

**Upper Mississippi River Restoration Program
Coordinating Committee**

Quarterly Meeting

November 16, 2016

**Agenda
with
Background
and
Supporting Materials**

**UPPER MISSISSIPPI RIVER RESTORATION PROGRAM
COORDINATING COMMITTEE**

November 15-16, 2016

AGENDA

Tuesday, November 15 Partner Quarterly Pre-Meetings

- 4:15 – 5:30 p.m. Corps of Engineers
4:15 – 5:30 p.m. Department of the Interior
4:15 – 5:30 p.m. States

Wednesday, November 16 UMRR Coordinating Committee Quarterly Meeting

Time	Attachment	Topic	Presenter
8:00 a.m.		Welcome and Introductions	<i>Sabrina Chandler, USFWS</i>
8:05	A1-6	Approval of Minutes of August 9, 2016 Meeting	
8:10		Regional Management and Partnership Collaboration	
	B1-5	<ul style="list-style-type: none">▪ FY 2016 Year-End Report▪ FY 2017 Fiscal Update and Scope of Work▪ FY 2018 Budget Process	<i>Marv Hubbell, USACE</i>
	B6-8	<ul style="list-style-type: none">▪ New Budget Process Potentially Starting in FY 2019	
	B9-10	<ul style="list-style-type: none">▪ Implementation of 2015-2025 UMRR Strategic Plan	
	B11-23	<ul style="list-style-type: none">▪ 2016 UMRR Report to Congress	
	B24-26	<ul style="list-style-type: none">▪ Path Forward on Project Partnership Agreements	<i>Marv Hubbell, USACE and Dru Buntin, UMRBA</i>
		<ul style="list-style-type: none">▪ Non-Federal Partner Discussion re Outreach to New Administration▪ Public Outreach and Activities	<i>Dru Buntin, UMRBA</i>
9:40		Habitat Restoration	
		<ul style="list-style-type: none">▪ District Reports▪ Habitat Needs Assessment II<ul style="list-style-type: none">– Project Development Process– Data Analysis	<i>District HREP Managers Nate De Jager, USGS</i>
	C1	<ul style="list-style-type: none">▪ Large Scale Water Level Management▪ September 27-29, 2016 HREP Team Meeting Report Out▪ HREP Highlight: TBD	<i>Kevin Stauffer, MN DNR and Sabrina Chandler, USFWS Marv Hubbell, USACE</i>
10:45		Break	

(Continued)

Wednesday, November 16, 2016
UMRR Coordinating Committee Quarterly Meeting
 (Continued)

Time	Attachment	Topic	Presenter
11:00		Long Term Resource Monitoring and Science	
	D1-14	▪ LTRM Highlights	<i>Jeff Houser, USGS</i>
	D15-18	▪ Assessing Recent Rates of Sedimentation in Backwaters of the Upper Impounded Reach (Pools 4, 8, and 13)	
		▪ USACE LTRM Update	<i>Karen Hagerty, USACE</i>
	D19	▪ A-Team Report	<i>Shawn Giblin, WI DNR</i>
		▪ Science Highlight: Invasive Curlyleaf Pondweed Dynamics on the UMR	<i>Deanne Drake, USGS</i>
11:50		Other Business	
	E1	▪ Future Meeting Schedule	
12:00 noon		Adjourn	

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

ATTACHMENT A

Minutes

- **August 9, 2016 UMRR Coordinating Committee Quarterly Meeting**
(A-1 to A-6)
- **August 9, 2016 Joint Meeting of the UMRR Coordinating Committee and the Upper Mississippi River Basin Association Board** *(A-7 to A-12)*

DRAFT
Minutes of the
Upper Mississippi River Restoration Program
Coordinating Committee

August 9, 2016
Quarterly Meeting

Radisson Hotel
La Crosse, Wisconsin

Thatch Shepard of the U.S. Army Corps of Engineers, on behalf of Don Balch, called the meeting to order at 3:35 p.m. on August 9, 2016. Other UMRR Coordinating Committee representatives present were Sabrina Chandler (USFWS), Jennie Sauer (USGS) on behalf of Mark Gaikowski, Dan Stephenson (IL DNR), Randy Schultz (IA DNR), Megan Moore (MN DNR) on behalf of Kevin Stauffer, Janet Sternburg (MO DoC) via phone, Jim Fischer (WI DNR), Ken Westlake (USEPA) via phone, and Marty Adkins (NRCS). A complete list of attendees follows these minutes.

Minutes of the May 25, 2016 Meeting

Dan Stephenson moved and Randy Schultz seconded a motion to approve the draft minutes of the May 25, 2016 UMRR Coordinating Committee meeting as written. The motion carried unanimously.

Thank You to Janet Sternburg

Brian Markert expressed appreciation to Janet Sternburg for her steadfast dedication to UMRR, particularly for her partnership and friendship. Markert said Sternburg has been instrumental in conceptualizing habitat projects and in making many key agreements allowing for projects to move forward. This sentiment was strongly echoed by the UMRR Coordinating Committee members and meeting participants.

UMRR's 30 Years of Service Commemoration

Marv Hubbell reflected on the successful series of events on August 8, 2016 in commemoration of UMRR's 30 years of service to the nation. Hubbell applauded the many individual partners involved in planning and staffing the event, which included a public outreach activities and a formal celebration. The public outreach events included many STEM-related activities such as a meet-and-greet with a live eagle and live fish as well as yoga for adults and question-and-answer with partner agencies. The formal ceremony featured a suite of speakers who collectively told UMRR's story from its inception to the present and what may be expected in the future. The event has already received much positive feedback, and has been publicized in many local news outlets.

Regional Management and Partnership Collaboration

FY 2018 Budget Guidelines and Anticipated Process

Marv Hubbell said the Corps is developing an FY 2018 budget proposal to submit to the Office of Management and Budget (OMB) per the typical process. However, OMB has indicated that it will wait for the new Administration to make any budget decisions.

Habitat Restoration

District Reports

St. Louis District

Brian Markert described how Rip Rap Landing's features address important resource issues in the area. While the draft feasibility study is complete, the Corps and NRCS are still considering legal issues under the existing wetland reserve easement requirements. Markert reported that MVS is closing out Batchtown and anticipates closing out Pools 25 and 26 Islands in FY 2017.

St. Paul District

Marv Hubbell explained that MVP's primary challenge is advancing North and Sturgeon Lakes given the issues to non-federal sponsors in signing project partnership agreements (PPAs).

Rock Island District

Hubbell reported that MVR has awarded a construction contract for Pool 12 Overwintering Stage II and has published a bid for Stage III of the project. The District's planning priority is Beaver Island and is anticipating completing the project's feasibility study in FY 2017. Construction of the pumps at Rice Lake Stage I is anticipated to be finalized soon.

In response to a question from Marty Adkins, Hubbell explained that one portion of the additional Lake Odessa spillway capacity was constructed north of the outlet structure on the Mississippi River and the other portion was located upstream of the existing spillway on the Iowa River. These project features should work better because they will accommodate the rate of rise characteristics of both rivers. In response to a question from Dru Buntin, Hubbell said Rice Lake has experienced a myriad of unforeseen complications including unusual flood events. The Corps is now raising the height of three electrical junction boxes above the 500-year flood elevation to avoid frequent flood damages. Lawrence Patterson asked if the project will include safe access to the Rice Lake pumps. Hubbell said he will consult the designs and following with Patterson following the meeting.

UMRR HREP Team Meeting

Hubbell said an HREP team meeting is scheduled for September 27-29, 2016 in Davenport. Meeting objectives include building relationships and facilitating dialogue, discussing insights gained from constructing previous projects and long term monitoring, and strengthening UMRR's restoration efforts. The meeting will cover a range of topics, including agency perspectives on UMRR's restoration, floodplain forest restoration, water level management, and long term monitoring and research findings. In addition, the team meeting will include a facilitated discussion regarding habitat project monitoring.

Habitat Needs Assessment

Hubbell reported that the steering committee for the Habitat Needs Assessment (HNA) II was held on July 19-20, 2016 in Rock Island. The November 16, 2016 UMRR Coordinating Committee meeting will include a recommended path forward for the effort.

Continuous Process Improvement

In response to a question from Hubbell, the UMRR Coordinating Committee agreed to hold an in-person meeting with implementing partners' leadership to discuss the scope for a continuous process improvement evaluation for the habitat project planning phase. Hubbell offered that the discussion also

include a review of the cumulative benefits of UMRR's habitat restoration and the future direction for restoration. The Committee agreed to hold a conference call to plan the details for this event.

Long Term Resource Monitoring and Science

LTRM Showcase: Improving Floodplain Research and Management by Integrating Inundation Models, Ecosystem Studies, and Ecosystem Service Assessments

Molly Van Appledorn presented information regarding the use of flood inundation models to predict flooding dynamics and various inundation patterns affecting ecological characteristics. Van Appledorn explained that actions to alter the physical and ecological attributes create recreational and social benefits to the public. The connections between actions and benefits are often very complicated, but teasing apart the physical and ecological relationships can allow restoration practitioners to better predict outcomes. Characterizing flooding dynamics for a particular watershed and relating them to ecology is important understanding how its river floodplains work. Local dynamics can be evaluated in broader context to understand how actions work within and influence a larger regional characterization. Gauge data is an important baseline for comparison. Temporal aspects of flooding inform predictions of how changes in land use and precipitation patterns will affect flooding dynamics and ecological functions. For example, flooding can affect forest regeneration by influencing the delivery of seeds to new patches as well as recruitment, establishment, growth, and competition rates. Temporal evaluations can be helpful for creating associations – e.g., silver maples are expected in areas that flood more often. Van Appledorn illustrated how maps of inundation duration can be used to assess the effects on tree species composition and diversity. In addition, hydrodynamic models capture spatial and temporal patterns in flooding dynamics. The models can be used to compare localized sites in a regional context using attributes such as flood frequency, event duration, velocity, shear stress, inundation depth, and stream power. They can also show how surface water moves throughout a watershed.

Defining the ecologically-relevant attributes allow for discerning the complex, scale-dependent biophysical relationships. Van Appledorn explained that linkages between actions and benefits of managing flood dynamics can be complex and disentangling the biophysical relationships relies on quality representations of physical attributes. To better understand these relationships on the UMRS, Van Appledorn offered the following steps:

- 1) Develop methods for characterizing UMRS flooding dynamics in ecologically-relevant ways.
- 2) Utilize tributary junctions as laboratories – i.e., examine how flood dynamics of the main stem and tributaries manifest at the junctions and understand regional variation in tributary flooding behavior. [It is expected that highly complex relationships exist between forest dynamics, sediment dynamics, and biogeochemical cycling that vary throughout the UMRS.]
- 3) Develop an ecological floodplain inundation mapping (Eco-FIM) initiative to connect hydraulic models to maps of floodplain forests and other habitat types. This could be served in an on-line, interactive interface.

Marty Adkins expressed appreciation to Van Appledorn for her presentation, acknowledging the importance of this work for improving floodplain management. Adkins said Van Appledorn's work would connect well with Iowa Flood Center's monitoring and predictive modeling work. He suggested that Van Appledorn contact Larry Weber from the Flood Center. Van Appledorn agreed and said she has worked with the Iowa Flood Center, using its geomorphic information and modeling outputs to guide tree planting.

Megan Moore said this research would fit well with our desire to learn more about the impacts of the changing water regimes. Van Appledorn agreed, explaining that it will be important to understand what an ecological shift would mean for the river floodplain and habitat needs. Given that forests are slow to

change, modeling could be used to illustrate expectations of future conditions – i.e., generate maps of the future that predict forest succession that reflect hydrologic regimes. In response to question from Shawn Giblin, Van Appledorn said research has not yet examined trends in late spring/early summer water level peaks. She said that would be a great suggestion for future research given its importance as an influencing variable.

Kirsten Mickelsen expressed appreciation to Van Appledorn for her presentation and work on this front. Mickelsen said she believes that this research and ability to utilize hydrologic models for explaining the effects of floodplain management on larger ecological conditions will be extremely important for multi-purpose management of the system. In particular, Mickelsen said she sees this type of research as being a valuable component of a potential UMRS watershed study.

FY 2016 3rd Quarter Highlights

Jennie Sauer gave a bit thank you to Wisconsin DNR for organizing the STEM-related activities at UMRR's August 9, 2016 30th anniversary commemoration. Several local school groups came to the event and the activities were major hits with the kids. Sauer also expressed appreciation to USFWS for publicizing the event via its social media sources, including as a Facebook event.

Sauer reported that accomplishments of the third quarter of FY 2016 include:

- Publication of four manuscripts:
 - Patchiness in a large floodplain river, associations among hydrology, nutrients, and fish communities;
 - Contrasts between channels and backwaters in a large, floodplain river: testing our understanding of nutrient cycling, phytoplankton abundance, and suspended solids dynamics;
 - Long-term changes in fish community structure in relation to the establishment of Asian carps in a large floodplain river; and
 - Long-term decreases in phosphorus and suspended solids, but not nitrogen, in six Upper Mississippi River tributaries.
- Online serving of topobathy – a merged dataset of bathymetry and LiDAR – for portions of the UMRS. USGS anticipates having all areas available on the web site by the end of December 2016. A major challenge in this effort is the fact that the two data sets were collected over different dates and with different vendors, equipment, and datum.

A-Team Report

Shawn Giblin reported that the August 1, 2016 A-Team meeting included a series of presentations focused on answering questions related to how water depth drives water quality and habitat outcomes. Giblin overviewed the key points of those presentations, which included:

- Depth considerations for restoration and enhancement on the UMRS
- Backwater restoration primarily for overwintering fish habitat
- Water depth issues on the lower UMRS
- Fish indicators and standardized fisheries monitoring of habitat projects
- Riparian vegetation simulation modeling and regional sediment management, particularly exploring beneficial use of Illinois River dredged material stockpiles
- Development of the Habitat Needs Assessment II
- Overviews of the UMRR resilience application effort

In response to a question from Megan Moore, Giblin said that the logistics of habitat project monitoring for fish have not yet been decided. It may include involvement of the field stations. It is all conceptual thinking right now.

Other Business

Jim Fischer suggested that joint meetings between the UMRBA Board and UMRR Coordinating Committee are held on a more regular basis.

Future Meetings

The upcoming quarterly meetings are as follows:

- **November 2016 — Twin Cities**
 - UMRBA quarterly meeting — November 15
 - **UMRR Coordinating Committee quarterly meeting — November 16**

- **February 2017 — Quad Cities**
 - UMRBA quarterly meeting — February 7
 - **UMRR Coordinating Committee quarterly meeting — February 8**

- **May 2017 — St. Louis**
 - UMRBA quarterly meeting — May 23
 - **UMRR Coordinating Committee quarterly meeting — May 24**

With no further business, the meeting adjourned at 4:45 p.m.

