non-Federal sponsor in accordance with the provisions of section 906(e) of this Act; except that the costs of operation and maintenance of projects located on Federal lands or lands owned or operated by a State or local government shall be borne by the Federal, State, or local agency that is responsible for management activities for fish and wildlife on such lands and, in the case of any project requiring non-Federal cost sharing, the non-Federal share of the cost of the project shall be 35 percent.

(B) Notwithstanding the provisions of subsection (a)(2) of this section, the cost of implementing the activities authorized by paragraph (1)(A)(ii) of this subsection shall be allocated in accordance with the provisions of section 906 of this Act, as if such activity was required to mitigate losses to fish and wildlife.

(8) None of the funds appropriated pursuant to any authorization contained in this subsection shall be considered to be chargeable to navigation.

(f) (1) The Secretary, in consultation with any agency established under subsection (d)(1) of this section, is authorized to implement a program of recreational projects for the system substantially in accordance with the recommendations of the GREAT I, GREAT II, and GRRM studies and the master plan reports. In addition, the Secretary, in consultation with any such agency, shall, at Federal expense, conduct an assessment of the economic benefits generated by recreational activities in the system. The cost of each such project shall be allocated between the Secretary and the appropriate non-Federal sponsor in accordance with title I of this Act.

(2) For purposes of carrying out the program of recreational projects authorized in paragraph (1) of this subsection, there is authorized to be appropriated to the Secretary not to exceed \$500,000 per fiscal year for each of the first 15 fiscal years beginning after the effective date of this section.

(g) The Secretary shall, in his budget request, identify those measures developed by the Secretary, in consultation with the Secretary of Transportation and any agency established under subsection (d)(1) of this section, to be undertaken to increase the capacity of specific locks throughout the system by employing nonstructural measures and making minor structural improvements.

(h)(1) The Secretary, in consultation with any agency established under subsection (d)(1) of this section, shall monitor traffic movements on the system for the purpose of verifying lock capacity, updating traffic projections, and refining the economic evaluation so as to verify the need for future capacity expansion of the system.

(2) Determination.

(A) In general. The Secretary in consultation with the Secretary of the Interior and the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, shall determine the need for river rehabilitation and environmental enhancement and protection based on the condition of the environment, project developments, and projected environmental impacts from implementing any proposals resulting from recommendations made under subsection (g) and paragraph (1) of this subsection.

(B) Requirements. The Secretary shall

(i) complete the ongoing habitat needs assessment conducted under this paragraph not later than September 30, 2000; and

(ii) include in each report under subsection (e)(2) the most recent habitat needs assessment conducted under this paragraph.



(3) There is authorized to be appropriated to the Secretary such sums as may be necessary to carry out this subsection.

(i) (1) The Secretary shall, as he determines feasible, dispose of dredged material from the system pursuant to the recommendations of the GREAT I, GREAT II, and GRRM studies.

(2) The Secretary shall establish and request appropriate Federal funding for a program to facilitate productive uses of dredged material. The Secretary shall work with the States which have, within their boundaries, any part of the system to identify potential users of dredged material.

(j) The Secretary is authorized to provide for the engineering, design, and construction of a second lock at locks and dam 26, Mississippi River, Alton, Illinois and Missouri, at a total cost of \$220,000,000, with a first Federal cost of \$220,000,000. Such second lock shall be constructed at or in the vicinity of the location of the replacement lock authorized by section 102 of Public Law 95-502. Section 102 of this Act shall apply to the project authorized by this subsection.

#### **SEC. 906(e). COST SHARING.**

(e) In those cases when the Secretary, as part of any report to Congress, recommends activities to enhance fish and wildlife resources, the first costs of such enhancement shall be a Federal cost when--

(1) such enhancement provides benefits that are determined to be national, including benefits to species that are identified by the National Marine Fisheries Service as of national economic importance, species that are subject to treaties or international convention to which the United States is a party, and anadromous fish;

(2) such enhancement is designed to benefit species that have been listed as threatened or endangered by the Secretary of the Interior under the terms of the Endangered Species Act, as amended (16 U.S.C. 1531, et seq.), or

(3) such activities are located on lands managed as a national wildlife refuge.

When benefits of enhancement do not qualify under the preceding sentence, 25 percent of such first costs of enhancement shall be provided by non-Federal interests under a schedule of reimbursement determined by the Secretary. Not more than 80 percent of the non-Federal share of such first costs may be satisfied through in-kind contributions, including facilities, supplies, and services that are necessary to carry out the enhancement project. The non-Federal share of operation, maintenance, and rehabilitation of activities to enhance fish and wildlife resources shall be 25 percent.

## EMP OPERATING APPROACH

2006 marks the 20<sup>th</sup> anniversary of the Environmental Management Program (EMP). During that time, the Program pioneered many new ideas to help deliver efficient and effective natural resource programs to the Upper Mississippi River System (UMRS). These included the creation of an effective partnership of five states, five federal agencies, and numerous NGOs; a network of six field stations monitoring the natural resources of the UMRS; and the administrative structure to encourage river managers to use both new and proven environmental restoration techniques.

EMP has a history of identifying and dealing with both natural resource and administrative challenges. The next several years represent new opportunities and challenges as Congress considers authorization of the Navigation and Environmental Sustainability Program (NESP), possible integration or merger of EMP with NESP, and changing standards for program management and execution.

We will continue to learn from both the history of EMP and experience of other programs. Charting a course for EMP over the next several years is important to the continued success of the Program. EMP will focus on the key elements of partnership, regional administration and coordination, LTRMP, and HREPs.

The fundamental focus of EMP will not change, however the way we deliver our services must change and adapt. This will include:

- further refinements in regional coordination and management,
- refinement of program goals and objectives,
- increased public outreach efforts,
- development and use of tools such as the regional HREP database and HREP Handbook,
- exploring new delivery mechanisms for contracting,
- continued refinement of the interface between LTRMP and the HREP program components, and
- scientific and management application of LTRMP information and data.

The focus of these efforts must benefit the resources of the UMRS through efficient and effective management.