

Upper Mississippi River Restoration Program Coordinating Committee

Quarterly Meeting

May 24, 2017

**Agenda
with
Background
and
Supporting Materials**

UPPER MISSISSIPPI RIVER RESTORATION PROGRAM COORDINATING COMMITTEE

May 23-24, 2017

AGENDA

Tuesday, May 23 Partner Quarterly Pre-Meetings

- 3:45 – 5:15 p.m. Corps of Engineers
- 3:45 – 5:15 p.m. Department of the Interior
- 3:45 – 5:15 p.m. States

Wednesday, May 24 UMRR Coordinating Committee Quarterly Meeting

Time	Attachment	Topic	Presenter
8:00 a.m.		Welcome and Introductions	<i>Tim Yager, USFWS</i>
8:05	A1-13	Approval of Minutes of February 8, 2017 Meeting	
8:10		Regional Management and Partnership Collaboration	<i>Marv Hubbell, USACE</i>
		<ul style="list-style-type: none"> ▪ FY 2017 Fiscal Update and Scope of Work ▪ FY 2018 Funding Outlook ▪ UMRR External Communications Strategy 	
9:00		UMRR Showcase Presentations	
		<ul style="list-style-type: none"> ▪ Ecosystem Metabolism in the UMR Open River Off-Channels ▪ Ted Shanks Habitat Project 	<i>Molly Sobotka, MO DoC</i>
			<i>Tim Eagan, USACE</i>
9:40		Ecosystem Resilience/Habitat Needs Assessment	
		<ul style="list-style-type: none"> ▪ Joint May 16-18, 2017 Meeting ▪ Progress and Findings To-Date ▪ Recommended Next Steps 	<i>Marv Hubbell and Tim Eagan, USACE; Jeff Houser and Nate De Jager, USGS; and Sara Schmuecker, USFWS</i>
10:45		Break	
11:00		Program Reports	
		<ul style="list-style-type: none"> ▪ Habitat Restoration <ul style="list-style-type: none"> – District Reports – HREP Process Improvement 	<i>District HREP Managers</i> <i>Marv Hubbell, USACE</i>
	B1-12	<ul style="list-style-type: none"> ▪ Long Term Resource Monitoring and Science <ul style="list-style-type: none"> – LTRM Highlights – USACE LTRM Update – A-Team Report 	<i>Jeff Houser, USGS</i> <i>Karen Hagerty, USACE</i> <i>Shawn Giblin, WI DNR</i>
11:20		Other Business	
	C1	<ul style="list-style-type: none"> ▪ Future Meeting Schedule 	
11:30 a.m.		Adjourn	

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

ATTACHMENT A

Minutes of the February 8, 2017
UMRR Coordinating Committee Quarterly Meeting
(A-1 to A-13)

DRAFT
Minutes of the
Upper Mississippi River Restoration Program
Coordinating Committee

February 8, 2017
Quarterly Meeting

Holiday Inn and Conference Center
Rock Island, Illinois

Don Balch of the U.S. Army Corps of Engineers called the meeting to order at 8:00 a.m. on February 8, 2017. Other UMRR Coordinating Committee representatives present were Sabrina Chandler (USFWS), Mark Gaikowski (USGS), Dan Stephenson (IL DNR), Randy Schultz (IA DNR), Kevin Stauffer (MN DNR), Matt Vitello (MO DoC), Jim Fischer (WI DNR), and Ken Westlake (USEPA). A complete list of attendees follows these minutes.

Minutes of the November 16, 2016 Meeting

Karen Hagerty said the total available funding for science projects in FY 2017 is approximately \$137,500, but it is noted as \$98,150 on page A-11 of the draft minutes of the November 16, 2016 UMRR Coordinating Committee quarterly meeting. Hagerty requested that the draft minutes be revised to reflect the actual amount. Jim Fischer moved and Randy Schultz seconded a motion to approve the draft minutes as amended. The motion carried unanimously.

Regional Management and Partnership Collaboration

FY 2017 Fiscal Report

Marv Hubbell reported that, on December 12, 2016, Congress enacted a second continuing resolution authority (CRA) for FY 2017 that expires on April 28, 2016. Hubbell explained that the Corps' obligation authority under the CRA is \$20 million, which is the least funding amount included for UMRR in either the FY 2017 President's budget or the House or Senate energy and water appropriations measure. Hubbell acknowledged that the final appropriation is unknown. Assuming it remains at \$20 million for FY 2017, the internal allocations would be as follows:

- Regional Administration and Programmatic Efforts — \$761,000
- Regional Science and Monitoring — \$6,714,000
 - Long term resource monitoring — \$4,610,000
 - Regional science in support of restoration — \$1,000,000
 - Regional science staff support — \$129,000
 - Habitat project evaluations — \$975,000
- Habitat Restoration — \$12,525,000
 - Regional project sequencing — \$150,000
 - MVP — \$4,005,700
 - MVR — \$4,363,000
 - MVS — \$4,005,700

FY 2018 President's Budget

Hubbell said the FY 2018 budget for the federal government has not yet been released. Per guidance issued on April 29, 2016, the Office of Management and Budget (OMB) requested formal budget submissions under the typical process though it would not provide a formal budget pass-back. In response to a question from Jim Fischer, Hubbell said any additional FY 2017 work plan funding depends on whether Congress includes additional discretionary funding as it has been doing the past few years. That is unknown at this point. In response to a question from Ken Westlake, Hubbell said the Corps provides spending plans at the funding levels of last fiscal year's appropriation as well as two other increments. One increment is always at UMRR's full annual authorized funding level of \$33.17 million.

2016 UMRR Report to Congress

Hubbell reported that MVD submitted the final draft 2016 UMRR Report to Congress (RTC) to Headquarters on December 23, 2016. The Office of Council requested revisions to the issues facing non-federal HREP sponsors in executing cost-share agreements. With those changes, Headquarters is scheduled to formally transmit the report to ASA(CW) on February 10, 2017. Hubbell explained that District staff did circulate a notice of the changes to the UMRR Coordinating Committee, other non-federal, and agencies and organizations that submitted a letter of support for the report.