**UMRR Coordinating Committee Attendance List
August 9, 2016**

UMRR Coordinating Committee Members

Thatch Shepard	U.S. Army Corps of Engineers, MVD [On behalf of Don Balch]
Sabrina Chandler	U.S. Fish and Wildlife Service, UMR Refuges
Jennie Sauer	U.S. Geological Survey, UMESC [On behalf of Mark Gaikowski]
Dan Stephenson	Illinois Department of Natural Resources
Randy Schultz	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

Ben Robinson	U.S. Army Corps of Engineers, MVD
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
MAJ Rich Star	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
Shawn Sullivan	U.S. Army Corps of Engineers, MVS
Kristen Bouska	U.S. Geological Survey, UMESC
Molly Van Appledorn	U.S. Geological Survey, UMESC
Lawrence Patterson	Illinois Department of Natural Resources
Megan Moore	Minnesota Department of Natural Resources
Robert Stout	Missouri Department of Natural Resources
Shawn Giblin	Wisconsin Department of Natural Resources
Brad Walker	Missouri Coalition for the Environment
Gretchen Benjamin	The Nature Conservancy
Barry Johnson	Public Citizen (Retired, U.S. Geological Survey)
Dru Buntin	Upper Mississippi River Basin Association
Dave Hokanson	Upper Mississippi River Basin Association
Kirsten Mickelsen	Upper Mississippi River Basin Association

DRAFT
Minutes of the Joint Meeting of the
Upper Mississippi River Basin Association Board and
Upper Mississippi River Restoration Program Coordinating Committee

August 9, 2016

Radisson Hotel
La Crosse, Wisconsin

UMRBA Chair Robert Stout and UMRR Coordinating Committee Co-Chair Thatch Shepard called the meeting to order at 1:30 p.m. Meeting participants were as follows:

UMRBA Representatives, Alternates:

Rick Gosch	Illinois Department of Natural Resources
Dan Stephenson	Illinois Department of Natural Resources
Tim Hall	Iowa Department of Natural Resources
Dave Frederickson	Minnesota Department of Agriculture
Barb Naramore	Minnesota Department of Natural Resources
Robert Stout	Missouri Department of Natural Resources
Bryan Hopkins	Missouri Department of Natural Resources
Dan Baumann	Wisconsin Department of Natural Resources

UMRR Coordinating Committee Members:

Thatch Shepard	U.S. Army Corps of Engineers, MVD
Sabrina Chandler	U.S. Fish and Wildlife Service, UMR Refuges
Jennie Sauer	U.S. Geological Survey [On behalf of Mark Gaikowski]
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 (by phone)
Jim Fischer	Wisconsin Department of Natural Resources
Marty Adkins	Natural Resources Conservation Service

Others in Attendance:

Lawrence Patterson	Illinois Department of Natural Resources
Megan Moore	Minnesota Department of Natural Resources
Shawn Giblin	Wisconsin Department of Natural Resources
Tom Novak	U.S. Army Corps of Engineers, MVP
Ben Robinson	U.S. Army Corps of Engineers, MVP
Col. Craig Baumgartner	U.S. Army Corps of Engineers, MVR
Dennis Hamilton	U.S. Army Corps of Engineers, MVR
Ken Barr	U.S. Army Corps of Engineers, MVR
Marv Hubbell	U.S. Army Corps of Engineers, MVR
Karen Hagerty	U.S. Army Corps of Engineers, MVR
Scott Whitney	U.S. Army Corps of Engineers, MVR
Maj. Rich Star	U.S. Army Corps of Engineers, MVS
Shawn Sullivan	U.S. Army Corps of Engineers, MVS
Brian Markert	U.S. Army Corps of Engineers, MVS
Monique Savage	U.S. Army Corps of Engineers, MVS

Tim Eagan	U.S. Army Corps of Engineers, MVS
Gary Lee	U.S. Army Corps of Engineers, MVS
Kat McCain	U.S. Army Corps of Engineers, MVS
Tim Yager	U.S. Fish and Wildlife Service
Scott Morlock	U.S. Geological Survey
Kristen Bouska	U.S. Geological Survey
Molly Van Appledorn	U.S. Geological Survey
John Medinger	U.S. Senator Tammy Baldwin
Mike Welvaert	National Weather Service
Tom Boland	AMEC Foster Wheeler
Brad Walker	Missouri Coalition for the Environment
Don Powell	SEH, Inc.
Gretchen Benjamin	The Nature Conservancy
Dru Buntin	Upper Mississippi River Basin Association
Dave Hokanson	Upper Mississippi River Basin Association
Kirsten Mickelsen	Upper Mississippi River Basin Association

Farewell to Janet Sternburg

Robert Stout recognized Janet Sternburg for her tremendous contributions to Mississippi River policy and habitat restoration. Sternburg is taking a new position within the Missouri Department of Conservation. Stout remarked that Sternburg is diligent and extremely hard working and she will be sorely missed by the UMRS partnership. Members of the UMRBA Board and UMRR Coordinating Committee expressed their sincere appreciation for Sternburg’s leadership and friendship over the years.

UMRR Presentation

Marv Hubbell touted the UMRR’s interdisciplinary and interagency partnership that has been working together successfully over the past 30 years, and has resulted in an efficient and effective larger river restoration and science program. UMRR is a pioneer in large river restoration and is acclaimed nationally and internationally. Because of this well designed infrastructure, UMRR’s obligation rate averages above 99 percent and the cost-per-acre restored is less than \$3,000. These attributes are incredibly important to the program’s ability to compete for limited restoration dollars nationally. The Corps ecosystem restoration funding is increasingly competitive, and UMRR’s ability to execute funds quickly and strategically will become even more important.

2015-2025 UMRR Strategic Plan

Hubbell described UMRR’s 2015-2025 Strategic Plan as proactive and forward-looking. According to Hubbell, the Plan’s integration of restoration and science is a keystone event that is already improving the ways in which partners are connecting their work to others and the overall strategic vision. The plan includes the following vision for the river, mission statement for the program, and four goals to achieve the vision and mission:

- *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 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
- *Goal 1:* Enhance habitat for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem

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

Hubbell explained that the UMRR partnership developed a subsequent operational plan that provided recommendations for establishing priorities, identified key policy and technical issues, offered approaches for integrating the program’s science and restoration efforts, and identified challenges to implementation. A few of the strategic plan’s primary recommendations include developing a communications strategy, applying resilience concepts to the UMRS ecosystem, updating the Habitat Needs Assessment, and enhancing transparency in budgeting. The planning team considered establishing a standing habitat team, but decided that the UMRR Coordinating Committee and other existing groups are already charged with considering many of the identified consultative needs.

Jim Fischer underscored the importance of the 2015-2025 UMRR Strategic Plan, both in terms of the outcomes of the development process itself as well as the recommendations that shift UMRR’s focus and internal collaborations. UMRR’s new focus on resilience is extremely important for better understanding the ecosystem at a broader spatial scale and determining how restoration can enhance the ecosystem sustainability in the face of degrading stressors. In addition, the strategic plan calls for a more integrated science and restoration program. Whereas the science and restoration efforts have operated mostly independently historically, the strategic plan offers new approaches for a more integrated program.

Hubbell reported that the UMRR is preparing to embark on the process to identify the third generation of habitat projects. The program is currently defining conceptual models for understanding the ecosystem’s resilience to stressors and updating the Habitat Needs Assessment. Both efforts will serve as foundational information sources for defining those future habitat restoration projects.

UMRS Ecological Resilience

Kristen Bouska provided a summary of the observations witnessed over the past six years using long term resource monitoring data. Out of the six study reaches, there have been both positive and negative developments. In the northern three study reaches, UMRR has observed an ecological shift to a healthier state, with less turbidity and clearer water that has resulted in a rebound of submersed aquatic vegetation and desired, native fish species. However, vegetation remains scarce in the southern study reaches. In 2015, Pool 26 and the Open River study reaches experienced the lowest water clarity in the 30-year monitoring period. Asian carps are outcompeting native species, reducing their body condition, in the Illinois River reach. Collectively, the ability to make these observations underscores the value of continuous long term monitoring and the infrastructure of six study reaches.

Bouska provided an overview of UMRR’s effort to-date to define and apply the concepts of ecological resilience to the UMRS. She recalled that the 2015-2025 UMRR Strategic Plan called for UMRR’s habitat projects to address ecological resilience and for an increased understanding of the status and trends of the UMRS’s ecological resilience. Bouska said she is assisting with the resilience effort, including authoring a manuscript to explain the insights gained through this exercise.

Bouska explained the definition of resilience as “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.” Main concepts of ecological resilience are:

- Small changes in controlling variables can lead to rapid changes in major ecosystem services to rapid changes in major ecosystem services when the system is near a threshold

- There are multiple possible states, instead of one global equilibrium to which an ecosystem can always return.
- There exists nonlinearity (hysteresis), meaning that an ecosystem cannot always return to its original state.
- Controlling variables and other components of the ecosystem can interact resulting in positive or negative feedbacks – e.g., a positive relationship exists between sedimentation and submersed aquatic vegetation.
- Slow variables, such as sedimentation, play a key role.

Bouska explained that resilience is value-neutral and must be placed in context. Strong resilience can either maintain a healthy ecosystem or an unhealthy ecosystem in the face of disturbances. On the other hand, low resilience could either shift a healthy ecosystem to an undesirable state or vice versa. For example, the return of a high presence aquatic vegetation in the northern reaches of the UMRS suggests that it vegetation is resilient to stressors. However, in the southern reaches, the vegetation seems to have difficulty reestablishing and therefore the vegetation is either not resilient or it may be resilient to its poor state.

Bouska said the workbook, *The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application*, is being used as a guide to applying ecosystem resilience concepts to the UMRS. The workbook contains three main sections: system description, assessing the system, and adaptive governance and management. Thus far, USGS has lead partners through the first main section, which includes defining the scope, scale, and a “desirable” future condition, the resilience of what to what, the governance and social interactions, and how the ecosystem functions.

Bouska said the purpose of doing the ecological resilience assessment is to 1) improve the understanding of the UMRS’s current ecosystem resilience and the potential for management and restoration actions to affect the resilience of the UMRS, 2) identify potential indicators of ecosystem resilience, and 3) identify areas of uncertainty where additional study is needed to inform management and restoration. UMRR partners agreed to define the UMRS ecosystem as the main stem river and floodplain, with larger scale processes included as external drivers. The analyses will focus at the floodplain reach scale, given the significant differences in ecosystem condition throughout the UMRS. In addition, the analyses will focus on three main ecological systems:

- 1) Lentic: backwater lakes and impounded areas
- 2) Lotic: channels (main and side channels)
- 3) Floodplain (with emphasis on forests)

Bouska explained that partners are now defining the basic relationships of the valued ecological component to its stressor – i.e., the resilience of what to what. This requires determining the critical ecological components of the system and what are the likely shocks/disturbances that the ecosystem will continue to experience. To answer the question of “resilience of what,” the resilience work group identified the valued uses or ecosystem services that are provided by the UMRS (e.g., recreation, water quality) and the ecological components that support those uses or services.

Using the conceptual model being developed for the lentic backwater lakes area, Bouska said partners are examining the main controlling variables and interactions among them that essentially make the ecosystem function, as well as the interactions across and within scales and feedbacks. This is then related to what we know about the relationships between components required to support expected uses and services and the key controlling variables, as well as what we do not know and need to research. The models will also be used to determine past and potential impacts of ecosystem management and restoration of the river. A next step will include quantifying the thresholds that exist between the key controlling variables and major uses and services as well as the associated scientific research. Bouska

said the models reflect the notion that the resilience of the UMRS ecosystem is dependent on individual and cumulative relationships among various stressors and disturbances and the valued ecological components that they influence.

Bouska said partners are now assessing alternate regimes (states) of the ecosystem, such as high turbidity and scarce aquatic vegetation versus clear water and abundance aquatic vegetation, in order to better understand both *specific* resilience (resilience of particular parts of a system to identified disturbances) and *general* resilience (the capacity of the ecosystem to cope with unfamiliar shocks and surprises). The conceptual models that Bouska presented form the basis for determining specific resilience. Bouska said that the principles for building resilience include maintain diversity and redundancy, manage connectivity, and manage slow variables and feedbacks, and described how UMRR's habitat projects contribute to those principles.

Bouska said next steps include populating the models and tables with information, refining the conceptual model diagrams, publishing the system assessment effort to-date and analyzing existing data to better quantify and understand the relationships identified in the conceptual models. Ultimately, the goal is to describe the impacts of UMRR's restoration and management of the ecosystem. Bouska said UMRR's long term monitoring data will be the primary reference for quantifying the relationships. The expected outcomes of this work are to assess the current state and trends of the UMRS's ecosystem, including trends in controlling variables, proximity to thresholds of concern, developing indicators of resilience, determining where the system is acceptable and resilience should be enhanced to maintain the state and where the system is unacceptable and resilience should be reduced.

In response to a question from Mike Klingner, Bouska said the data regarding the percent that lock gates are open is from 1959 to 2015. Klinger said he has privately-held monitoring data that might be useful. Fischer observed that UMRR can effectively address the first two general variables – maintaining diversity and redundancy and managing connectivity. However, UMRBA has a role in working to manage slow variables and feedbacks, which may include watershed inputs, climate change, and invasive species. These things are not within UMRR's ability to control. Fischer suggested that the UMRBA Board consider advocating for policies and other efforts that could reduce the impacts of these slower stressors.

Increasing Competition for Fiscal Resources

Hubbell observed that UMRR has faced increasing pressure to demonstrate success and explain the intended benefits of its budget requests. Col. Craig Baumgartner elaborated on Hubbell's statement and said UMRR must demonstrate that it remains good stewards of the federal money. In other words, the Administration places substantial emphasis on delivering outcomes and executing fully and efficiently. That requires preparedness with action-ready projects and other efforts. Col. Baumgartner emphasized that the programs and projects with the most traction typically have a united partnership with a strong, compelling message and proactively communicate with decision-makers. According to Col. Baumgartner, it is important for partners to articulate the value of UMRR, the risk of reduced budgets and what can be done with increased funding, the importance of the long term monitoring baseline and sustaining its continuity, the strength of UMRR's regional partnership, and how this program is able to advance the interest of other federal and state agencies as well as local communities and nonprofit organizations.

Dru Buntin emphasized the need for dedicated staff to develop communications messages and tools as well as strategies for targeting the appropriate audiences. Buntin said his observations in Washington D.C. are that UMRR often falls short compared with other large aquatic ecosystems such as the Everglades.

Col. Baumgartner said the new Administration may have different perspectives on funding criteria and advised partners to be prepared with a variety of messages to quickly speak to any particular objective

or question. Scott Morlock suggested using ESRI's new "story map" tool, which helps to develop compelling stories with visuals and audio. Jennie Sauer added that the story map tool is very simple and user-friendly.

Project Partnership Agreements

Hubbell explained the communication between UMRBA and the Corps during the past few months. UMRBA sent two letters to Congress seeking that project partnership agreements (PPAs) be addressed in WRDA 2016, dated February 3, 2016 and April 22, 2016. The former letter is included in the agenda packet. Specifically, the changes sought by the states include creating a more shared approach to liability and limiting the obligations for operations, maintenance, repair, replacement, and rehabilitation (OMRR&R). In a May 11, 2016 letter, UMRBA requested that the Corps explain what action would be required to modify the PPA template and whether the Corps has existing authority to make such changes. In response, Corps Headquarters explained that the indemnification clause is based on Sections 103(j)(1) and 101(j) of WRDA 1986. Perpetual OMRR&R is based on the fact that Section 103(j)(1) requiring a non-federal sponsor to pay 100 percent of the OMRR&R costs does not identify a time limit. Thus, the Corps stated that Congressional action is required to make the requested changes. In that letter, the Corps Director of Civil Works invited the Association to work collaboratively with the Corps to identify solutions that would be mutually beneficial.

Buntin explained that there was some traction within the UMRS delegation to seek changes to the PPA templates in WRDA 2016. Buntin observed that the Corps attorneys seem to only be concerned with decreasing any potential risk of federal liability and are not considering that worthy projects might not be implemented as a result. However, this approach appears to conflict with the Administration's and Congress' desire for leveraging nonfederal dollars through cost-shared projects as well as through public-private partnerships in implementing projects. Buntin said he believes it will be helpful to start engaging directly with the Corps attorneys and asked for the Corps' insight on how UMRBA might best engage with Headquarters. It appears that the Corps has not provided any alternative approaches to liability for consideration by Congressional members working on WRDA.

Hubbell said the exercise to review the legal obligations related to PPAs resulted in the Corps removing a requirement that tribes waive their respective sovereign immunity. That was required in addition to fully indemnifying the Corps.

Barb Naramore described the difficulty that states face in executing PPAs and asserted that the Corps does not fully appreciate the challenge of the state constitutional and statutory prohibitions on indemnification. Naramore asked the Corps to consider how the project agreements can be structured in a practical way so that the states can effectively participate as cost-share sponsors. She explained that Minnesota has nearly lost two projects in the last few years that it would have fully committed to as a cost-share sponsor if the legal requirement were not so burdensome and one-sided. The state was fortunate to find a work-around for one of the projects, but it will not likely be as lucky in the future. Naramore urged the Corps to also consider the capacity for the state to fulfil its long standing obligations compared with the risk of using local, smaller-scale organizations that are willing to execute PPAs with indemnification requirements.

Sabrina Chandler added that the USFWS has been asked to assume the sponsorship in two cases recently. And while the Service places high value on these projects, the agency sometimes cannot do so because of jurisdictional issues and it is also concerned with setting precedent. Chandler offered to assist in facilitating conversations about the non-federal sponsor agreements. Buntin noted that this issue will likely be a limiting factor on the placement of the next generation of UMRR habitat projects and encouraged the Corps to resolve these issues.

ATTACHMENT B

UMRR Regional Management

- **UMRR Spreadsheets thru 4th Quarter of FY 2016 (10/2016)**
(B-1 to B-5)
- **OMB Requirements for the FY 2018 Process (4/29/2016)** *(B-6 to B-8)*
- **Synopsis of 2015-2025 UMRR Strategic Plan** *(B-9 to B-10)*
- **Executive Summary of the 2016 UMRR Report to Congress**
(B-11 to B-23)
- **UMRBA Correspondence**
 - **UMRBA letter to USACE Headquarters re action needed to resolve PPA issues (5/11/2016)** *(B-24)*
 - **USACE Headquarters response to UMRBA's letter re PPA statutory requirements requiring Congressional action to resolve (6/30/2016)** *(B-25 to B-26)*

UMRR EXPENDITURES AND ALLOCATIONS

FY16 (\$ 000)						
	CARRY IN FROM FY 15	FY 16 ALLOCA.	TOTAL AVAILABLE TO EXP.	30 Sept 16 ACTUAL EXP.	30 Sept 16 ACTUAL OBLIG.	
PROGRAM ELEMENTS						
HABITAT PROJECTS						
HREP PROJECTS	193	12,413	12,599	16,560	12,618	
ARRA HREP PROJECTS	0	0	0	0	0	
HABITAT EVAL/MONITORING	60	658	718	880	605	
HABITAT NEEDS ASSESSMENT	0	322	322	65	502	
PLANNING/PRIORITIZATION	0	0	0	0	0	
USFWS HREP SUPPORT	0	289	289	341	498	
PROGRAM COOR. (Includes District Habitat Coordination)	64	2,454	2,518	2,343	1,886	
REPORT TO CONGRESS- 2014	0	65	65	92	55	
REGIONAL INITIATIVES	0	345	345	107	108	
LTRM (Includes LTRM Regional Technical)	0	4,629	4,629	5,730	5,305	
ARRA LTRM PROJECTS	0	0	0	0	0	
TOTALS	316	21,175	21,485	26,211	21,633	
TOTALS BY ORGANIZATION						
MVR *	47	11,184	11,225	9,963	11,359	
MVP	192	1,560	1,752	7,074	1,524	
MVS	77	3,501	3,578	3,244	3,785	
USGS	0	4,500	4,500	5,435	4,331	
UMRBA Administration	0	76	76	63	81	
USFWS (Multi-district funded)	0	289	289	341	498	
REPORT TO CONGRESS- 2012	0	65	65	92	55	
System Ecological Team (SET)	0	0	0	0	0	
TOTAL	316	21,175	21,485	26,211	21,633	

*1

* 1 Equals Work Allowance amount of \$21,174,000

Oct 2016
FY 2016

ADMINISTRATIVE, LTRM, and Non-Site Specific Costs

	FY16 (\$ 000)				
	CARRY		TOTAL	30 Sept 16	30 Sept 16
	IN	ALLOCA.	SCHEM EXP.	Actual Exp.	Actual Obl.
HABITAT (Rollup from district sheets)					
BASELINE MONITORING	23	76	99	48	48
HABITAT PROJ. EVALUATION	37	507	544	832	558
BIO-RESPONSE STUDIES	0	75	75	0	0
USFWS HREP SUPPORT (Multi-district funded)	0	289	289	341	498
PLANNING/SEQUENCING (PRIORITIZATION)	0	0	0	0	0
TOTAL HABITAT	60	947	1,007	1,221	1,103
PROGRAM COORDINATION (excludes District Habitat Coord.)					
UMRBA	0	76	76	63	81
System Ecological Team (SET)	0	0	0	0	0
PUBLIC INVOLVEMENT	0	60	60	154	54
EMP PROGRAM ADMINISTRATION	0	595	595	972	972
LTRM REGIONAL TECHNICAL	0	129	129	295	974
REGIONAL INITIATIVES	0	345	345	107	108
PROGRAM MGT TOTAL	0	1,205	1,205	1,591	2,190
REPORT TO CONGRESS (includes all organizations)					
	0	65	65	92	55
LTRM					
CORPS LTRM MANAGEMENT	0	0	0	0	0
LTRM (USGS & STATES)	0	4,500	4,500	5,435	4,331
CORPS BATHOMETRY & LiDAR (Multi-district funded)	0	0	0	0	0
ARRA - BATHOMETRY, LiDAR, & GIS (Multi-district funded)	0	0	0	0	0
CORPS APE'S ACTIVITIES	0	0	0	0	0
CORPS LTRM TECHNICAL SUPPORT (MSP)	0	0	0	0	0
SUBTOTAL	0	4,500	4,500	5,435	4,331

ST. PAUL DISTRICT

MVP	PROJECT ESTIMATE		TOTAL W/O NON FED	NON-FED EST	EXP FOR FY 15	EXP THRU FY 15	FY16 (\$ 000)					(Federal) Scheduled \$ To Complete		
							DESIGN	CONST	CARRY IN	ALLOCA.	TOTAL AVAILABLE TO EXP.		30 Sept 16	30 Sept 16
													Actual Exp.	Actual Obl.
HABITAT PROJECTS														
Capoli Slough, WI	500	8,750	9,250		327	6740	9	113	123	166	28	7,103	CONSTRUCTION	
Conway Lake, IA	462	2,050	2,512		268	522	25	260	285	280	280	2,091	DESIGN	
Harpers Slough, IA	1,500	15,000	16,500		3,028	5213	10	256	266	5,618	217	10,383	CONSTRUCTION	
Lake Winneshiek, WI	620	4,380	5,000			9			0			5,000	DESIGN	
Lower Pool 10 Islands/Backwater, IA	920	5,200	6,120			0			0			6,093	DESIGN	
McGregor Lake, WI	900	5,600	6,500		19	171		7	7	4	4	6,345	DESIGN	
North & Sturgeon Lakes, MN	900	7,600	8,500	1,100	408	2580	24	331	355	367	355	7,836	DESIGN	
ARRA PLANING, ENG & DESIGN	0	75	75	0		75			0			75		
Other Habitat (Carry over)	0	0	0	0		0			0			0		
HABITAT TOTAL	5,802	48,655	54,457	1,100	4,050	15,310	69	967	1,036	6,435	884	44,926		
									0					
PLANNED ALLOCATIONS														
			55,181	397										
HABITAT EVAL/MONITORING														
HABITAT NEEDS ASSESSMENT					0	57			0	0	0			
BASELINE MONITORING					20	602	23	16	39	16	16			
HABITAT PROJ. EVALUATION					136	1907	37	167	204	202	202			
BIO-RESPONSE STUDIES						1333			0					
USFWS HREP SUPPORT					253	1598			0	15	146			
PLANNING/SEQUENCING (PRIORITIZATION)						0			0					
SUBTOTAL	0	0	0	0	409	5,497	60	183	243	233	364	0		
PROGRAM MANAGEMENT														
PROGRAM COORDINATION					332	5221	64	410	474	421	422			
PUBLIC INVOLVEMENT - mipr \$						0			0					
SUBTOTAL	0.0	0.0	0.0	0.0	332	5,221	64	410	474	421	422	0		
LTRM														
LTRM COORDINATION						455	0	0	0					
ADDITIONAL LTRM						484	0	0	0					
SUBTOTAL	0	0	0	0		939	0	0	0	0	0	0		
DIRECT MVP EXPENDITURES														
				1,100	4,791	26,967	192	1,560	1,752	7,089	1,670	0		
MIPR & CROSS CHARGE LABOR EXPENDITURES														
Mipr for LTRM Travel						15.1			0	0	0			
Cross charge labor Technical & Bathemetry						31.7			0	0	0			
MIPR TOTALS (Includes Public Involvement)						47	0	0	0	0	0			
TOTAL MVP EXPENDITURES					4,791	27,014	192	1,560	1,752	7,089	1,670			
*1														
NOTES:														
*1 Equals MVP work allowance of \$2,131,600 (Initial Work Allowance of 3,631,600 - \$2,072,000 = 1,559,600). Funding was reallocated to MVR in the amount of \$1,972,000 and to MVS in the amount of \$100,000.														

ROCK ISLAND DISTRICT

MVR	PROJECT DESIGN	ESTIMATE CONST	TOTAL W/O NON FED	NON-FED EST	EXP FOR FY 15	EXP THRU FY 15	FY16 (\$ 000)						(Federal) Scheduled \$ To Complete	
							CARRY IN	ALLOCA.	TOTAL AVAILABLE TO EXP.	30 Sept 16		Actual Exp.		Actual Obl.
										Actual Exp.	Actual Obl.			
HABITAT PROJECTS														
BEAVER ISLAND, IA	1,500	11,000	12,500		605	1,016			260	260	490	469	11,777	PLANNING
FOX ISLAND, MO	700	4,300	5,000		293	5,967			40	40	48	48	4,506	CONSTRUCTION
HURON ISLAND, IA	2,100	8,400	10,500		2,750	5,035	47	4,430	4,477	900	4,461	8,961	8,961	CONSTRUCTION
LAKE ODESSA, IA	2,470	12,394	14,864			15,133			357	357	2,578	297	12,196	CONSTRUCTION
POOL 11 ISLANDS, WI	1,548	14,469	16,017			10,157							16,017	CONSTRUCTION
POOL 12 OVER WINTER, IA	2,500	16,500	19,000		3,387	7,326		2,547	2,547	1,931	2,212	15,258	15,258	CONSTRUCTION
RICE LAKE, IL	2,800	10,720	13,520	6,825	692	13,065		400	400	637	175	11,365	19,500	CONSTRUCTION
TURKEY RIVER BOTTOMS	2,900	16,600	19,500			0							19,500	PLANNING
BOSTON BAY	900	5,100	6,000		21	23		4	4	81	81	5,919	8,100	PLANNING
STEAMBOAT ISLAND	1,250	6,850	8,100		0	3							8,100	PLANNING
KEITHSBURG DIVISION	1,400	12,100	13,500		354	368		228	228	616	607	12,872	12,872	PLANNING
DELAIR DIVISION	1,750	7,750	9,500		0	2		173	173				9,500	PLANNING
SNYDER SLOUGH	1,800	15,700	17,500		0	16							17,486	PLANNING
EMIQUON	242	9,700	9,942	6,400	9	242							9,710	DESIGN
LAKE ODESSA, IA (Flood Recovery) (supplemental)		5,500	5,500		161	5,076							5,326	FLOOD RECONSTR.
ARRA ODESSA		236	236			158							236	ARRA
OTHER HABITAT		0	0			0							0	
HABITAT TOTAL	23,618	148,322	171,940	6,825	8,273	95,606	47.0	8,438.5	8,486	7,281	8,350	39,233		
HABITAT														
HABITAT NEEDS ASSESSMENT						0		322	322	65	502			
BASELINE MONITORING			268			254			0					
HABITAT PROJ. EVALUATION			938		288	3,802		325	325	621	347			
BIO-RESPONSE MONITORING			588			1,036		0	0					
USFWS HREP SUPPORT					150	1,199		174	174	213	239			
PLANNING/SEQUENCING (PRIORITIZATION)						39		0	0					
SUBTOTAL	0	0	1,794	0	438	6,330	0	821	821	899	1,088			
PROGRAM MANAGEMENT														
REGIONAL HREP SCIENCE SUPPORT			3,496	0	388	5,856		963	963	374	-3			
PUBLIC INVOLVEMENT	0.0	20.0	20.0			4	248	60	60	154	54			
REGIONAL ADMIN				0	699	3,635		595	595	972	972			
LTRM REGIONAL TECHNICAL						1,813		129	129	295	974			
PROGRAM INITIATIVES						1,334		345	345	107	108			
SUBTOTAL			3,516	0	1,255	12,887	0	2,092	2,092	1,902	2,106			
REPORT TO CONGRESS					26	122		65	65	92	55			
LTRM														
CORPS BATHOMETRY & LIDAR (Multi-district funded)					0	463	0	0	0	0	0			
ARRA - BATHOMETRY, LIDAR, USGS, & GIS					0	2,811	0	0	0	0	0			
CORPS APE'S ACTIVITIES						165	0	0	0	0	0			
ADDITIONAL LTRM					0	927	0	0	0	0	0			
SUBTOTAL	0	0	530	0	0	4,365	0	0	0	0	0			
MIPRS & Contracts														
UMRBA					75	314	0	76	76	63	81			
ITRC					0	0	0	0	0	0	0			
USGS					6,622	26,908	0	4,500	4,500	5,435	4,331			
FY14 Reprogram						0	0	6	6					
SUBTOTAL					6,697	27,222	0	4,582	4,576	5,498	4,412			
TOTAL MVR EXPENDITURES					16,688	146,533	47.0	15,995	16,040	15,673	16,010			
*														
*1 Equals MVR work allowance of \$15,998,500 (14,026,500+1,972,000 = \$15,526,500). Funding was reallocated from MVP to MVR in the amount of \$1,972,000.														

ST LOUIS DISTRICT

MVS	PROJECT ESTIMATE		TOTAL W/O NON FED	NON-FED EST	EXP FOR FY 15	EXP THRU FY 15	FY16 (\$ 000)				(Federal) Scheduled \$ To Complete			
	DESIGN	CONST					CARRY IN	ALLOCA.	TOTAL AVAILABLE TO EXP.	30 Sept 16			30 Sept 16	
										Actual Exp.			Actual Obl.	
HABITAT														
BATCHTOWN MGMT, IL	3,220	14,875	18,095	145	96	16,892		200	200	141	141	1,158	CONSTRUCTION	
CLARENCE CANNON, MO	2,637	27,180	29,817		617	2,119		1,050	1,050	1,073	1,526	27,242	DESIGN	
EAGLES NEST & PIASA IS., IL	1,057	4,500	5,557		280	712		300	300	292	292	4,833	FACT SHEET	
GLADES WETLAND, IL	3,218	14,000	17,218		32	32		100	100	9	9	17,209	DESIGN	
HARLOW ISLAND	750	13,750	4,500		330	390		325	325	350	350	4,090	DESIGN	
RIP RAP LANDING	1,373	10,553	11,926	1,207	13	761		50	50	14	14	11,164	DESIGN	
POOL 24 ISLANDS	1,373	8,119	9,492			8		10	10			9,484	DESIGN	
POOLS 25/26, MO	875	1,600	2,475		143	1,219		50	50	10	10	1,389	CONSTRUCTION	
REDS LANDING,	621	2,863	3,484			0		10	10			3,484	DESIGN	
SCHENIMANN CHUTE, MO	691	2,800	3,491			396		10	10			3,095	DESIGN	
TED SHANKS, MO	4,405	25,101	29,506		7,460	20,080	77	866	943	938	1,025	15,948	CONSTRUCTION	
WILKINSON ISLAND	1,250	2,730	3,980	0		876		10	10			3,104	DESIGN	
WEST ALTON ISLAND	805	5,727	6,532		4	21		10	10	4	4	6,511	DESIGN	
HORSESHOE LAKE	1,520	12,750	14,270		9	49		10	10			14,230	DESIGN	
FT. CHARTRES SIDE CHANNELS, IL	650	2,650	3,300			44						3,256	DESIGN	
ESTABLISHMENT CHUTE SC, MO	650	2,250	2,900			24						2,876	FACT SHEET	
KASKASKIA OXBOWS, IL	750	3,500	4,250			0						4,250	FACT SHEET	
ARRA RIPRAP LANDING	0	319	319			319						0	ARRA	
ARRA BATCHTOWN	0	3,405	3,405			3,261						144	ARRA	
ARRA SWAN LAKE	0	1,109	1,109			1,109						0	ARRA	
(Other Unexpended Carryover)	0	184	184			122				13	13	109		
HABITAT TOTAL	25,845	159,965	175,810	1,352	9,106	63,700	77	3,001	3,078	2,844	3,384	133,576		
HABITAT EVAL/MONITORING														
HABITAT NEEDS ASSESSMENT	1,000		1,000			0								
BASELINE MONITORING					74	1,446		60	60	32	32			
HABITAT PROJ. EVALUATION					39	705		15	15	9	9			
BIO-RESPONSE MONITORING						1,184		75	75					
USFWS HREP SUPPORT					83	697		115	115	113	113			
PLANNING/SEQUENCING(PRIORITIZATION)						4								
SUBTOTAL	1,000	0	1,000	28,347	196	4,036	0	265	265	154	154			
PROGRAM MANAGEMENT														
PROGRAM COORDINATION					499	2,784		350	350	359	360			
PUBLIC INVOLVEMENT					0	0								
SUBTOTAL	0	0	0	0	499	2,784	0	350	350	359	360			
LTRM														
LTRM COORDINATION					0	0								
ADDITIONAL LTRM					0	0								
SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0			
DIRECT MVS EXPENDITURES	26,845	159,965	176,810	29,699	9,801	70,520	77	3,616	3,693	3,357	3,898			
MIPR EXPENDITURES														
LTRM mipr for Travel					0	444		0	0	0	0			
LTRM Bathemetry & Technical cross chrg					0	28		0	0	0	0			
MIPR/ Cross charge totals					0	472		0	0	0	0			
TOTAL MVS EXPENDITURES					9,801	70,992	77	3,616	3,693	3,357	3,898			

NOTES:
 *1 Equals MVS work allowance of \$3,615,900 (Initial Work Allowance of 3,515,900 + 100,000 = 3,615,900) Funding was reallocated from MVP in the amount of \$100,000.