Jim Fischer said a Wisconsin DNR legal review of the cost-share issues found that the state can in fact enter into the Corps non-federal agreements. Dating to the origins of UMRR, Wisconsin determined that the benefits of cost-sharing UMRR's habitat projects outweighed the costs.

Karen Hagerty said the full 2016 RTC and brochure are located on UMRR's website on the "Key Documents" page.

External Communications and Outreach

Hubbell reported that an *ad hoc* external communications group met via conference call on January 12, 2017 to review its objectives and brainstorm initial ideas for expanding UMRR's public outreach efforts. Group members include Angie Freyermuth and Karen Hagerty (Corps), Harland Hiemstra (Minnesota DNR), Randy Hines (UMESC), and Kirsten Mickelsen (UMRBA). On the January 12 call, participants discussed possibilities of involving representatives from USFWS, NRCS, USEPA, TNC and any other interested organizations. Potential ideas for future outreach included developing a resources folder with talking points on selected issues, a UMRR-specific web site and social media pages, and signage at HREP and field station sites. Hubbell asked that partners interested in participating in that group contact Angie Freyermuth.

Buntin said the UMRBA Board invited the state UMRR Coordinating Committee members to a February 6, 2017 meeting to discuss the Association's 2018-2023 strategic initiatives related to ecosystem health. The clear consensus is that dedicated public outreach and engagement is lacking and that a more concerted effort is needed in order to continue competing for limited resources in the federal budget. The Board directed staff to increase its resources on public communication and outreach, making it the top priority for the Association's ecosystem health work. Hubbell said the Corps has not dedicated sufficient resources to public outreach, but that it intends to ramp up funding in future years. Jim Fischer recommended that the Corps engage UMRBA staff to support UMRR-related outreach activities.

Marty Adkins asked to what extent UMRR actively communicates to the public. Hubbell said efforts are relatively mixed given the interagency staff involved and the timing – e.g., how much funding is available and what projects are being implemented and where. He said that, on average, MVP is fairly active while MVR and MVS are less so. Tom Novak said MVP staff participate in high school events and involve students in tree plantings at HREP sites on Earth Day. Adkins urged partners to think of

UMRR as part of a larger effort to make the river cleaner and healthier, noting possibilities to do joint efforts with Living Lands and Waters for example. Hubbell said the UMRR communications group is thinking through potential opportunities such as that. Karen Hagerty noted that the River Action non-profit showcased UMRR last year as the single best effort to raise the grade.

Sabrina Chandler acknowledged the need for a dedicated staff person in order to make UMRR communication and outreach successful. Chandler asked what the expectations would be for individuals serving on the UMRR communications team. She also noted the news article that incorrectly attributes the great ice fishing conditions at Stoddard Lake HREP to zebra mussels, and said UMRR needs to get out in front of those kinds of things.

Hubbell recognized the need for a more proactive approach to public outreach. Hubbell said he expects to be doing outreach like what Buntin and Adkins had suggested and anticipates being more active in the coming years, particularly now that Col. Craig Baumgartner has directed Freyermuth to spend a third of her time on UMRR outreach. Buntin said he remains convinced that UMRR needs a dedicated staff person, recognizing the payoff for other aquatic ecosystems throughout the nation that invest in outreach. Noting that the UMRR communications group has only had one call so far, Buntin encouraged the Corps to more actively pursue opportunities rather than on an *ad hoc*, inconsistent basis. Hubbell agreed and said he will coordinate with Col. Baumgartner on increasing internal resources for outreach.

Mark Gaikowski asked whether the dedicated staff person would need to be held within the Corps or could be from another agency, such as UMRBA. Hubbell said he will ask Col. Baumgartner for his recommendation on that. Fischer asked the Corps to consider funding a support services contract with UMRBA staff.

In response to a suggestion from Fischer for agencies to coordinate on social media, Chandler recognized Sharonne Baylor for generating great public attention to the Refuge's Facebook sites that are reaching people beyond immediate followers. Fischer agreed and expressed appreciation for Baylor's work. He pointed out that the federal and state agencies can repost each other's Facebook statuses and link to one another. Hagerty said the Corps explored having a dedicated UMRR Facebook page, but leadership decided that posts about programs and projects should all come from the District's Facebook. Kara Mitvalsky emphasized the value of social media in reaching the public in fun, quick, and accessible ways. Mitvalsky said the USFWS' pages are great examples, and encouraged the rest of the partnership to engage in similar ways.

Fischer also suggested having ambassadors at boat landings that can explain generally about the ecosystem and what UMRR is doing to improve it and learn more about it. Fischer said ambassadors could be given business card with general information to hand out.

UMRR Showcase Presentations

Keithsburg Habitat Project

Ron Knopik provided a brief historical overview of the 1,600-acre Keithsburg area located in Pool 18. Land use dominated by logging and agriculture in the 1800s, the Keithsburg drainage district formed in 1906 and constructed the levee that surrounds the project site and allowed for farming. The Corps purchased the site in 1941 and then transferred management authority to the USFWS in 1945. The Service then established it as a Refuge in 1958 and has been primarily managed for migratory waterfowl, threatened and endangered species, and wetlands. Some farming remained on the site until 1984 and water control structures were added in the 1960s and 1970s. The 1993 flood cause a large break in the south levee that allows for some connectivity. However, water level management capability remains limited. Tributary rivers exist just north and south of the Port Louisa Refuge.