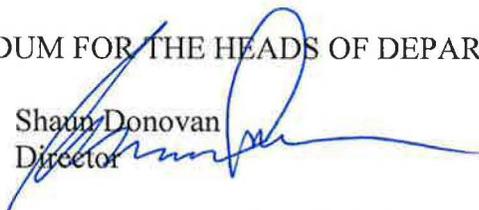
EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

April 29, 2016

M-16-10

MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

FROM: 
Shaun Donovan
Director

SUBJECT: Requirements for the FY 2018 Budget Process

This memorandum describes the Administration's plans for the development of budget data and other materials necessary for the Fiscal Year (FY) 2018 budget process in order to support a smooth transition.

The FY 2018 Budget will be submitted by the next President. In order to lay the groundwork for the incoming administration, we intend to prepare a budget database that includes a complete current services baseline. OMB also plans to gather information necessary to develop current services program estimates for FY 2018, as well as other budget and programmatic information from which the incoming administration can develop its budget proposals.

Budget Submissions

You are not required to submit a formal budget request to OMB in September, and there will be no formal Director's Review or Passback processes this fall. Most of the policy materials you usually submit in September in support of your budget requests will not be required until after the new administration (or a transition team) is in place, although you may be asked to provide information on selected topics by your OMB representatives.

At the end of this memo is a schedule for constructing a complete baseline budget database by account for FYs 2018 through 2027, as well as actual data for the prior year (PY) and estimates for the current year (CY), by the middle of December. You will be asked to complete the technical review of PY and CY data and to develop budget year and outyear baseline estimates.

At this time, you should proceed with your internal review procedures to prepare information to help the next administration quickly produce its budget. Specifically, you should work with your OMB representatives to identify information needed to develop program-level current services estimates. Such information might include the identification of recurring and

non-recurring costs in FYs 2017 and 2018, FTE levels and personnel costs assuming current services, and estimates of program utilization for FY 2018.

You should also work with your OMB representatives to identify key programmatic and budget issues that may require attention from the incoming administration. For example, this may include areas in which the implementation of program changes due to legislation or policy is in process and may require a decision on continuation; areas in which future funding needs may be significantly different than a standard current services baseline; or issues with significant budgetary implications that could require decisions early in the next administration. Please be prepared to provide the above information to your OMB representatives in September.

The President's Management Agenda

The FY 2018 performance plan will be developed to align with the incoming administration's policies and will be published concurrent with your final FY 2018 congressional budget justifications. Therefore, you do not need to submit to OMB the FY 2018 performance plan components of your budget materials until a new administration (or transition team) is in place. As with your budget materials, you should proceed with your internal review procedures to prepare information to help the next administration quickly produce the performance plans and reports.

In addition, agencies should adhere to on-going IT and cybersecurity related reporting requirements. As the Administration continues to focus on implementing the Federal Information Technology Acquisition Reform Act (FITARA), IT Capital Planning and Investment Control process changes for the FY 2018 budget cycle are forthcoming and will focus on empowering agency CIOs. Details on these requirements will be specified in OMB Circular A-11 and OMB IT Budget – Capital Planning Guidance.

Additional Guidance

OMB Circular A-11 provides guidance on the preparation and submission of budget estimates and the timing and use of relevant economic assumptions. Most of the transition-related updates to A-11 relate to timing and not specific requirements associated with the FY 2018 Budget developed for transmittal by the incoming administration. OMB plans to issue the revised Circular in June.

OMB expects to provide guidance during the transition on policy development for FY 2018 that will describe the process and timing for submitting agency requests, information required for analytical purposes, and other materials that will be used to prepare the incoming administration's budget.

FY 2018 Transition Data and Budget Information: Tentative Schedule

OMB Circular A-11 issued	June
Agencies submit budget information to OMB	September
GTAS revision window opens	October 18

MAX database available for agency input
MAX A-11 PY lock and GTAS revision window closes
MAX baseline closed for agencies

November 1
November 15
December

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.



EXECUTIVE SUMMARY

*"The face of the water, in time, became a wonderful book ...
Throughout the long 1,200 miles there was never a page that was void of interest."
– Mark Twain*

The mighty Mississippi River is a treasured part of our national heritage. What the next chapter holds for the iconic waterway and its diverse but endangered ecosystem will depend in large part on continued collaborative efforts of the Upper Mississippi River Restoration (UMRR) Program.

The Upper Mississippi River System (UMRS) is an economic engine, which helps drive a global economy and serves as the main artery for transportation of the country's agricultural exports. It is also a tremendously significant ecosystem, supporting commercial and recreational fishing, hunting, boating, and other activities. Tourism and outdoor recreation in the Upper Mississippi River corridor alone translates into \$24.6 billion to the region's economy, creating an estimated 421,000 jobs.

Humans are not unique in their dependence on Upper Mississippi River; it is also a globally significant flyway used by more than 326 species of birds and as a home for at least 260 species of fish, 37 species of mussels, 47 species of reptiles and amphibians, and 50 species of mammals, including a number of rare and endangered species. The Upper Mississippi River ecosystem includes 318,750 acres designated as Ramsar Wetlands of International Importance.

Our ability to maintain a healthy economy is directly tied to the ecological health of the river. Starting in the mid-1800's, alternations to make large-scale commercial navigation possible resulted in profound changes to the natural landscape. For decades, the diverse purposes of the river were at odds, with navigation and nature serving as a source of conflict for river stakeholders. Recognizing the dual federal role of providing commercial navigation while also managing the Upper Mississippi River National Wildlife and Fish Refuge, Congress passed the Water Resources Development Act of 1986, designating the Upper Mississippi River System as both a "nationally significant ecosystem" and a "nationally significant commercial navigation system." In that same legislation, Congress established UMRR to provide stewardship of the environmental needs of the river.

The UMRR Program is widely recognized as the first large river ecosystem restoration and scientific monitoring program in the country. UMRR has established a record of leadership. Now 30 years strong, many national and international restoration programs emulate UMRR's innovative approach to habitat projects, planning processes, and cutting-edge science, monitoring, and research.



UMRR's geographic extent compasses 2.7 million acres of river floodplain along the Congressionally-defined navigable portions of the Upper Mississippi, Illinois, Minnesota, Black, Saint Croix, and Kaskaskia Rivers. It is the only major river system in North America to run directly north-to-south, serving as an internationally-recognized flyway utilized by 40 percent of America's migratory waterfowl. Today, the river serves a complex system of human and biota uses, including commercial navigation and water supply, and is a popular tourism and recreation destination.

While we have made great progress, the existing and new stressors on the system will continue to cause degradation. Fish and wildlife habitat has been declining in quantity, quality, and diversity for decades, at an estimated degradation rate of one to three percent annually. What this means is, at these rates,



the ecosystem is declining at one to four times faster than it is currently being restored. The highly invasive Asian carp are among the most notorious stressors in this battle, but climate change, soil erosion, island erosion, and nutrient run-off are less headline-grabbing, silent threats to the river.

Accomplishments Since 2010 Report to Congress

UMRR Program Accomplishments

Throughout its 30 years of service to the Nation, the UMRR Program has led the country in innovation, leadership, and partnership to fulfill its restoration mission. In addition to constructing critical habitat restoration projects and understanding the river ecosystem, the program has completed important milestones on this journey.

2015-2025 UMRR Strategic Plan – This 10-year plan outlines the UMRR Program’s key approaches to enhancing restoration and advancing knowledge necessary for a healthier and more resilient Upper Mississippi River ecosystem that sustains the river’s multiple uses. It focuses on the program’s efforts to continue delivering products and services that are nationally significant, regionally relevant, internationally engaged, and technically sound. This strategic plan enhances the UMRR Program’s longstanding commitment to internal and external communication and collaboration among the many organizations and individuals that are working for a better Upper Mississippi River ecosystem.

Advisory Groups Charter – The UMRR Program is charged in its authorizing legislation to work in consultation with the Department of the Interior and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The UMRR Coordinating Committee, the Analysis Team, and the Habitat and Rehabilitation and Enhancement Project (HREP) Planning and Sequencing Framework Teams are the crucial partnership forums that facilitate the implementation of the program.

Ecosystem Objectives Report (2011) – This report builds on the extensive knowledge of the needs of the Upper Mississippi River ecosystem and lays out the needs of the ecosystem by floodplain and geomorphic reach. This information augments the 2000 Habitat Needs Assessment to identify high priority areas for restoration.

Habitat Rehabilitation and Enhancement Project (HREP) Accomplishments

Since 1986, UMRR has completed 55 projects, improving critical fish and wildlife habitat on 102,220 acres in Minnesota, Wisconsin, Iowa, Illinois, and Missouri. Since 2005, the UMRR Program’s habitat rehabilitation and enhancement projects (HREPs) benefitted nearly 35,000 acres of critical habitat, comprising nearly 50 percent of the wetland acres restored by the Corps nationally! Despite the complexity of the high-energy Upper Mississippi, UMRR plans, designs, and constructs habitat projects that successfully generate the intended ecological responses and at an impressively low average cost of \$3,000 per acre.

The UMRR habitat projects slow or reverse the negative impact of sedimentation and other problems by restoring and protecting high value fish and wildlife habitat. A variety of techniques are used to address the unique circumstances of each particular area. These techniques include:

- Dredging to remove sediment from selected backwaters and side channels to restore aquatic habitat.
- Constructing dikes and levees to keep silt-laden water out of prime habitat areas and to control water levels for optimal plant growth for waterfowl feeding.
- Building islands to decrease wind-generated disturbances, thereby reducing turbidity and stimulating small aquatic plant growth that provides habitat for small animals.
- Altering water flow to side channels and backwaters to prevent inflows of turbid water during flood events and increase dissolved oxygen levels during drought events.
- Modifying wing and closing dams to restore main channel habitat.
- Restoring diverse and healthy floodplain forests.

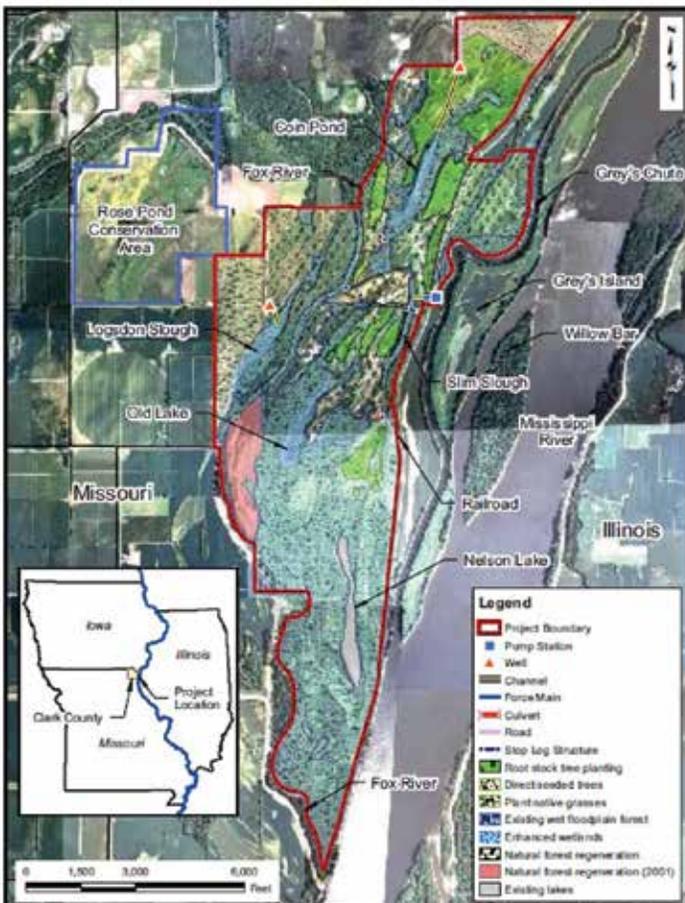
The UMRR Program closely monitors habitat projects to refine techniques and to ensure optimal results. Restoration practitioners use analyses of completed projects in designing similar projects in other areas of the river system. Resource managers and researchers in other regions of the country are also learning from UMRR projects. The construction of habitat projects is one of the most vital components of the UMRR. The projects reflect a strong commitment to maintaining the river as a multi-use resource and will have an important positive effect on the fish and wildlife resources of the river.

The UMRR Program tracks the successes and monitors progress on each habitat project. Since its 2010 Report to Congress, UMRR created a new database that integrates all information related to the program and its habitat projects. It is a key resource allowing UMRR to track and share key information on all project phases and stages.

Completed Habitat Rehabilitation and Enhancement Projects (HREPs)

Since 2010, UMRR has restored over 26,610 acres of important, high-quality habitat through seven projects that provide protection, nesting, and feeding areas for a highly diverse set of fish, birds, mussels, reptiles and amphibians, and mammals, including a number of rare and endangered species.

The **Fox Island** habitat project, Rock Island District (Pool 20), connects a large tract of contiguous forest habitat critical for bird migration and creates 2,020 acres of high-quality wetland and floodplain habitat for resident and migratory waterfowl, shorebirds, and wading birds. U.S. Fish and Wildlife Service purchased this former agricultural land following the major 1993 flood to increase river connectivity and wildlife habitat in the floodplain. UMRR is providing the tools necessary for the Service to transition this area back into a mosaic of bottomland forest, wetlands, and grasslands to provide significant benefits to a wide variety of important wildlife species.



The **Lake Odessa** habitat project, Rock Island District (Pools 16 & 17), reduces the influence of sedimentation (a primary degrading influence) and restores fish nursery and migratory bird habitat on 6,400 acres, by strengthening the existing levee, creating new spillways, installing water control structures to provide desired water levels, reforesting hardwood trees, and recreating ephemeral wetlands.



The **Rice Lake** habitat project, Rock Island District (La Grange Pool), provides an important food source for waterfowl and improves habitat for herons, egrets, shorebirds, eagles, and other native fish and wildlife species on 6,180 acres, by providing control structures to mimic natural water fluctuations and protecting the area from floods. Rice Lake has historically been excellent fisheries and mid-migration waterfowl habitat. However, summer flood spikes and loss of deep-water habitat and mast trees have reduced habitat quality for resident and migratory waterfowl.

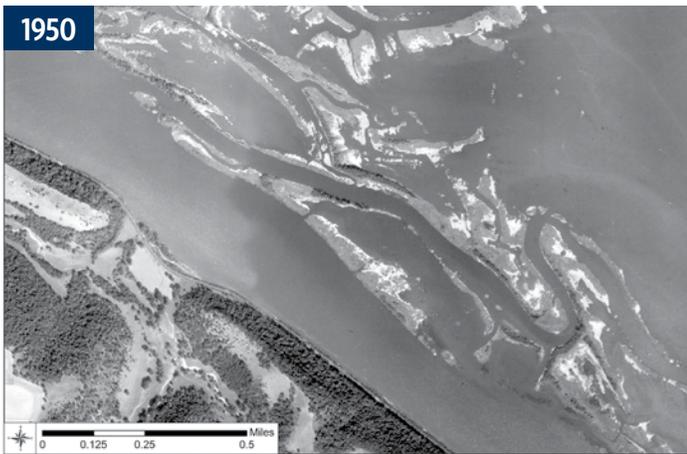


The **Capoli Slough** habitat project, St. Paul District (Pool 9), is a prime example of UMRR's many restoration success stories. In the 1940's and 1950's, the area consisted of numerous islands and deep-water areas that provided habitat for a wide variety of species. By 1950 (photo #1), the islands were showing signs of erosion and the deep areas were filling with sediment. Photo #2 shows that the islands and deep-water was nearly completely lost, as well as the plants and animals that once thrived there.



This project repaired the damage and reestablished the islands and deep-water habitat (photo #3) that were there previously. The environmental response to the project, restoring 1,570 acres, was remarkable with significant improvements in the amount of desirable aquatic vegetation, water quality, diversity of habitat resulting in dramatic increases in the numbers and quality of fish, waterfowl, and many other species.

The **Batchtown** habitat project, St. Louis District (Pool 25), improves the quality and diversity of wetland habitats used extensively by migratory waterfowl and other birds, by protecting the 3,490-acre site from fluctuating water levels and high sedimentation. The resulting site is a mosaic of backwater wetlands, marshes, and channels. The Batchtown area was once a prime habitat site for large numbers of migrating waterfowl, but the habitat had degraded due to siltation and inadequate water level control. This project received the 2014 Chief of Engineers Environmental Award in recognition of its innovative features and designs.



The **Calhoun Point** habitat project, St. Louis District (Pool 26), provides 2,170 acres of breeding, nesting, and feeding habitats for many forms of waterfowl and wildlife species and recreates productive spawning and nursery areas for riverine fishes through a suite of levees and water control structures. Located at the confluence of the Mississippi River and the Illinois Waterway, Calhoun Point is a prime resting and feeding area for migratory waterfowl. It is an important site for endangered salt meadow grass.



The **Swan Lake** habitat project, St. Louis District (Pool 26), restores a significant 4,780-acre backwater lake complex, increases water clarity, and restores submerged and emergent vegetation that provides important habitat for fish and macroinvertebrates. Swan Lake is the largest backwater complex in Pool 26 of the Mississippi River and one of the largest on the Illinois Waterway. This UMRR project allows water level management to reduce river-induced sediment deposition and restore floodplain forest connectivity, and the constructed islands reduce turbidity from wind-generated wave action.



Development of Habitat Rehabilitation and Enhancement Projects (HREPs)

UMRR is currently constructing five projects to benefit another 14,440 acres. Since 2010, UMRR has completed feasibility studies for seven projects that restore 22,990 acres of important habitat; some of the projects have been or are currently in construction. UMRR partners are in the process of developing feasibility reports for an additional 11 projects that, when constructed, would benefit an additional 20,020 acres. These projects, listed in Table ES-1, address critical fish and wildlife habitat needs in the Upper Mississippi River ecosystem and are described in more detail in Chapter 2.

From 2011 until 2016, UMRR had a remarkable rate of fiscal execution with an average annual obligation rate of 97 percent. During the last three years of this reporting period, this rate improved to 99 percent.



The Upper Mississippi River System proves that commercial navigation and ecosystem restoration can co-exist in relative harmony, as illustrated by the Pool 11 Islands habitat projects located just north of Dubuque, Iowa. This picture shows a thriving rehabilitated ecosystem on the left, functioning side-by-side with the main navigation channel and a 15-barge tow on the right.

**Table ES-1: Accomplishments Since 2010:
Restoring the Upper Mississippi River Ecosystem Health and Resilience**

Project Name	Location	Acres Benefitted
UMRR has constructed seven projects, benefiting 26,610 acres of important, high-quality habitat		
St. Paul District Capoli Slough	Pool 9	1,570
Rock Island District Fox Island Lake Odessa Rice Lake	Pool 20 Pool 17 La Grange Reach	2,020 6,400 6,180
St. Louis District Batchtown Calhoun Point Swan Lake	Pool 25 Pool 26 Pool 26	3,490 2,170 4,780
UMRR is actively constructing five projects benefitting 14,400 acres of important, high-quality habitat		
St. Paul District Harpers Slough	Pool 9	3,510
Rock Island District Huron Island Stage 1 (Construction Complete - 100%) Stage 2 (Under Construction - 85%) Stage 3 (Contract to be Awarded - 35%)	Pool 18	2,530
Pool 12 Overwintering Stage 1 (Construction Complete - 100%) Stage 2 (Under Construction - 85%) Stage 3 (Contract Awarded - 10%)	Pool 12	1,280
St. Louis District Pool 25 and 26 Islands Ted Shanks	Pool 25 Pool 24	3,940 3,140
UMRR has completed feasibility studies for seven projects that will restore 22,990 acres of important high-quality habitat		
St. Paul District Capoli Slough (constructed)	Pool 9	1,570
Rock Island District Emiquon Fox Island (constructed) Huron Island (in construction) Pool 12 Overwintering (in construction) Rice Lake (constructed)	La Grange Reach Pool 20 Pool 18 Pool 12 La Grange Reach	5,810 2,020 2,530 1,280 6,180
St. Louis District Clarence Cannon	Pool 25	3,600

**Table ES-1: Accomplishments Since 2010:
Restoring the Upper Mississippi River Ecosystem Health and Resilience (continued)**

Project Name	Location	Acres Benefitted
UMRR is evaluating 11 projects through feasibility reports that, collectively, could restore 20,020 acres of important high-quality habitat		
St. Paul District		
Conway Lake	9	1,170
Lake Winneshiek	9	2,800
Lower Pool 10 Island and Backwater Complex	10	1,410
McGregor Lake	10	580
North and Sturgeon Lakes	3	4,350
Rock Island District		
Beaver Island	14	1,680
Boston Bay	18	920
Delair Division	24	1,730
Keithsburg Division	18	1,400
St. Louis District		
Piasa and Eagle's Nest Islands	26	1,380
Rip Rap Landing	25	2,600

Table ES-2 — UMRR's high obligation rate results from its ability to manage risk by utilizing the unique capabilities and geographic location of the three Corps Districts, U.S. Fish and Wildlife Service, U.S. Geological Survey and five state natural resource agencies.

Fiscal Year	Total obligated
2011	93.6 percent
2012	93.8 percent
2013	97.1 percent
2014	98.8 percent
2015	99.4 percent
2016	99.4 percent
Average (2014-2016)	99.2 percent
Average (2011-2016)	97 percent

Long Term Resource Monitoring (LTRM) and Research Element Accomplishments

The combination of long term monitoring and research has significantly enhanced knowledge of the complex and diverse Upper Mississippi River ecosystem. In addition, these efforts uniquely position UMRR to contribute to large-scale ecosystem restoration nationally and internationally.

The datasets and tools produced by UMRR in the past six years provide an unprecedented amount of information regarding the Upper Mississippi River floodplain ecosystem that is invaluable to restoration, monitoring, and managing the river system. UMRR uses the new data to identify opportunities to restore critical habitats for native plants and animals as well as to refine specific restoration project techniques.

With long term data collected for nearly three decades, UMRR's database is one of the most extensive and comprehensive on any large river system in the world. Long term resource monitoring make it possible to detect actual changes in status and trends of ecological health indicators against the background of long term cycles and variation. Short-term studies cannot provide that information. Continued long term monitoring is imperative for understanding and managing ecosystem responses to ongoing and future stresses such as invasive species, climate



change, and land use in the watershed. UMRR restoration practitioners must understand these dynamics and interactions in order to reduce uncertainty in predicting the effects of various restoration alternatives.

Standardized monitoring of the ecosystem’s key features in six study reaches provides valuable information over the wide range of environmental and human-use gradients that exist on the Upper Mississippi River. Using long term resource monitoring, UMRR evaluates the river ecosystem’s status and trends through quantitative assessments of the fundamental biological, chemical, and physical indicators. Significant findings and developments since 2010 include:

Ecosystem Health – While the Upper Mississippi River ecosystem still retains the underlying features that define river ecosystem integrity, a general gradient of river health exists that ranges from a relatively healthy system in the northern reaches to a system that is much less healthy in the southern reaches.

- The northern portion of the Upper Mississippi River ecosystem is clearly experiencing an ecological shift from a turbid, less vegetated condition to a clearer, more vegetated condition. Since 2005, fish species associated with high water quality, such as weed shiners, yellow perch, largemouth bass, and young-of-year bluegills have rebounded. Habitat projects and natural variation triggered this response. See page 48 for more information.
- The ecosystem is more degraded in the southern portions of the river that any side channel restoration project would generate significant positive fish and wildlife responses spanning large spatial scales. Side channel restoration will increase habitat connectivity, providing access to refuge and high-energy food sources. See page 23 for more information.
- Since 2010, UMRR completed an extensive evaluation of the ecological indicators used in its assessments and is recommending a suite of new indicators to use in a future assessment that are more community-based rather than single-species indicators.

Landscape Indicators – UMRR developed landscape ecological indicators and a graphical web browser that allows decision makers to easily obtain landscape-related indicators and maps. This provides restoration practitioners with a greater understanding of the Upper Mississippi River landscape ecology and the ecological consequences of modifying landscape patterns.

Systemic Data Layers – UMRR acquired, processed, and published online four new data layers for the entire Upper Mississippi River ecosystem that are extremely valuable for flood inundation modeling, hydrologic and environmental modeling, planning and designing restoration projects, and predicting and communicating the effects of water level management projects. They include:

- The third decadal land cover/land use data set (collected in 2010 and 2011) with associated aerial photography.
- Airborne Light Detection and Ranging (LiDAR) data (floodplain elevations).
- Bathymetry data (riverbed elevation).
- Topobathy, which merges the LiDAR and bathymetry datasets to form a seamless elevation data layer.

New Tools – UMRR published new, user-friendly internet-based mapping and query application tools allowing users to easily access and download fisheries, water quality, vegetation, invertebrate, land cover, and bathymetric data monitored over the life of UMRR. Figure 3-5 on page 47 shows an example output



Asian carps, not even present in the river 100 years ago, are now so dominant that they make up 35 to 70 percent of the fish biomass in some parts of the Upper Mississippi River ecosystem. The high-quality habitat created by UMRR enhances the resilience of native species to invasive species and other stressors.

of the spatial data query tool. In addition, UMRR has increased the public accessibility of its long term water quality monitoring data by serving a new graphical browser for stratified random sampling.

New Fisheries Information Tool – UMRR simplified a complex database of fisheries’ monitoring information to provide easy comparisons of fish abundance between study reaches, among species within study reaches, and even between functional levels of organization, such as native and nonnative fish assemblages and reproductive guilds. This can illustrate changes in fish community responses in comparison to longer term averages for any given year.

WHY THE UMRR PROGRAM MATTERS FOR THE UPPER MISSISSIPPI RIVER SYSTEM

UMRR Partners ...

The Upper Mississippi River ecosystem benefits from a deeply-rooted history of interagency and interdisciplinary partnerships. While the Corps is ultimately responsible for UMRR’s implementation, no one agency or program can manage this multi-use ecosystem alone. Rather, successful management requires thoughtful coordination among numerous agencies, organizations, and individuals with varying but related mandates, missions, and talents. Through UMRR, five federal agencies, five states, numerous nongovernmental organizations, and community members all work toward a common goal – a healthy and resilient river. On average, its partners contribute \$1 million annually to UMRR’s efforts.

The UMRR Coordinating Committee serves as the primary venue for partners to discuss a broad range of policy, technical, and budget related issues. The Committee’s quarterly meetings serve as an important forum for communicating and coordinating with a broad range of federal, state, and other non-federal habitat project sponsors on issues related to restoration, research, and monitoring.

UMRR Leads ...

The UMRR Program leads the country in innovation, leadership, and partnership to fulfill its restoration mission. UMRR facilitates interactive dialogue and engagement to inform and solicit input from the public and large river ecosystem experts throughout the Upper Mississippi River watershed, the Nation, and the world.



The Upper Mississippi River Wildlife and Fish Refuge attracts as many visitors annually as the Yellowstone National Park!

UMRR Innovates ...

As the Nation’s first large river restoration and monitoring program, UMRR has a proud history of pioneering innovative restoration techniques. The second edition of the UMRR Environmental Design Handbook, published in 2012, seeks to share our understanding of the biological responses to project designs with restoration practitioners, while also conveying new information about the most effective restoration and management approaches. For example, UMRR has learned that slightly lowering island elevations provides a more natural seasonal connectivity between channels and backwaters during smaller flood events. By contrast, islands with elevations higher than flood stage may support establishment and maturity of hard mast trees.

Since 2010, UMRR has developed a suite of new and improved models to help interpret long term resource monitoring data and predict conditions under a range of scenarios and potential management interventions. The models include comprehensive hydrology, spatial floodplain inundation simulations, two-dimensional hydrodynamics, wind fetch, submersed aquatic vegetation and floodplain vegetation.

The Corps created a new UMRR database that integrates and geo-references information related to the program’s 90 habitat projects. The database includes several important features that give quick access to UMRR data and information – all while ensuring data quality and consistency.



UMRR's Plan for The Next Six Years: What UMRR Will Deliver for the 2022 Report to Congress

Over the next six years, UMRR will pursue habitat restoration and scientific long term resource monitoring and investigations as envisioned in the 2015-2025 UMRR Strategic Plan. This includes:

- Identifying the most pressing restoration opportunities, designing critical habitat projects that address site-specific habitat needs and restore larger ecological processes and functions, and using innovative and effective restoration techniques and approaches.
- Increasing knowledge of the Upper Mississippi River ecosystem for the purposes of understanding its current health and resilience and predicting future conditions in order to inform and enhance river restoration and management.

Habitat Rehabilitation and Enhancement Project Planning

Over the next six years, UMRR anticipates completing construction on a total of nine projects improving another 23,330 acres, beginning construction on six projects, completing 13 feasibility reports, and developing feasibility reports on an additional seven projects. These projects are outlined in Table ES-3.



UMRR Regional Manager Marvin Hubbell and other program partners brief Representative Ron Kind (Wisconsin) and Secretary of Interior Sally Jewell on the importance of the Upper Mississippi River ecosystem and the role that UMRR plays to restore and monitor its health and resilience.

Table ES-3 Planned Habitat Restoration Accomplishments for 2017-2022

Project Name	Location	Acres Benefitted
UMRR will complete construction on nine projects benefiting 23,330 acres of important, high-quality habitat		
St. Paul District		
Conway Lake	Pool 9	1,170
Harpers Slough	Pool 9	3,510
North and Sturgeon Lakes	Pool 3	4,350
Rock Island District		
Beaver Island	Pool 14	1,680
Delair Division	Pool 24	1,730
Huron Island	Pool 18	2,530
Pool 12 Overwintering	Pool 12	1,280
St. Louis District		
Pools 25 and 26 Islands	Pool 25	3,940
Ted Shanks	Pool 24	3,140
Clarence Cannon	Pool 25	3,600

Table ES-3 Planned Habitat Restoration Accomplishments for 2017-2022 (continued)

Project Name	Location	Acres Benefitted
UMRR will initiate active construction on 6 projects that will benefit 11,590 acres of important, high-quality habitat		
St. Paul District McGregor Lake	Pool 10	580
Rock Island District Beaver Island Delair Division Keithsburg Division	Pool 14 Pool 24 Pool 18	1,680 1,730 1,400
St. Louis District Clarence Cannon Rip Rap Landing	Pool 25 Pool 25	3,600 2,600
UMRR will complete feasibility studies for 13 projects that will benefit 26,890 acres of important, high-quality habitat		
St. Paul District Conway Lake McGregor Lake North and Sturgeon Lakes	Pool 9 Pool 10 Pool 3	1,170 580 4,350
Rock Island District Beaver Island Delair Division Keithsburg Division	Pool 14 Pool 24 Pool 18	1,680 1,730 1,400
St. Louis District Crains Open River Islands Glades Godar Wetlands Harlow and Open River Islands Piasa and Eagle's Nest Islands Red's Landing Wetlands Rip Rap Landing Wilkinson Open River Islands	Pool 12 Open River Alton Open River Pool 26 Pool 25 Pool 25 Open River	1,280 590 5,770 1,260 1,380 1,620 2,600 2,760
UMRR will initiate feasibility planning on seven projects that will benefit 23,340 acres of important, high-quality habitat		
St. Paul District Lake Winneshiek Clear Lake	Pool 9 Pool 5	2,800 320
Rock Island District Boston Bay Steamboat Island Turkey River Bottoms Snyder Slough	Pool 18 Pool 16 Pool 11 Pool 11	920 440 3,370 1,990
St. Louis District Oakwood Bottoms	Open River	13,500



Long Term Resource Monitoring and Research Element Planning

The 2015-2025 UMRR Strategic Plan calls for continued rigorous, scientific analyses to further increase understanding of the Upper Mississippi River’s large, complex and dynamic ecosystem. This includes implementing adaptive management in more deliberative ways and keeping track of biological responses to restoration.