In a 2009 workshop for the Keithsburg Division project, Knopik said participants utilized many data sources to use in resource issue identification and project planning, as well as information needs. This includes an HGM assessment, contaminant assessment, USFWS water resource inventory and assessment, water quality sampling, wildlife surveys, forest inventories, and fisheries sampling. Knopik explained that vegetation is a primary resource issue at Keithsburg, with large blooms of blue-green algae and duckweed stemming from high inputs of nutrients from the northern portion of the project area. And, declines in forest area began in 1995 and continue today. Knopik said water management capability is needed to provide more natural water regimes, including helping to ensure that drawdowns can be effectively implemented when relatively minor to modest late summer flood events occur. The objective would be to manage for periodic drying periods, with alternating flooding over seasons and years. He mentioned that the closest USFWS office is 45 minutes from the project site and therefore management capabilities should be kept in mind as project features are considered. For example, a fuel pumping every day would not be feasible.

Knopik also described the ecological issues at the site due to loss of acreage and diversity of native floodplain forest. The habitat project aims to restore and enhance the age, composition, structure, and diversity of the floodplain forest on the site, also improving connectivity among forest patches systemically.

Kara Mitvalsky explained that constraints to project planning have included real estate, water levels required for the 9-foot navigation channel, program authority, environmental laws and regulations, and levees for flood control. There are two primary goals for the Keithsburg habitat project. One, increase quantity and quality of off-channel aquatic and wetland habitat by restoring mudflat and shallow water habitat for shorebird use as well as submerged and emergent vegetation for migratory waterfowl. This will be achieved by enhancing water level management capabilities, deepening backwater channels, rehabilitating the existing levee and spillways and, planting various native wetland species. Two, restore floodplain forest habitat to increase hardwood, mast-producing trees, improve the year-round scrub-shrub plant community, and improve the year-round bottomland hardwood habitat. Project features associated with this goal include enhancing water control capabilities, planting trees, and improving the existing timber stand health.

Mitvalsky explained that the trick is figuring out how to best manage the water levels to produce the desired ecological outcomes. She provided an overview of the various project features and alternatives considered. Knopik summarized the synthesis of various bird monitoring information to illustrate that dabblers, divers, and shorebirds visit the Keithsburg site at different times throughout the year. Therefore, optimal water levels can be adjusted to maximize the overall benefits to waterfowl to accommodate their specific needs. The timing and duration at which the water level is held are also important considerations for managing for the floodplain forest plant species. Mitvalsky visually illustrated through a graph how the enhanced water level management capabilities will allow for achieve success in providing the habitat requirements for dabblers, divers, and vegetation.

Mitvalsky described the suite of features recommended in the Keithsburg habitat project's draft tentatively selected plan. Sabrina Chandler reflected on how the Corps and USFWS are integrating lessons learned from other projects to inform the design of Keithsburg. Chandler noted that Trempealeau habitat project involved a water control structure that costs about \$20,000 per year to maintain, not including the electricity expenses. In response to a question from Jim Fischer, Chandler explained that electric-powered water control structures would have an average cost of about \$7,000 annually. Fuel-powered pumps are about equal in annual costs because of additional labor required. Chandler observed that the annuals cost of Keithsburg would be significantly lower than Trempealeau because of smaller pump size and design.

Mitvalsky said the next step in the project development is to undergo an independent review (i.e., value engineering study) that examines ways to reduce costs, increase efficiencies, and add benefits. Pending

sponsor confirmation on the tentatively selected plan, Mitvalsky said construction is likely to be in 2020. Chandler noted that land acquisition is a critical component of the project that is remaining to be resolved, but expressed optimism that it will work out. In response to a question from Randy Shultz, Mitvalsky explained that Illinois and Iowa did share fisheries monitoring information. The interagency planning team did explore options for an overwintering fish habitat feature but it was determined to not be feasible because it would require piercing the clay levee.

In response to a question from Ken Westlake, Hubbell said the Keithsburg project does not include a pool-scale drawdown but it is something that the Corps could explore as a feature. Chandler expressed support for that idea. In response to a question from Dan Stephenson, Mitvalsky said the project area the public can get into the areas within the embankment but there is no access to the river for fishing. Mitvalsky said the Corps and USFWS hosted a public meeting early in the planning process that received very positive engagement and feedback.

Simulating SAV Occurrence at the HREP Scale

Yao Yin presented on the development of a new model to predict the occurrence of submersed aquatic vegetation at the HREP scale. When tested against sampling results, it was found that the “old” model for predicting submerged aquatic vegetation (SAV) was consistently underestimating the actual presence. This is mostly because the model did not adequately account for connectivity. Yin illustrated this effect through a series of maps and charts comparing the predicted and actual values.

Yin explained that a new model was developed for the Stoddard Bay habitat project, having localized parameters set within the immediate and adjacent pseudo-control area rather than the entire pool. In addition, the new model modified local turbidity by flow velocity. In a trial attempt, the connectivity indicator including both velocity and travel distance showed some promise but ultimately did not work effectively. Yin explained the model development over a series of iterations. This included running the model with a dummy variable; turbidity only; turbidity and depth; turbidity and velocity; and turbidity, velocity, and turbidity*depth*velocity. The latter showed the greatest associated statistical significance.

Yin said the new model provides important insights about the predicted effects of the proposed design of Sturgeon Lake habitat project in Pool 3. This includes that the two of the four proposed sites would generate significant enhancements in vegetation, while the smallest island would not create a significant response. The southernmost island is predicated to have a less significant initial response due to residual flow velocity, while it may have substantial responses over a longer term. If a faster response or higher degree of confidence is desired, Yin suggested that the project design is modified to further reduce flow velocity behind the southernmost island.

In response to a question from Mike Griffin about how the model accounts for vegetation associated with different velocities, Yin explained that velocity is less of a determining factor of vegetation species further north where there is less turbidity. Velocity becomes a greater factor where there is more turbidity. In response to a question from Monique Savage, Hubbell said this model was developed with the intent that it be useable by all three Districts.

Long Term Resource Monitoring and Science

FY 2016 2nd Quarter Highlights

Jeff Houser reported that accomplishments of the first quarter of FY 2017 include publications of five manuscripts:

- Changes in aquatic vegetation and floodplain land cover in the Upper Mississippi and Illinois Rivers

- Development and assessment of a new method for combining catch-per-unit effort data from different sampling gears: multi-gear mean standardization (MGMS)
- Fish associations among un-notched, notched, and L-head dikes in the Middle Mississippi River
- Mesohabitat associations in the Mississippi River Basin: a long term study on the catch rates and physical habitat associations of juvenile silver carp and two native planktivores
- Population trends and a distributional record of selected fish species from the Illinois River

In response to a question from Marty Adkins, Houser and Dave Bierman said there is not sufficient information about the fish communities in the tributaries to make conclusions about whether these same findings would be true there. However, given that the tributaries face some of the same fundamental environmental challenges (e.g., nutrients), there could very likely be some connections.

FY 2017 Science Proposals

Karen Hagerty reported that the FY 2017 allocation to LTRM is \$5.61 million, with \$4.61 million for base monitoring and \$1 million for science research and analysis in support of restoration and management. FY 2016 carry-over funds of \$232,044 and pass through adjustment of \$318 make the total available funding for LTRM in FY 2017 \$5.842 million. Hagerty recalled that the UMRM Coordinating Committee agreed to spend \$36,706 to fund a backwaters sediment proposal, leaving \$149,490 available for additional research and analysis.

Hagerty reported that, at its January 9, 2017 meeting, the A-Team reviewed six proposals for the available funding and selected four proposals to recommend to the UMRM Coordinating Committee for its consideration. Background information on the four recommended proposals is provided on pages C-11 to C-30 of the agenda packet.

Houser reviewed the objectives of the four science proposals and their potential management objectives. They include:

- 1) Estimating backwater sedimentation resulting from alluvial fan formation
- 2) Advancing understanding of habitat requirements for fish assemblages using multi-species models
- 3) Investigating metabolism, nutrient processing, and fish communities in floodplain water bodies of the Middle Mississippi River
- 4) Mapping the thermal landscape of the Upper Mississippi River

Jim Fischer said Wisconsin DNR did an internal review of the four proposals and concluded that they each attempt to address important management questions. Kevin Stauffer indicated that Minnesota DNR staff reviewed the proposals and is supportive of the four recommended. In response to a question from Matt Vitello, Hagerty explained that the other two research proposals had outstanding questions and were not ripe for funding at this point. They may be candidates in future years. Sabrina Chandler said USFWS would like to see the mussel habitat research move forward and will assist in developing that proposal for future consideration.

Marty Adkins said he would like to be able to share these findings to NRCS' internal technical experts. Houser said NRCS staff could become more involved in the A-Team discussions and also extended an offer to visit various NRCS offices to talk through the research being done through UMRM. Kirsten Mickelsen mentioned that the 2015-2025 UMRM Strategic Plan explicitly calls for enhanced communications of increased knowledge to the agencies and individuals whose management in the watershed may affect the health and resilience of the main stem ecosystem. Mickelsen suggested that this would be an appropriate task for the UMRM communications team.

In response to a question from Bryan Hopkins, Houser explained that UMRR published a research paper several years ago that quantified the effects of UMRR restored backwaters on sequestration, making several broad assumptions. The research found that denitrification in backwaters was detectable but modest.

Hagerty mentioned that the UMR Research Consortium held annually in La Crosse is a great opportunity to exchange information among resource practitioners.

In response to a question from Don Balch, the UMRR Coordinating Committee endorsed the four research proposals.

A-Team Report

Shawn Giblin reported that the A-Team's January 9, 2017 meeting focused mostly on the four research proposals (as discussed above) as well as two new potential fish indicators to evaluate ecological health. Giblin explained that, after considerable debate, the A-Team is recommending that migratory and backwater fish assemblages replace the suite of individual fish species as indicators of ecological health. An executive summary of a manuscript explaining these two new fish indicators are included on pages C-31 to C-32 of the agenda packet.

Hagerty clarified that this effort to explore new indicators is a product of a 2013 A-Team recommendation to create indicators that were more comprehensive of ecological health for future status and trends analyses. Marv Hubbell mentioned that the larger goal of focusing more broadly on ecosystem health and resilience is a direct result of the 2015-2025 UMRR Strategic Plan. Hubbell explained that these indicators are meant to directly connect the LTRM base monitoring information to habitat restoration and management.

Tim Yager asked whether fish indicators associated with lentic and lotic habitats would be included, recognizing that many UMRR habitat projects are creating new lentic areas and would inform their success. Giblin explained that the new fish indicators would replace most single species indicators but that future iterations could explore incorporating certain species for that purpose. Sabrina Chandler expressed support for Yager's comment. Chandler moved and Jim Fischer seconded a motion to endorse the new migratory and backwater fish indicators with the understanding that lotic and lentic indicators will be incorporated in the future. The motion was approved by the Committee.

Hubbell recognized that the next UMRS status and trends analysis is scheduled to be developed soon and suggested that the lotic and lentic indicators question be addressed soon. Giblin said he will pose that question to the A-Team at its next meeting.

Habitat Restoration

UMRR Six Year Plan

Marv Hubbell discussed the Corps' scheduled six-year plan, using the following chart to show the anticipated work flow of various habitat projects:



Hubbell emphasized the importance of maintaining flexibility in making adjustments to the schedule in order to effectively manage risk. In response to a question from Mike Griffin, Hubbell explained that the Corps would follow the guidelines outlined in the 2012 UMRR/NESP Transition Plan should such a transition occur.

Project Partnership Agreements

Hubbell reported that the Water Infrastructure Investment for the Nation (WIIN) Act of 2016 (P.L. 114-322) was signed into law by President Barack Obama on December 16, 2016. Section 1161 of the Act caps non-federal sponsors' OMRR&R obligations to 10 years following the Corps' determination that the project's physical features are functioning as intended. This decision process would be integrated into adaptive management evaluations of individual projects.

District Reports

St. Paul District

Tom Novak reported that MVP is accelerating construction of Conway Lake with an anticipated close-out this fiscal year. The District's next construction priorities include McGregor Lake followed by Pool 10 Islands and then Peterson Lake. Novak mentioned that the project partnership agreement issues stopped the implementation of North and Sturgeon Lakes. Kevin Stauffer expressed appreciation to Novak for his effort to make that project work via number of avenues. Hubbell credited Novak for the efficient execution of Conway Lake planning so that it could be ready for construction.