The monitoring, research, and analyses undertaken by UMRR are critical to enhancing our understanding of the Upper Mississippi River ecosystem. With this information, we will more effectively target critically needed ecosystem restoration. In the time until the next Report to Congress, many significant initiatives will be undertaken or completed. The most important of these initiatives are described below.



Mike Steuck of the Iowa Department of Natural Resources displays largemouth bass collected from the recently constructed Sunfish Lake habitat project in Pool 11, explaining to Assistant Secretary of the Army for Civil Works Jo-Ellen Darcy and Major General Michael Walsh about how the project provides the habitat needed for fish to survive harsh winters that frequently occur on the Upper Mississippi.



UMRR samples water quality parameters each winter to assess the distribution of suitable winter habitat for fish and identify areas where habitat restoration is needed for fish to survive over the winters when the river’s surface is frozen.

Complete the Habitat Needs Assessment II – UMRR will finalize the second comprehensive habitat needs assessment as described on page 21, incorporating learned information about the river’s fundamental ecological characteristics and the influence of in-river and watershed factors on fish and wildlife habitat. This assessment will serve as a foundational guide to identifying and selecting the third generation of habitat projects.

Measure ecological resilience – An ecosystem’s resilience is its ability to return to its current state after disturbances. For example, ecosystems can exist in multiple states such as a healthy, clear-water state with high-quality habitat or a turbid state with little to no vegetation and low-quality habitat. Better understanding the factors influencing ecological health and resilience of the Upper Mississippi River will result in more effective restoration efforts.

Quantify ecosystem health: Third Status and Trends Report – The continued accumulation of long term resource monitoring data is necessary to be able to assess, and detect changes in, the fundamental health and resilience of the Upper Mississippi River ecosystem and detect trends over time. This includes monitoring and evaluating the river’s key ecological components: water quality, aquatic vegetation, fish, bathymetry, and land cover/land use.

Enhance knowledge and analytical capabilities – UMRR will continue to conduct research about the factors controlling the dynamics and interactions of important ecological components. Scientific research, analysis, and modeling is focused on gaining critical, management-relevant information about the Upper

Mississippi River ecosystem's structure and function and on increasing certainty related to predicting ecological responses to management actions.

Collect and analyze the land cover/land use – UMRR will begin collecting digital aerial photos in 2020 for this dataset. These decadal datasets and aerial photo mosaics, accomplished through the collection and interpretation of systemic aerial photography every 10 years, are key components in this monitoring effort. These data are heavily used in restoration project formulation.

Monitor and evaluate key ecological components – Assesses changes in the Upper Mississippi River's ecological conditions and determines how those changes relate to management actions, natural variation, and the overall ecological integrity of the Upper Mississippi River. Future analyses will expand and build upon these data to also examine long term dynamics and interactions among the various indicators.



One visible signal that UMRR's habitat project successfully restore fisheries' abundance is the fact that the Bassmaster Elite held an unprecedented three tournaments in Pool 8 near La Crosse, Wisconsin just within the past five years. Eight of the top 10 finishers in 2013 focused on/spent most of their time fishing around structures built by the UMRR's Pool 8 Islands habitat project.

UMRR Report to Congress Requirements

Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended, requires UMRR to submit a Report to Congress every six years. The first Report to Congress in 1998 resulted in a permanent authorization for UMRR as well as changes to the cost-share requirements for habitat restoration projects not on national wildlife refuge lands. Section 1103 requires that each Report to Congress:

- A) Contain an evaluation of the UMRR habitat rehabilitation and enhancement projects and long term resource monitoring elements;
- B) Describe the accomplishment of each UMRR element;
- C) Provide updates of a systematic habitat needs assessment; and
- D) Identify any needed adjustments to UMRR's authorization.

Recommendations

The UMRR Program partners believe the program continues to carry out the vision of Congress for the 1,200 mile Upper Mississippi River System in exemplary fashion. The 2015-2025 Strategic Plan continues to guide partner organizations' collective work toward that vision. The environmental enhancements and progress made by UMRR and its partners could be undone without the continuation of this unified effort.

While UMRR program partners recommend no adjustments to the authorization in this Report to Congress, to remain fully functional, the Corps, with its implementing partners, should continue to work together to address challenges associated with the project partnership agreements.



Upper
Mississippi River
Basin Association

ILLINOIS, IOWA, MINNESOTA, MISSOURI, WISCONSIN

May 11, 2016

Mr. Steven Stockton
U.S. Army Corps of Engineers, Headquarters
Director of Civil Works
441 G. Street NW
Washington, D.C. 20314-1000

Dear Mr. Stockton:

We have been in continued discussions with multiple Districts and members of your staff regarding the challenges to non-federal sponsors in signing project partnership agreements (PPAs) with the Corps - namely complete indemnification, OMRR&R in perpetuity, and crediting nonprofit organizations for the value of donated goods. From that conversation, we understand that Corps attorneys have concluded that Congressional action is required to resolve these issues. We are hopeful that Congress' effort to advance a water resources development act this year will provide an opportunity for appropriate legislative action.

UMRBA has been working with the Nature Conservancy (TNC), Audubon, and members on the House Transportation and Infrastructure Committee as well as Upper Mississippi delegates of the House and Senate to include provisions that aim to address challenges with the current PPA template. Congress expressed in the *2014 Water Resources Reform and Development Act* its desire to have the Corps resolve the issues working through the National Academy of Public Administration's evaluation and recommendations for improving the cost-share agreements. However, given that the effort has not advanced, Congressional members have expressed to us their desire to have a statement from the Corps explaining what Congressional action is required.

We recognize that resolving this issue is important to the Corps for the purposes of efficiently advancing water resource projects authorized by Congress. Therefore, we would greatly appreciate your assistance in securing a statement from the Corps explaining why Congressional action is needed to 1) employ a shared approach to liability on state-sponsored projects, 2) create an appropriate limit to non-federal sponsors' OMRR&R obligations on ecosystem restoration projects, and 3) account for the value of donated goods that are specifically provided for the project by the non-federal sponsor.

Please feel free to call us to discuss further. We certainly appreciate our collaborative relationship and we look forward to continuing to work together to our address shared priorities.

Sincerely,

Dru Buntin
UMRBA, Executive Director

415 Hamm Building
408 St. Peter Street
St. Paul, Minnesota 55102
Phone: 651-224-2880
Fax: 651-223-5815
www.umrba.org



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

JUN 30 2016

Mr. Dru Buntin
Upper Mississippi River Basin Association, Executive Director
415 Hamm Building
408 St. Peter Street
St. Paul, Minnesota 55102

Dear Mr. Buntin:

Thank you for your letter dated May 11, 2016, and your longstanding leadership involving a broad range of U.S. Army Corps of Engineers programs impacting the Upper Mississippi River. I am responding to your letter requesting information regarding statutory provisions that require the non-federal sponsor to be responsible for operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) of a project, that require indemnification, and that determine crediting for in-kind contributions.

The statutory requirements regarding indemnification and responsibility for OMRR&R reflect Congress' longstanding division of responsibilities for implementation of water resources development projects, and help to ensure that the significant federal investment required for the construction of such projects is sustained. These requirements were reaffirmed in the Water Resources Development Act of 1986 (WRDA 86).

Section 103(j)(1) of WRDA 86 requires that prior to initiation of a water resources development project, a non-federal sponsor must enter into a binding agreement to pay 100 percent of the OMRR&R costs of a project, other than a navigation project. The law does not place a time limit on this requirement for OMRR&R, which applies to ecosystem restoration projects as well as to flood risk management and other water resources development projects. In developing the operation and maintenance manual for individual projects, the Corps can recognize that the requirements of OMRR&R for a project may change over time.

In addition, Section 103(j)(1) and Section 101(j) of WRDA 86 require that in this binding agreement, the non-federal sponsor must agree to hold and save the United States free from damages due to the construction or operation and maintenance of the project, except for damages due to the fault or negligence of the United States or its contractors. Please note the exception to indemnification for damages due to the fault or negligence of the United States or its contractors.

Finally, Section 2003 of WRDA 2007 amended Section 221 of the Flood Control Act of 1970 to authorize credit for in-kind contributions. This law provides that credit afforded for in-kind contributions is limited to "the actual and reasonable costs of the materials, services, or other things provided by the non-federal interest." Where materials, services, or other things are donated by a third party, the non-federal sponsor incurs no cost and thus is not eligible for credit under Section 221. It should be noted that Section 203 of WRDA 1992 does allow for parties other than the non-federal sponsor to contribute cash, funds, materials, and services toward implementation of an ecosystem restoration project. Such donations would reduce the total project cost of a project, thereby benefitting both the Federal Government and the non-federal sponsor with a lower project cost and lower cost share amounts.

These statutory requirements are reflected in the Project Partnership Agreements, the binding agreements required prior to initiation of water resources development projects. Changes to these requirements would require legislative action, as they are statutory. Given the longstanding nature of the requirements and the important interests they serve, the Corps would want to engage in detailed discussions with your staff to find the best way to address your concerns without negatively impacting the Civil Works program.

Thank you for your interest in the Corps Civil Works program. If you have additional questions or concerns, please contact me or your staff may contact Mr. Joseph Redican, Deputy Chief, Mississippi Valley Division Integration Team, at (202) 761-4523.

A handwritten signature in black ink, appearing to read 'S. L. Stockton', written in a cursive style.

STEVEN L. STOCKTON, P.E.
Director of Civil Works

ATTACHMENT C

Habitat Restoration

- **Excerpt of the 2000 UMRR Implementation Guidance re Large Scale Water Level Management (5/12/2000) (C-1)**

Secretary of the Interior, recommended cooperation in developing a business plan to help protect the Environmental Management Technical Center (EMTC) from budget impacts while progressing towards self-sufficiency.

Pending a response from the Secretary of the Interior to the Chief's 03Feb99 letter, no additional guidance is necessary.

Implementation Guidance: Continue to implement the LTRMP subject to the availability of funds.

16. Proposal: *"Future EMP efforts to restore, protect, and enhance UMRS habitat should continue to include an appropriate mix of large-scale actions, which are compatible with other river system purposes, such as pool-scale water level management modifications, and smaller projects affecting limited areas. The U.S. Army Corps of Engineers, St. Paul, Rock Island, and St. Louis Districts should continue to place increasing emphasis on using natural river processes and innovative measures in the design and construction of habitat projects."* (Partnership Report, page 7-6)

Analysis: The Commander, CEMVD, has sufficient authority to study large and small scale projects. No additional guidance is necessary.

Implementation Guidance: The reports to Congress prepared pursuant to Section 509(b)(2) shall evaluate the emphasis placed on using natural river processes and innovative measures in the design and construction of habitat projects.

17. Proposal: *"A concerted effort by the U.S. Army Corps of Engineers, Mississippi Valley Division and Headquarters should be undertaken to identify factors (e.g., project life design requirements, definitions of project failure, and experimental design) that may currently be limiting program innovation. Subsequently, any potentially constraining policies and guidance should be reviewed and, if necessary, modified."* (Partnership Report, page 7-6)

Analysis: CEMVD should work with the EMP-CC to identify any unnecessary constraints.

Implementation Guidance: Forward any unnecessary constraints that are beyond your authority to implement, with proposals for policy or legislative changes to provide relief, to CECW-P for review and approval. Each proposal should fully describe the constraint, its impact, alternative solutions and their impacts and costs, and a recommendation for a specific policy change or legislation.

18. Proposal: *"The Corps of Engineers, Mississippi Valley Division should facilitate development of charters, within the constraints imposed by Federal law, for the EMP-CC and LTRMP Analysis Team."* (Partnership Report, page 7-6)

Analysis: CEMVD has sufficient authority to develop charters for the EMP-CC and LTRMP Analysis Team.

Implementation Guidance: Develop and implement charters for the EMP-CC and LTRMP Analysis Team, as needed.

19. Proposal: *"The Corps of Engineers, St. Paul, Rock Island, and St. Louis Districts should increase the level of public involvement in the planning and implementation of the UMRS-EMP. Efforts should be taken to inform the public about habitat project purposes (resource management goals and objectives), expected outputs, and actual performance. In addition, opportunities to support public education that increases general understanding of the UMR ecosystem and management challenges should be pursued."* (Partnership Report, page 7-6)

Analysis: CEMVD has sufficient authority to implement this proposal with no further guidance. CEMVD should work with the EMP-CC to determine if any changes in the level of

ATTACHMENT D

Long Term Resource Monitoring and Science

- **FY 2014 UMRR Science Activities in Support of Restoration and Management (10/31/2016)** *(D-1 to D-3)*
- **FY 2015 UMRR Science Activities in Support of Restoration and Management (10/31/2016)** *(D-4 to D-5)*
- **Base Monitoring Scope of Work thru 4th Quarter of FY 2016 (10/31/2016)** *(D-6 to D-9)*
- **FY 2016 UMRR Science Activities in Support of Restoration and Management (10/31/2016)** *(D-10 to D-14)*
- **Backwater Sediment Study Proposal** *(D-15 to D-18)*
- **October 26, 2016 A-Team Meeting Agenda** *(D-19)*

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

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Seamless Elevation Data						
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
Land Cover / Land Use data and Accuracy Assessment/Validation for UMRS						
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
Standardized HREP Non-forested Wetland Plant Sampling Protocol						
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
Standardized HREP Forested Wetland Plant Sampling Protocol						
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
Predictive Model for Aquatic Cover Types						
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
UMRS Vegetation Handbook						
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
Phase 2 Geospatial Data Upgrades						
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
Spatial Data Query Tool						
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
UMRS Data Map						
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 http://umesc.usgs.gov/reports_publications/ltrmp_rep_list.html 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
Assessing System-wide Hydrodynamic Model Availability						
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
Development of Mussel Vital Rates						
2014MVR1	Brief summary report	30-Sep-15		30-Sep-15	completed, in UMESC review	Newton, Zigler, Davis
2014MVR2	Progress update	30-Sep-16		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
October 2016 Status

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Validation of Mussel Community Assessment Tool						
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	27-Apr-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-Sep-16	26-Sep-16		Newton, Zigler, Dunn, Duyvejonck
Effects of Nutrient Concentrations on Zoo- and Phytoplankton						
2014NC1	Counting of phytoplankton samples	13-Mar-15		2-Mar-15		Giblin, Campbell, Houser, Manier
2014NC2	Database completed and analysis completed	13-Mar-16	13-Mar-17		Working With UWL staff. Analysis will have to be conducted after academic year.	Giblin, Campbell, Houser, Manier
2014NC3	Full manuscript completed	13-Mar-18				Giblin, Campbell, Houser, Manier
Ecological Shifts Turbid to Clear States						
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		4-Jan-16	reconciling journal review comments	Giblin, Ickes, Langrehr, Bartels
2014ES3	Manuscript submitted for publication	13-Mar-17				Giblin, Ickes, Langrehr, Bartels
Invasive Carp Population Demographics (#1)						
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; http://www.reabic.net/journals/mbi/2015/Accepted.aspx	Phelps, McCain
Asian Carps Recruitment Sources (#2)						
2014CRS1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014CRS2	Manuscript	31-Mar-16	30-Aug-16	30-Aug-16	in review at Aquatic Invasions	Phelps, McCain
Effects of Asian Carps on Native Piscivore Diets (#3)						
2014NPD1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014NPD2	Manuscript	31-Mar-16	30-Oct-16			Phelps, McCain
Early Life History of Invasive Carps (#4)						
2014CLH1	Summary letter	31-Jan-15		16-Jan-15		Phelps, McCain
2014CLH2	Manuscript	31-Mar-16		1-Jan-16	in press	Phelps, McCain