St. Louis District

Tim Eagan reported that MVS is finalizing draft plans and specs for Rip Rap Landing. Eagan said Division staff have been extremely helpful in streamlining progress for that project and increasing coordination to move through feasibility planning much faster. MVS will be increasing its focus on restoration opportunities in the open river reach, with a kick-off event and site visit to Oakwood Bottoms this summer. Eagan reported that, while still in design, MVS is developing the O&M manual for

Ted Shanks so that it can be closed out more readily following construction. The District will be employing OMRR&R inspections for all constructed projects within its respective boundaries this summer, capturing any lessons learned regarding how project features are working and how they are being maintained.

Rock Island District

Hubbell announced that MVR is planning ribbon-cutting ceremonies for Lake Odessa Stage I and Rice Lake this spring. The District is also continuing planning work on Beaver Island, Keithsburg, and DeLair habitat projects. Construction of Pool 12 remains on schedule, with a construction contract recently awarded for Stage II that includes an option for advancing Stage III. Hubbell said that District staff are considering ways to complete O&M manuals more readily so that maintenance information is provided as soon as possible following construction. For example, the Corps is considering developing the manuals for each project stage that can be handed over to the sponsor independent of progress on subsequent stages.

Ecosystem Resilience

Jeff Houser provided a brief overview of the first major stage in the UMRS ecological resilience assessment effort, which is to describe the river ecosystem's fundamental characteristics in a simplified way. A draft manuscript is provided on pages D-1 to D-36 of the agenda packet that details the "agreed upon" system description – the fundamental characteristics of the system. This includes valued uses and ecosystem services, major ecological resources needed to support those uses and services, and major controlling variables that affect those major resources. It characterizes the river ecosystem in three major subcategories: lentic areas, lotic channels, and floodplains. The manuscript reflects both substantial discussion among the interagency partners about how it views the primary components of the river ecosystem as well as a synthesis of significant existing research and analysis.

Houser explained the meanings of general and specified resilience and how that relates to the UMRS ecosystem. The primary principles for enhancing general resilience are maintaining diversity and redundancy, managing connectivity, and managing and accounting for slow variables and feedbacks, such as sedimentation, catchment land use, and climate. Specified resilience evaluates the relationship between the major resources and controlling variables to known and potential thresholds.

Houser said the next steps include 1) developing metrics for assessing the UMRS ecosystem's general resilience and 2) assessing the ecosystem's specified resilience in the context of conceptual models. In FYs 2017 and 2018, Houser anticipates publishing a series of manuscripts that describe the system characteristics, the ecosystem's general resilience using existing data, the ecosystem's specified resilience using a set of selected indicators, and synthesizing management implications.

Houser reported that a joint meeting of the ecosystem resilience and habitat needs assessment teams is being planned for April 2017. [Note: Subsequent to the meeting, partners agreed to hold the joint meeting on May 16-18, 2017 in the Quad Cities.]

Habitat Needs Assessment II

Eagan described the planned schedule for developing the HNA II. He reported that the Steering Committee held conference calls on December 5 and 20, 2016 to discuss system-wide data development and the use of a worksheet to obtain input from restoration practitioners regarding habitat objectives. Eagan explained how the HNA will build from the ecological resilience conceptual models and information, using the determined relationships as a basis for making assessments of existing conditions including identifying stressors and desired states. The tri-chairs (Eagan, Sara Schmucker, and Nate De Jager) are coordinating with the District-based river resource teams.

Eagan anticipates that the HNA II development process will be similar to the 2000 HNA, where subject matter experts and resource managers reviewed the quantitative physical and chemical attributes of the ecosystem and floodplain reach objectives to assess existing conditions. According to Eagan, the resulting questions will be 1) do we want more or less of certain habitats (using the 2010 data layer) and 2) how do these wants mesh with the future projections.

In response to a question from Ken Westlake, Nate De Jager said there has not yet been a decision regarding at what timeframe to base future desired conditions. De Jager observed that a decadal basis associated with the land cover/land use data acquisition may make the most sense. In response to a question from Jim Fischer, De Jager said LTRM has a lot of data for defining chemical parameters, which may include things like overwintering and late summer conditions and low water aquatic areas using land cover data.

Eagan outlined the major milestones of the anticipated HNA II development schedule as follows:

- HNA II steering committee and ecological resilience team discuss the a habitat objectives questionnaire in April 2017
- Presentation of key pool data and methods and discussion of non-key pool data development at the UMRR Coordinating Committee's May 24, 2017 quarterly meeting
- Presentation of system-wide data and discussion of the qualitative assessment at the UMRR Coordinating Committee's August 9, 2017 quarterly meeting
- In-person meeting of the HNA steering committee to initiate the qualitative assessment and needs of the ecosystem
- Development of a system-wide data geo-database, assessment of the UMRS ecosystem habitat needs, and identification of other information needs in November 2017
- Draft HNA II report in February 2018
- Final HNA II report in March 2018

Other Business

Wisconsin DNR Realignment

Jim Fischer reported that Wisconsin DNR recently underwent a major realignment. The agency's Mississippi River programs and projects are now in a new Office of Great Waters, which also includes Great Lakes efforts. Fischer observed that the more inclusive office should bring wider attention to the Mississippi River within the state.

Future Meetings

The upcoming quarterly meetings are as follows:

- **May 2017 — St. Louis**
 - UMRBA quarterly meeting —May 23
 - **UMRR Coordinating Committee quarterly meeting — May 24**
- **August 2017 — Onalaska/UMESC**
 - UMRBA quarterly meeting —August 8
 - **UMRR Coordinating Committee quarterly meeting — August 9**

- **November 2017 — Twin Cities**
 - UMRBA quarterly meeting — November 7
 - **UMRR Coordinating Committee quarterly meeting — November 8**

With no further business, the meeting adjourned at 12:27 p.m.

**UMRR Coordinating Committee Attendance List
February 8, 2017**

UMRR Coordinating Committee Members

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

Others In Attendance

Thatch Shepard	U.S. Army Corps of Engineers, MVD
Gabe Harris	U.S. Army Corps of Engineers, MVD
Tom Novak	U.S. Army Corps of Engineers, MVP
Shahin Khazrajafari	U.S. Army Corps of Engineers, MVP
Andy Barnes	U.S. Army Corps of Engineers, MVR
Mark Cornish	U.S. Army Corps of Engineers, MVR
Rebecca Costello	U.S. Army Corps of Engineers, MVR
Michael Dougherty	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
Davi Michl	U.S. Army Corps of Engineers, MVR
Kara Mitvalsky	U.S. Army Corps of Engineers, MVR
Jim Ross	U.S. Army Corps of Engineers, MVR
Marshall Plumley	U.S. Army Corps of Engineers, MVR
Heather Schroeder	U.S. Army Corps of Engineers, MVR
Jackie Veninger	U.S. Army Corps of Engineers, MVR
Brian Johnson	U.S. Army Corps of Engineers, MVS
Tim Eagan	U.S. Army Corps of Engineers, MVS
Monique Savage	U.S. Army Corps of Engineers, MVS
Deanne Strausser	U.S. Army Corps of Engineers, MVS
Ron Knopik	U.S. Fish and Wildlife Service, UMR Refuges
Kraig McPeck	U.S. Fish and Wildlife Service, RIFO
Sara Schmuecker	U.S. Fish and Wildlife Service, RIFO
Tim Yager	U.S. Fish and Wildlife Service, UMR Refuges
Scott Morlock	U.S. Geological Survey, Midwest Region
Victoria Christensen	U.S. Geological Survey, Minnesota Water Science Center
Jeff Ziegeweid	U.S. Geological Survey, Minnesota Water Science Center
Amy Beussink	U.S. Geological Survey, Missouri Water Science Center
Jim Stefanor	U.S. Geological Survey, Southwest Region
Nate De Jager	U.S. Geological Survey, UMESC [On the phone]
Jeff Houser	U.S. Geological Survey, UMESC
Jennie Sauer	U.S. Geological Survey, UMESC
Yao Yin	U.S. Geological Survey, UMESC
Kyle Bales	Iowa Department of Natural Resources
Dave Bierman	Iowa Department of Natural Resources
Mike Griffin	Iowa Department of Natural Resources

Megan Moore	Minnesota Department of Natural Resources
Robert Stout	Missouri Department of Natural Resources
Bryan Hopkins	Missouri Department of Natural Resources
John Petty	Wisconsin Department of Agriculture, Trade and Consumer Protections
Steve Galarneau	Wisconsin Department of Natural Resources
Shawn Giblin	Wisconsin Department of Natural Resources [On the phone]
Olivia Dorothy	American Rivers
Tom Boland	AMEC Foster Wheeler
Brad Walker	Missouri Coalition for the Environment
Gretchen Benjamin	The Nature Conservancy
Kristian Starner	Upper Mississippi, Illinois, and Missouri Rivers Association
Dru Buntin	Upper Mississippi River Basin Association
Dave Hokanson	Upper Mississippi River Basin Association
Kirsten Mickelsen	Upper Mississippi River Basin Association

ATTACHMENT B

Long Term Resource Monitoring and Science

- **FY 2014 UMRR Science Activities in Support of Restoration and Management (4/2017) (B-1)**
- **FY 2015 UMRR Science Activities in Support of Restoration and Management (4/2017) (B-2)**
- **Base Monitoring Scope of Work thru 2nd Quarter of FY 2017 (5/8/2017) (B-3 to B-6)**
- **FY 2017 UMRR Science Activities in Support of Restoration and Management (5/8/2017) (B-7 to B-12)**

UMRR Science in Support of Restoration and Management
FY2014 Scope of Work
April 2017 Status

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Seamless Elevation Data						
2015LB9	Lidar (Tier 2) processing for Pool 1, 2, and Lockport	31-Dec-15		31-Dec-16	no cost acquisition of new LiDAR	Dieck, Hanson
2015LB10	Seamless Elevation processing for Pool 2 and 19	31-Dec-15		31-Dec-16	resolved data quality issues (Pool 19)	Dieck, Hanson
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
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-Sep-17		Working With UWL staff. Analysis partially complete.	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 competed	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		13-Mar-17	accepted by Journal fo Freshwater Ecology	Giblin, Ickes, Langrehr, Bartels
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	17-Nov-16	submitted to Environmental Biology of Fishes	Phelps, McCain

UMRR Science in Support of Restoration and Management
FY2015 Scope of Work
April 2017 Status

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
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
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	16-Dec-16	all requested changes were made	Anderson, Casper, McCain
2015FI5	Final draft Project Report submitted to UMRR CC for endorsement at FEBRUARY meeting	15-Jul-16	15-Jan-17	15-Jan-17	on schedule	Anderson, Casper, McCain
2015FI6	Final Report	1-Jun-16	28-Feb-17	13-Apr-17	INHS report http://hdl.handle.net/2142/95874	Anderson, Casper, McCain
Plankton community dynamics in Lake Pepin						
2015LPP1	Phytoplankton processing; species composition, biovolume	30-Dec-15		22-Oct-15		Burdiss
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	Burdiss
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	27-Dec-16		Gray, Schlifer
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	3-Jun-17		Resolving model discrepancy took longer than anticipated. Needs extension of summary deadline	Yin, Rogala, Ingvalson