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

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Seamless Elevation Data						
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	15-Apr-16	All pools completed and in FSP review except for Pool 2 and St. Croix; Pool 2 will be completed once we acquire and process the new lidar data sets for counties in Twin Cities; Target date to complete Pool 2 seamless data set is 12/31/16; no bathymetry data exists for St. Croix so seamless layer cannot be completed.	Dieck, Hanson
2015LB6	Seamless Elevation for Pools 15-19, 20, and 22-24	31-Mar-16		15-Apr-16	Separate line item needs to be created for Pool 19 due to bathymetry issue; Target date to complete Pool 19 is 12/31/2016; All remaining Pools completed and in FSP review	Dieck, Hanson
2015LB7	Seamless Elevation for Pools 25-OR & Kaskaskia	30-Jun-16	15-Aug-16	5-Aug-16	We continue to have a number of issues concerning the Pool 26 bathymetry. We plan to deliver the Pool 26 seamless layer on the Sept 30 deadline in place of completing Marseilles and Starved Rock with this group of products.	Dieck, Hanson
2015LB8	Seamless Elevation for the Illinois River	30-Sep-16		28-Sep-16	Including Pool 26	Dieck, Hanson
Producing NED ready LiDAR products						
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
Pool 12 AM monitoring (crappie telemetry)						
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
Fish Indicators of Ecosystem Health						
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	16-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	16-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	30-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 JANUARY meeting	1-Mar-16	15-Dec-16		delay in incorporating changes from A-Team	Anderson, Casper, McCain
2015FI5	Final draft Project Report submitted to UMRR CC for endorsement at FEBRUARY meeting	15-Jul-16	15-Jan-17			Anderson, Casper, McCain
2015FI6	Final Report	1-Jun-16	28-Feb-17			Anderson, Casper, McCain

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Plankton community dynamics in Lake Pepin						
2015LPP1	Phytoplankton processing; species composition, biovolume	30-Dec-15		22-Oct-15		Burdis
2015LPP2	draft manuscript: Plankton community dynamics in Lake Pepin	30-Sep-16	30-Mar-18		delayed due to field station staffing shortages and will also include data from 2015D15	Burdis
Estimating trends in UMRR fish and vegetation levels using state-space models						
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	27-Mar-16		Gray
2015SST3	Provide trend estimates for fish and vegetation web browser pages	30-Sep-16	31-Dec-16		Project delayed by statistical challenges	Gray, Schlifer
Generating and serving presumptive habitat maps for 28 UMRS fish species						
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
Predictive Aquatic Cover Type Model - Phase 2						
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	31-Mar-16		Yin, Rogala
2015AQ3	Detailed summary of work for Phases I & II	31-Dec-15	30-Jun-16	1-Dec-16	Resolving model discrepancy took longer than anticipated. Needs extension of summary deadline	Yin, Rogala, Ingvalson
Landscape Pattern Research on the UMRS: synthesis and significance, FY16-18						
	Milestones will be coordinated through the UMRR annual scope of work process					De Jager
Developing and Applying Indicators of Ecosystem Resilience to the UMRS						
	Milestones will be coordinated through the UMRR annual scope of work process					work group, post doc

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
Aquatic Vegetation Component						
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		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		30-Sep-16		Drake, Bartels, Hoff, Kalas
2016A4	Complete aquatic vegetation sampling for Pools 4, 8, and 13 (Table 1)	31-Aug-16		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
Intended for distribution						
LTRM Technical Report: Ecological Assessment of High Quality UMRS Floodplain Forests (2007APE12; Chick, Guyon, Battaglia) <i>(in final edits with author)</i>						
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) <i>(in USGS review)</i>						
LTRM completion report: FY05-07 data--Analysis and support of aquatic vegetation sampling data in Pools 6, 9, 18, and 19 (2008APE4a; Yin) <i>(in USGS review)</i>						
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) <i>(in USGS review)</i>						
Manuscript: A statistical model of species occupancy using the LTRM aquatic vegetation data (2013A7; Yin) <i>(in USGS review)</i>						
Fisheries Component						
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		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		15-Feb-16		Ickes, Schlifer
	c. Field Station QA/QC with corrections to USGS	15-Mar-16		15-Mar-16		DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Pendleton
	d. Corrections made and data moved to public Web Browser	30-Mar-16		30-Mar-16		Ickes, Sauer, and Schlifer
2016B2	Update Graphical Browser with 2015 data on Public Web Server.	31-May-16		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		4-Aug-16		Bowler

Upper Mississippi River Restoration
Long Term Resource Monitoring Element
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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		22-Apr-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		22-Apr-16		Solomon, Pendleton, Casper
2016B8(D)	Database increment: Stratified random day electrofishing samples collected in Pools 9–11	30-Sep-16		30-Sep-16		Bowler
2016B9(D)	Database increment: Stratified random day electrofishing samples collected in Pools 16–18	30-Sep-16		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)						
Water Quality Component						
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		15-Mar-16		Yuan, Schlifer
2016D3	1st Quarter of laboratory sample analysis (~12,600)	30-Dec-16		30-Dec-16		Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Cook, Sobotka
2016D4	2nd Quarter of laboratory sample analysis (~12,600)	30-Mar-16		30-Mar-16		Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D5	3rd Quarter of laboratory sample analysis (~12,600)	29-Jun-16		29-Jun-16		Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2016D6	4th Quarter of laboratory sample analysis (~12,600)	28-Sep-16		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		15-Mar-16		Schlifer, Rogala, Houser
	b. Field Station QA/QC; USGS QA/QC.	15-Apr-16		30-Mar-16		Houser, Rogala, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
	c. Corrections made and data moved to public Web Browser	30-Apr-16		7-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		30-Sep-16		Houser, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka

Upper Mississippi River Restoration
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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		30-May-16		Rogala
2016D10	Draft Completion report: Evaluation of water quality data from automated sampling platforms	30-Sep-16			Duplication of 2015D11	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		30-Sep-16		Kalas, Hoff, Bartel, Drake
2015D11	Draft report/manuscript: Developing continuous water quality monitoring methods in the UMR	1-Sep-16	30-Jun-17		Delayed due to move to new field station building	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 unimpounded portion of the Upper Mississippi River (2006D9; Hrabik & Crites) <i>(in USGS review)</i>						
LTRM report: Main channel/side channel report for the Open River Reach. (2005D7; Hrabik) <i>(in USGS review)</i>						
Manuscript: Contrasts between channels and backwaters in a large, floodplain river: testing our understanding of nutrient cycling, phytoplankton abundance, and suspended solids dynamics (2012D10; Houser) <i>(Accepted for publication; Freshwater Science)</i>						
Completion report, compilation of 3 years of sampling: Water Quality (2009R1WQ; Giblin, Burdis) <i>(in USGS review)</i>						
Manuscript: Trends in suspended solids, nitrogen, and phosphorus in select upper Mississippi River tributaries, 1991-2011 (Kreiling and Houser, 2013D14) <i>(in USGS review)</i>						
Manuscript: Relationship between the temporal and spatial distribution, abundance, and composition of zooplankton taxa and hydrological and limnological variables in Lake Pepin (2013D17; Burdis) <i>(ready for submission to Journal)</i>						
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) <i>(in USGS review)</i>						
Land Cover/Land Use with GIS Support						
2016LC1	Maintenance ArcGIS server	30-Sep-16		30-Sep-16		Hlavacek, Fox, Rohweder
2016LC2	Aerial Photo scanning; year 1 key pools	30-Sep-16	31-Dec-16		Pools 4, 8, 13, La Grange are complete; 3/4 of Pool 26 is complete; 1/2 of OR South is complete; Delay due to unanticipated time needed to cut and sort transparencies from original film	Ruhser
2016LC3	Bathymetry footprint	30-Sep-16	30-Nov-16		delay was due to loss of student intern working on project and need to retrain a new student	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		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		30-Mar-16		Schlifer

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
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	30-Jun-16	12-Jul-16	Currently undergoing testing before final release	Schlifer
2016M5	Update Aquatic Vegetation Graphical SRS Data browser from java applet based to html5 JavaScript plugin free version.	1-Mar-16	30-Nov-16		Beta version under review	Schlifer
2016M6	Rewrite Fisheries Data Download Query to increase efficiency and performance	1-Jun-16		1-Jun-16		Schlifer
Quarterly Activities						
2016QR1	Submittal of quarterly activities	30-Jan-16		30-Jan-16		All LTRM staff
2016QR2	Submittal of quarterly activities	13-Apr-16		13-Apr-16		All LTRM staff
2016QR3	Submittal of quarterly activities	13-Jul-16		13-Jul-16		All LTRM staff
2016QR4	Submittal of quarterly activities	12-Oct-16		12-Oct-16		All LTRM staff
Equipment Inventory						
2016ER1	Property inventory and tracking	15-Nov-16				LTRM staff as needed

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Developing and Applying Indicators of Ecosystem Resilience to the UMRS						
2016R1	Updates provided at each quarterly UMRR-CC meeting and A team meeting	Various		on-going		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		30-May-16		Bouska, Houser
Landscape Pattern Research and Application						
2016L1	Draft Manuscript: Changes in land cover and land use 2000-2010.	30-Sep-16		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		30-Sep-16		Swanson, Strauss, Thomsen (UW-L) &
2016L3	Draft Manuscript: Review of Landscape Ecology on the UMR	30-Sep-16	TBD		delayed due to work on the HNA-II	De Jager (UMESC)
2016L4	Draft Manuscript: Reed canarygrass abundance and distribution in the UMR.	30-Sep-16	TBD		delayed due to work on the HNA-II	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	31-Dec-16		After discussion with TNC this manuscript has taken a bit of a new direction.	Morlock, Van Appledorn, De Jager, 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		30-Sep-16		Weeks & Haro (UW-L), De Jager (UMESC)
On-Going						
2015L6	Presentation: Developing methods to map floodplain functions and ecosystem services	30-Jul-16		30-Jul-16		Morlock (USGS), Van Appledorn, De Jager
2015L6a	Draft Manuscript: Developing methods to map floodplain functions and ecosystem services	30-Sep-16			Duplication of 2016L5	Morlock (USGS), Van Appledorn, De Jager
Intended for distribution						
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). (Completed DOI 10.1007/s11273-015-9445-z)						
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) (in USGS Review)						
Fact Sheet: De Jager, N.R. 2014. Landscape Ecology on the Upper Mississippi River: lessons learned, challenges, opportunities (2013L3). (Completed; https://pubs.er.usgs.gov/publication/fs20163007)						
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). (Completed doi: 10.1111/avsc.12189)						
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). (in USGS Review)						
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) (in USGS Review)						
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). (in USGS Review)						

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Mussel Research Framework						
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		1-Apr-16		Ries, Newton, De Jager, Zigler
2015MRF22	Spatial patterns of native mussels in the UMRS: brief summary letter, including compiled dataset, GIS layers, map	1-Jun-16			In lieu of summary letter a presentation will be given to the LTRM Mgt. Team	Ries, Newton, De Jager, Zigler
Intended for distribution						
Manuscript: Reis, P., De Jager, N.R., Newton, T., Ziegler, S. Spatial patterns of native freshwater mussels in the UMR. <i>Freshwater Science</i> . (in USGS Review)						
Pool 12 Overwintering HREP Adaptive Management Fisheries Response Monitoring						
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 2015	1-Feb-16		1-Feb-16		Bierman and Bowler
2016P13e	In-house project databases updated	31-Mar-16		31-Mar-16		Bierman and Bowler
2016P13f	Summary report compiled and made available to program partners	30-Sep-16		30-Sep-16		Bierman and Bowler
Statistical Evaluation						
2016E1	Draft manuscript: Trends in summer water temperatures in the LTRM study reaches	30-Sep-16		30-Mar-16	Submitted to Hydrological Processes	Gray
2016E2	Draft manuscript: How well do trends in LTRM percent frequency of occurrence SAV statistics track trends in true occurrence?	30-Sep-16		30-Sep-16	Was not accepted by journal	Gray, Erickson
Intended for distribution						
Completion report that describes methods of estimating variance components from LTRMP water quality data (2008E1; Gray) (Completed; replaced by Gray BR. 2012. <i>Variance components estimation for continuous and discrete data, with emphasis on cross-classified sampling designs</i> . In: Gitzen, R.A., J.J. Millsbaugh, A.B. Cooper, D.S. Licht, editors. <i>Design and analysis of long-term ecological monitoring studies</i> . Cambridge University Press, pp. 200-227)						
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						
Aquatic Vegetation Component						
2016A6	Analysis: Aquatic Plant Response to Large-Scale Island Construction in the Upper Mississippi River.	30-May-16		30-May-16		Drake and Gray
2016A6a	Draft manuscript: Aquatic Plant Response to Large-Scale Island Construction in the Upper Mississippi River.	30-Sep-16			Delayed due to modifications of models	Drake and Gray
2016A7	Draft completion report: How many years did the effects of the 2001-2002 Pool 8 drawdown on arrowheads (<i>Sagittaria latifolia</i> and <i>S. rigida</i>) last?	30-May-16	30-Dec-16			Yin

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
On-Going						
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	30-Dec-17		Eric Lund, new vegetation component specialist will be taking over this project	Lund
2015A8	Draft completion report or manuscript: Aquatic macrophyte communities and their potential lag time response to changes in physical and chemical variables in the LTRM vegetation pools	30-Jun-17	30-Jun-18		Eric Lund, new vegetation component specialist will be taking over this project	Lund
Fisheries Component						
2016B12	Draft Manuscript: Benefits of Collaboration among Long Term Fish Monitoring Programs in Large Rivers (Fisheries Journal)	31-Dec-15		22-Oct-15	Reconciled peer review comments and resubmitted to journal for publication, 7/15/2016	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	Not accepted by Environmental Monitoring; being revised for submission to another Journal.	Counihan, Ickes, Casper, Sauer
2016B14	Draft completion report: Exploring Years with Low Total Catch of Fishes in Pool 26	30-Sep-16	30-Jun-17		Delayed due to moving to new field station Bldg.	Gittinger, Ratcliff, Lubinski, Chick
2016B15	Summary letter: Technical Support to River Managers Investigating UMR Walleye Dynamics	30-Sep-16			On-going. Managers still collecting data (email update sent to Sauer on 10/14)	Andy Bartels, Kraig Hoff, Fish Managers from WI, MN, and IA
On-Going						
2015B5	Letter summary: Exploring years with low total catch of fishes in Pool 26	15-Nov-15	31-Jul-16			Gittinger, Ratcliff, Lubinski, Chick
2015B17	Draft Manuscript: Fish Trajectory Analysis	30-Sep-16	31-Dec-16		Authors will be meeting in mid-November to discuss this manuscript and 2016B17. Plan is to submit both by 12/31/2016	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
Water Quality Component						
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-Sep-16		30-Sep-16	Not accepted by Freshwater Biology; being reformatted for Journal of Freshwater Ecology	Burdis