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Aquatic Vegetation Component						
2017A1	Complete data entry and QA/QC of 2016 data; 1250 observations.					
	a. Data entry completed and submission of data to USGS	30-Nov-16		30-Nov-16		Lund, Drake, Bales
	b. Data loaded on level 2 browsers	15-Dec-16		15-Dec-16		Schlifer
	c. QA/QC scripts run and data corrections sent to Field Stations	28-Dec-16		28-Dec-16		Sauer, Schlifer
	d. Field Station QA/QC with corrections to USGS	15-Jan-17		15-Jan-17		Lund, Drake, Bales
	e. Corrections made and data moved to public Web Browser	30-Jan-17		30-Jan-17		Yin, Sauer, Schlifer, Caucutt
2017A2	Web-based: Creating surface distribution maps for aquatic plant species in Pools 4, 8, and 13; 2016 data	31-Jul-17				Yin, Rogala, Schlifer
2017A3	Wisconsin DNR annual summary report 2016 that combines current year observations from LTRM with previous years' data, for the fish, aquatic vegetation, and water quality components.	30-Sep-17				Drake, Bartels, Hoff, Kalas
2017A4	Complete aquatic vegetation sampling for Pools 4, 8, and 13 (Table 1)	31-Aug-17				Yin, Lund, Drake, Bales
2017A5	Pool 4: Graphical summary and maps of aquatic vegetation current status and long-term trends.	30-Dec-16		21-Oct-16		Lund
2017A6	Pool 8: Graphical summary and maps of aquatic vegetation current status and long-term trends.	30-Dec-16		19-Sep-16		Drake, Weeks
Intended for distribution						
LTRM Technical Report: Ecological Assessment of High Quality UMRS Floodplain Forests (2007APE12; Chick, Guyon, Battaglia) (in final edits with author)						
LTRM Technical Report; Experimental and Comparative Approaches to Determine Factors Supporting or Limiting Submersed Aquatic Vegetation in the Illinois River and its Backwaters (2008APE5, Sass) (in USGS review)						
LTRM completion report: FY05-07 data--Analysis and support of aquatic vegetation sampling data in Pools 6, 9, 18, and 19 (2008APE4a; Yin) (in USGS review)						
Manuscript: Have the recent increases in aquatic vegetation in Pools 5 and 8 been the result of water level management drawdowns, HREPs, or natural fluctuations? (2009APE1a; Yin) (in USGS review)						
Manuscript: A statistical model of species occupancy using the LTRM aquatic vegetation data (2013A7; Yin) (in USGS review)						
Fisheries Component						
2017B1	Complete data entry, QA/QC of 2016 fish data; ~1,590 observations					
	a. Data entry completed and submission of data to USGS	31-Jan-17		31-Jan-17		DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Maxson
	b. Data loaded on level 2 browsers; QA/QC scripts run and data corrections sent to Field Stations	15-Feb-17		15-Feb-17		Ickes, Schlifer
	c. Field Station QA/QC with corrections to USGS	15-Mar-17		15-Mar-17		DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Maxson
	d. Corrections made and data moved to public Web Browser	30-Mar-17		30-Mar-17		
2017B2	Update Graphical Browser with 2016 data on Public Web Server.	31-May-17				Ickes, Sauer, and Schlifer
2017B3	Complete fisheries sampling for Pools 4, 8, 13, 26, the Open River Reach, and La Grange Pool (Table 1)	31-Oct-17				Ickes, Sauer, DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Maxson, Schlifer
2017B4	Summary Letter: Floodplain fisheries sampling	31-Oct-17				Ickes, DeLain, Bartels, Bowler, Ratcliff, Gittinger, West, Solomon, Maxson
2017B5	IDNR Fisheries Management State Report: Fisheries Monitoring in Pool 13, Upper Mississippi River, 2016	30-Jun-17				West, Sobotka

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
2017B6	Sample collection, database increment, Summary letter on Asian carp age and growth: collection of cleithral bones	31-Jan-17		10-Jan-17		Solomon, Maxson, Casper
2017B7	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-17		10-Jan-17		Solomon, Maxson, Casper
2017B8(D)	Database increment: Stratified random day electrofishing samples collected in Pools 9–11	30-Sep-17				Bowler
2017B9(D)	Database increment: Stratified random day electrofishing samples collected in Pools 16–18	30-Sep-17				Bowler
2017B10	Summary Letter: Open River Chevron Dike monitoring	31-Oct-17				West
2017B11	Summary Letter: Evaluating the Fish Community in a rare Backwater Habitat in the Middle Mississippi River 2017	30-Sep-17				West
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)						
Manuscript: Population Trends and a Distributional Record of Selected Fish Species from the Illinois River; Levi E. Solomon, Richard M. Pendleton, Robert A. Hrabik, and Andrew F. Casper Completed: Transactions of the Illinois State Academy of Science (2016) Volume 109, pp. 57-61						
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						
2017D1	Complete calendar year 2016 fixed-site and SRS water quality sampling	31-Dec-16		31-Dec-16		Jankowski, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2017D2	Complete laboratory sample analysis of 2016 fixed site and SRS data; Laboratory data loaded to Oracle data base.	15-Mar-17		15-Mar-17		Yuan, Schlifer
2017D3	1st Quarter of laboratory sample analysis (~12,600)	30-Dec-16		30-Dec-16		Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Cook, Sobotka
2017D4	2nd Quarter of laboratory sample analysis (~12,600)	30-Mar-17		30-Mar-17		Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2017D5	3rd Quarter of laboratory sample analysis (~12,600)	29-Jun-17				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2017D6	4th Quarter of laboratory sample analysis (~12,600)	28-Sep-17				Yuan, Manier, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
2017D7	Complete QA/QC of calendar year 2016 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-17		1-Mar-17		Schlifer, Rogala, Jankowski
	b. Field Station QA/QC; USGS QA/QC.	15-Apr-17		23-Mar-17		Jankowski, Rogala, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
	c. Corrections made and data moved to public Web Browser	30-Apr-17		27-Mar-17		Rogala, Schlifer, Jankowski
2017D8	Complete FY2017 fixed site and SRS sampling for Pools 4, 8, 13, 26, Open River Reach, and La Grange Pool	30-Sep-17				Jankowski, Burdis, Kalas, Kueter, L. Gittinger, Kellerhals, Sobotka
2017D9	WEB-based annual Water Quality Component Update w/ 2016 data on Server.	30-May-17				Rogala
2017D10	Final LTRM Completion report: Evaluation of water quality data from automated sampling platforms	30-Sep-17				Soeken-Gittinger,Lubinski, Chick, Houser
2015D11	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-17				Kalas, Hoff, Bartel, Drake
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) (in USGS review)						
LTRM report: Main channel/side channel report for the Open River Reach. (2005D7; Hrabik) (replaced with Sobotka, M. J. and Q. E. Phelps. 2016. A Comparison of Main and Side Channel Physical and Water Quality Metrics and Habitat Complexity in the Middle Mississippi River)						
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) (Freshwater Science. 2016. 35(2):457–473. DOI: 10.1086/686171)						
Completion report, compilation of 3 years of sampling: Water Quality (2009R1WQ; Giblin, Burdis) (in USGS review)						
Manuscript: Trends in suspended solids, nitrogen, and phosphorus in select upper Mississippi River tributaries, 1991-2011 (Kreiling and Houser, 2013D14) (Environ Monit Assess. 188: 454. doi:10.1007/s10661-016-5464-3)						
Manuscript: Relationship between the temporal and spatial distribution, abundance, and composition of zooplankton taxa and hydrological and limnological variables in Lake Pepin (2013D17; Burdis) (ready for submission to Journal)						
Manuscript: Nutrients and dissolved oxygen in the UMRS: improving our understanding of winter conditions and their implications for structure and function of the river (2014D12; Houser) (in USGS review)						
Land Cover/Land Use with GIS Support						
2017LC1	Maintenance ArcGIS server	30-Sep-17				Hlavacek, Fox, Rohweder
2017LC2	Aerial Photo scanning	30-Sep-17				Ruhser
2017LC3	USNVC Database Table	30-Sep-17				Hop
2017LC4	Updates on progress for land cover products listed.	New progress reported in the quarterly activities. Percent complete updated 30 Sept 2017.				Robinson
Data Management						
2017M1	Update vegetation, fisheries, and water quality component field data entry and correction applications.	30-May-17				Schlifer
2017M2	Load 2016 component sampling data into Oracle tables and make data available on Level 2 browsers for field stations to QA/QC.	30-Jun-17				Schlifer