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
On-Going						
2015D13	Initial analysis and draft manuscript: Coherence in temporal variation of select water quality parameters across strata and study reaches	1-Sep-16			Pulled from SOW due to job change for Jeff Houser	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	30-Jun-17		Delayed due to staff shortage	Burdis
2015D16	Draft manuscript: Trends in water quality and biota in segments of Pool 4, above and below Lake Pepin	31-Dec-15	31-Dec-16			Burdis
2014D13	Presentations, draft completion report: A Comparison of Side and Main Channel Fish Community and Water Quality Characteristics	1-Dec-15		25-Feb-16	Manuscript River Res. Applic. 2016; DOI: 10.1002/rra.3061	Sobotka, West, Phelps
Development of 2010–2011 Land Cover/Land Use GIS Database and Aerial Photo Mosaics						
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
USACE UMRR LTRM Technical Support						
2016COE1	Quarterly update submitted to the LTRM Management Team	30-Dec-15		30-Dec-15		McCain, Theiling, Potter
2016COE2	Quarterly update submitted to the LTRM Management Team	30-Mar-16		30-Mar-16		McCain, Theiling, Potter
2016COE3	Quarterly update submitted to the LTRM Management Team	30-Jun-16		30-Jun-16		McCain, Theiling, Potter
2016COE4	Quarterly update submitted to the LTRM Management Team	30-Sep-16		30-Sep-16		McCain, Theiling, Potter
Science Coordination Meeting						
2016N1	Science Planning Meeting	Feb. 2016		Feb. 2016		Houser, Sauer, Lowenberg, Hubbell, and Hagerty
A-Team and UMRR-CC Participation On-going						
Spatial Patterns of native mussels in the UMRS						
2016MRF1	Draft Completion report: Spatial patterns of native mussels in the UMRS	15-Sep-17				Ries, Newton, De Jager, Zigler
2016MRF2	Final completions report: Spatial patterns of native mussels in the UMRS	15-Nov-17				Ries, Newton, De Jager, Zigler
Pool 12 Overwintering HREP Adaptive Management Fisheries Response Monitoring – Pre-construction Biological Response Monitoring; Crappie Telemetry –Kehough Lake						
2016AM1	Capture fish and affix radio tags to white crappies in study lakes	1-Nov-15	1-Nov-15			Bierman, Hansen, Bowler, Theiling
2016AM2	Location of tagged fish and update in-house project database	Ongoing through FY				Bierman, Hansen, Bowler, Theiling
2016AM3	Complete tracking portion of study	30-Sep-16			Due to an uncommon and extended high water period from late December through most of January this past winter, the crappies tagged last fall were either found dead once the waters receded or were washed out of Pool 12.	Bierman, Hansen, Bowler, Theiling
2016AM4	Summary report: Analysis of tracking data and quantification of 80% UD for Stone, Tippy, and Green lakes	30-Sep-16				Bierman, Hansen, Bowler, Theiling
2016AM5	Summary report: Analysis of tracking data and quantification of 80% UD for Kehough lake	30-Sep-17				Bierman, Hansen, Bowler, Theiling

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Understanding biological shifts in the UMR due to invasion by <i>Potamogeton crispus</i>						
2016PC1	Summary letter on FY16 work	30-Sep-16		30-Sep-16		Drake, Giblin, Nissen, Kalas
2016PC2	Draft manuscript: Understanding biological shifts in the UMR due to invasion by <i>Potamogeton crispus</i>	1-Jun-17				Drake, Giblin, Nissen, Kalas
Developing and applying trajectory analysis methods for UMRR Status and Trends indicators – Year 2						
2016B14	Data assembly	30-May-16		14-Jan-16		Ickes, Minchin
2016B15	Model functional trajectory	30-Sep-16		25-Feb-16		Ickes, Minchin
2016B16	Summary letter	31-Oct-16			In lieu of summary letter a presentation will be given to the LTRM Mgt. Team	Ickes, Minchin
2016B17	Draft Manuscript	31-Oct-17				Ickes, Minchin

**Upper Mississippi River Restoration (UMRR)
Science and Monitoring Proposal Format
For FY17**

- ❖ **Proposals and detailed budgets should be submitted electronically to Karen Hagerty (karen.h.hagerty@usace.army.mil) AND Jennie Sauer (jsauer@usgs.gov).**
 - ❖ **Proposals can be a maximum of 6 pages, excluding this cover page.**
 - ❖ **Multi-year projects may be proposed, however, funding for all proposed years may not be guaranteed.**
 - ❖ **Incomplete or late applications will not be considered. No exceptions will be made.**
-

CHECK **ONE** OF THE BOXES BELOW:

- Analysis Under Base Proposal (no additional funding needed), due by **X**
 - Science in support of Restoration Proposal (requires additional funding), due by **X**
-

Title of Project: Assessing recent rates of sedimentation in the backwaters of Pools 4, 8 and 13 to support river restoration and the Habitat Needs Assessment.

Previous LTRM project:

(If this is a continuing project or builds on previous work, briefly describe previous work, including relevant tracking milestones)

In a previous LTRM study between 1997 and 2001, annual bed elevations were measured along a set of backwater transects in Pools 4, 8 and 13 of the Upper Impounded Reach of the UMRS (Rogala et al. 2004). These survey data provided basic information on rates of backwater sedimentation across a gradient of depth and among backwaters that varied in their hydraulic connectivity with channels. The results of the 1997 – 2001 study found relatively low rates of backwater sedimentation compared to most other studies. This finding could be because many of the other studies measured rates in areas of known sediment accumulation, whereas Rogala et al. distributed transects in a stratified random design to assess pool-wide sedimentation rates. Alternatively, the study period for the Rogala et al. work included an extremely high discharge year (2001) during which the scouring that occurred may have reduced net rates of sedimentation during the 5 year period included in that study. The study proposed here will use comparisons of bed elevations in 2016/17 to those observed in the 1997 – 2001 study to assess net sedimentation rates since 2001. This longer (i.e., > 15-yr) period of change will likely substantially improve our estimates of current rates of backwater sedimentation.

Name of Principal Investigator: Jim Rogala

Agency: USGS – UMESC

Telephone: 608-781-6373

E-mail address: jrogala@usgs.gov

Collaborators (Who else is involved in completing the project):

Name(s) with E-mail address(s) and agency affiliation:

Name: Lake City LTRM Field station (Pool 4) staff. Megan Moore is point of contact.

Agency: Minnesota Department of Natural Resources

Telephone: 651-345-3331 ext. 225

E-mail address: megan.moore@state.mn.us

Name: LTRM Pool 8 field station staff. John Kalas is point of contact.

Agency: Wisconsin Department of Natural Resources

Telephone: 608- 781-6365
E-mail address: jkalas@usgs.gov

Name: LTRM Pool 13 Field station staff. Dave Bierman is point of contact.
Agency: Iowa Department of Natural Resources
Telephone: 563-872-5495
E-mail address: dave.bierman@dnr.iowa.gov

Introduction/Background: *Please address all of these questions:*

What's the issue or question? What do we already know about it? Why is it important? If work involves an HREP, name it.

The fate of backwaters in the UMRS is a concern of river resource managers, as these backwaters are critical for biota associated with lentic habitats. Loss of water depth due to sedimentation is a primary concern. Backwater depth has been identified as controlling variables in the conceptual models produced as part of the ongoing UMRR resilience assessment (Bouska et al. *in prep*) and is a fundamental component of the second Habitat Needs Assessment (HNA II). Understanding the rate at which those depths are changing due to sedimentation will improve the projections of future conditions made as part of HNA II. Many backwater restoration projects contain a component to remove sediment that has accumulated since the backwaters were created (or expanded) by lock and dam construction. Ongoing sedimentation will further threaten backwater habitat, therefore information on backwater sedimentation is critical for making informed decisions on habitat rehabilitation needs (e.g., Gaugush and Wilcox 2002).

Relevance of research to UMRR: *Please address all of the following:*

Objective(s) or hypothesis;

Relevance (demonstrate scientific and/or management value);

How the project enhances on-going work;

How this work relate to needs of UMRR and river managers;

Include specific citation from specific research framework or UMRR partner vetted document addressed

We propose to improve our understanding of backwater sedimentation rates by resurveying LTRM transects previously surveyed annually from 1997 to 2002. The annual surveys provided much insight into associations between sedimentation and the predictor variables of discharge and bed elevation. Given the high annual variability in rates determined from that study, and the short period of study (four annual change increments), sedimentation over longer time periods (e.g., decadal scale) is difficult to predict. The longer 15-yr period of change that will be investigated in the proposed study will substantially improve our overall estimates of recent rates of sedimentation in backwaters of the Upper Impounded Reach of the UMR. Information derived from this project will substantially inform projections of future system conditions produced as part of HNA II, and will be useful in broader assessments of restoration needs.

The study transects are distributed across a range of backwater size and hydraulic connectivity and include a full range of water depths. This provides the opportunity to assess associations between those characteristics and sedimentation rates. A better understanding of the types of backwater areas where degradation through high rates of sedimentation are likely can improve selection and planning of restoration projects such as dredging that maintain or enhance existing deep backwater habitat. The information can also be used to estimate project longevity by applying sedimentation rates to project areas.

The proposed work address UMRR Strategic Plan (2015-2025) 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. Specifically Strategy 2 within that Objective: 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

Methods:

Detailed enough so reviewers can understand specifically what you will do. i.e., study design, field methods, and statistical analysis. You may cite an accepted protocol, if appropriate. If statistical analysis is proposed, review by Brian Gray is strongly recommended prior to submission.

This study will use the same sampling design and survey methodology used in the 1997-2002 study. The full Methods section from that report is appended. A summary of those methods is provided here:

Randomly selected locations were used to establish transects across backwaters in Pools 4, 8, and 13. A stratified design based on backwater lake size and connectivity was used to select 25 transects in each pool. Two transects were selected in each of the 6 largest backwater lakes in each pool, and 13 transects split across low and high connectivity backwater lakes.

The measurement of bed elevation along established transects is split into over-ice and open-water surveys. The measurements through the ice are performed wherever possible (i.e., aquatic and ice not froze to bottom) and open-water surveys performed at the nearshore locations. Pre-determined distances from an endpoint are used to locate survey locations along transects. Water depth is measured during over-ice surveys, and the depth converted to a bottom elevation relative to an established temporary vertical benchmark by using a level. Bed elevation is measured by leveling for open-water surveys.

Rates of sedimentation at each survey location will determined by the simple difference between bed elevations of the 2002 and the resurvey. Mean rates for various areas of interest (e.g., pool, aquatic/terrestrial, specific subareas) will be estimated using designed-based statistics. Correlation between sedimentation rates and bed elevation will be determined with mixed models similar to those used in the 1997-2002 study.

This study would use funding provided in FY17 to complete work in the fall/winter of 2016-17. Transects will be relocated and reestablished as needed and open-water nearshore surveys will be completed the fall of 2016. Over-ice surveys will be completed in the winter of 2016-17. If the results of this study are to be at all included in HNA II there is a need to adhere to this timeline.

Staff time requirements: *Analysis under base proposals only; Include hours of effort for each staff member (other proposals capture this information in budget spreadsheet)*

Special needs/considerations: *(e.g., funding needs to be received by 30 January)*

FY 2017 Budget ONLY: *For Science in Support of Restoration ONLY: use attached budget spreadsheet (tabs for each field station, UMESC, & Corps). Staffing requirements (hours of effort) should be shown on budget spreadsheet for each staff member.*

- See attached Excel spreadsheet.

FY 2017 Timeline:

- **Latest date for beginning of project: November 7, 2016. If the results of this study are to be incorporated in HNA II, the project must be started by this date.**
- Expected completion date: 12 months after receipt of funds

Expected milestones and products [with completion dates]:

For multi-year projects, please include an annual update milestone (Please note that all reports, publications, and manuscripts must go through USGS-Upper Midwest Environmental Sciences Center review.)

FY17 Milestones and products:

- Reestablishment of horizontal and vertical temporary benchmarks, and a data base for horizontal and vertical benchmarks. – November 2016
- Open-water nearshore surveys completed and a database – December 2016
- Over-ice surveys completed and a database – March 2017
- Data analysis and completion report on sedimentation rates along transects – Late FY2017

References

Bouska, K.L., J.N. Houser, and N. R. De Jager. In prep. Developing a shared understanding of the Upper Mississippi River: the foundation of a resilience assessment.

Gaugush, R. F., and D. B. Wilcox. 2002. Recommended investigations of sediment transport and deposition for predicting future configurations of Upper Mississippi River System channels and floodplain. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin, September 2002. LTRMP 2002-P001. 5 pp. + Appendix. (NTIS PB2003-101509)

Rogala, J. T., P. J. Boma, and B. R. Gray. 2003. Rates and patterns of net sedimentation in backwaters of Pools 4, 8, and 13 of the Upper Mississippi River. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. An LTRMP Web-based report available online at http://www.umesc.usgs.gov/data_library/sedimentation/documents/rates_patterns/page1.html.

UMRR Analysis Team Agenda October 26, 2016
Cape Girardeau Conservation Nature Center Auditorium
2289 County Park Dr., Cape Girardeau, MO 63701
WebEx/Call-in information:

Date: Wednesday, October 26, 2016

Time: 11 AM- 3 PM

Weblink:

[Join WebEx meeting](https://mdc.webex.com/mw3100/mywebex/default.do?service=1&main_url=%2Fmc3100%2Ffe.do%3Fsiteurl%3Dmdc%26AT%3DMI%26EventID%3D478725552%26MTID%3Dmb31b8b64630e2283baa55adb18866d72%26Host%3DQUhTSwAAAAIaIXH-r8nsJiVwsGCCD6Czblk9PJpUEwtITVleR8uUObsfIJkpgmEDIs47KLwMnLaVAiK1CfVvOvOd-7amCl0%26FrameSet%3D2&siteurl=mdc&nomenu=true)

https://mdc.webex.com/mw3100/mywebex/default.do?service=1&main_url=%2Fmc3100%2Ffe.do%3Fsiteurl%3Dmdc%26AT%3DMI%26EventID%3D478725552%26MTID%3Dmb31b8b64630e2283baa55adb18866d72%26Host%3DQUhTSwAAAAIaIXH-r8nsJiVwsGCCD6Czblk9PJpUEwtITVleR8uUObsfIJkpgmEDIs47KLwMnLaVAiK1CfVvOvOd-7amCl0%26FrameSet%3D2&siteurl=mdc&nomenu=true

Phone:

+1-855-797-9485 US Toll free

+1-415-655-0002 US Toll

Chair: Shawn Giblin, Wisconsin Department of Natural Resources

1100 -1110 AM- Introductions and Roll Call, Shawn Giblin

1110-1115 AM- Time and Place for next meeting- UMESC Jan 24th (online)

1115-1120 AM- Approval of minutes from August meeting (Group)

1120- 1135 AM- UMRR update, Marv Hubbell, USACE

1135-1205 PM- LTRM Science Update, Jeff Houser, USGS

1205-1230 PM- Long-term decreases in phosphorus and suspended solids but not nitrogen in six upper Mississippi River tributaries, 1991-2014, Becky Kreiling, USGS

1230-1300 PM- Lunch- Pizza available \$5-10- depending on group size

How Water Velocity Drives Water Quality and Habitat Outcomes Session

1300- 1325 PM- Water Quality, Rob Burdis, MN DNR

1325- 1350 PM- Vegetation, Yao Yin, USGS

1350- 1415 PM- Water Velocity Discussion

1415-1440 PM- Fish Indicators vote and discussion.

1440-1500 PM- Additional funding and associated projects discussion.

Adjourn- Open river tour commences- Dinner \$10.

ATTACHMENT E

Additional Items

- **Future Meeting Schedule** *(E-1)*
- **Frequently Used Acronyms (5/9/2016)** *(E-2 to E-7)*
- **UMRR Authorization, As Amended (1/27/15)**
(E-8 to E-11)
- **UMRR (EMP) Operating Approach (5/06)** *(E-12)*

**QUARTERLY MEETINGS
FUTURE MEETING SCHEDULE**

FEBRUARY 2017
<u>Rock Island, Illinois</u>
February 7 UMRBA Quarterly Meeting
February 8 UMRR Coordinating Committee Quarterly Meeting

MAY 2017
<u>St. Louis, Missouri</u>
May 23 UMRBA Quarterly Meeting
May 24 UMRR Coordinating Committee Quarterly Meeting

Acronyms Frequently Used on the Upper Mississippi River System

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
DEWS	Drought Early Warning System
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
HAB	Harmful Algal Bloom
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
LTRM	Long Term Resource Monitoring

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
NIDIS	National Integrated Drought Information System (NOAA)
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

OHW	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 20th 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.