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Quarterly Activities						
2017QR1	Submittal of quarterly activities	30-Jan-17		30-Jan-17		All LTRM staff
2017QR2	Submittal of quarterly activities	13-Apr-17		13-Apr-17		All LTRM staff
2017QR3	Submittal of quarterly activities	13-Jul-17				All LTRM staff
2017QR4	Submittal of quarterly activities	12-Oct-17				All LTRM staff
Equipment Inventory						
2017ER1	Property inventory and tracking	15-Nov-17				LTRM staff as needed

Upper Mississippi River Restoration
LTRM Science in Support of Restoration and Management
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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						
2017R1	Updates provided at quarterly UMRR CC meeting and A team meetings	Various				Bouska, Houser
2017R2	Submit following manuscript for publication: Bouska, K.B., J.N. Houser,	30-May-17				Bouska, Houser, De Jager
2017R3	Draft General Resilience of the UMRS manuscript to RWG for review	15-Sep-17				Bouska, Houser
Modelling and mapping current and projected future habitats of the Upper Mississippi River System (HNA-II)						
Aquatic Habitats						
2017AH1	Develop general classification for 2010 and refit 1989-- Key Pools completed	30-Jan-17		21-Sep-16		Janis Rusher
2017AH2	Develop general classification for 2010 and refit 1989-- Rest of system	30-Jul-17				Janis Rusher
2017AH3	Develop enhanced lentic areas--Add Connectivity and depth of backwaters to aquatic areas for Key Pools	30-Jan-17	30-Jun-17		Draft completed for Pools 4, 8, and 13. New target date allows input from managers following HNA/Resilience Meeting	Jim Rogala
2017AH4	Develop enhanced lentic areas--Add Connectivity and depth of side channels, structured MCB to aquatic areas for rest of system	30-Aug-17				Jim Rogala
2017AH5	Develop enhanced lotic areas--Add Connectivity and depth of side channels, structured MCB to aquatic areas for Key Pools	30-Jan-17	30-May-17		Scripts/tools have been developed to enhance lotic polygons. Meeting with partners 4/20 to finalize list of metrics to calculate. Once this is done will run tools for each key pool.	Jason Rohweder
2017AH6	Develop enhanced lotic areas--Add Connectivity and depth of side channels, structured MCB to aquatic areas for rest of system	30-Aug-17				Jason Rohweder
2017AH7	Conduct ecological assessment of enhanced aquatic areas--conduct analyses in Key Pools	30-Mar-17	TBD		Lead author has taken a new job with the ACOE in St. Louis. Discussions under way to determine next lead(s)	Allison Anderson, Kristen Bouska, Jeff Houser, Alicia Weeks
2017AH8	Conduct ecological assessment of enhanced aquatic areas--complete draft report	30-Sep-17				Allison Anderson, Kristen Bouska, Jeff Houser, Alicia Weeks
2017AH9	Apply ecological relationships to entire system and incorporate into geodatabase	30-Sep-17				Tim Fox
Modelling future aquatic habitats						
2017FAH1	Develop Model in Key Pools	30-Mar-17	30-Jul-17		Sedimentation data has been analyzed and methods to determine general associations with backwater characteristics are being developed	Jim Rogala
2017FAH2	Apply Model to entire system	30-Aug-17				Jim Rogala
2017FAH3	Draft report	30-Sep-17				Jim Rogala

Upper Mississippi River Restoration
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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Floodplain Habitats						
2017FH1	Develop water surface profiles and flood inundation models for the UMRS	30-Jan-17	30-Jun-17		In progress; delayed due to USCOE gage data availability	Molly Van Appledorn
2017FH2	Refine/update levee and lidar data for isolated areas	28-Feb-17	30-Sep-17		These features will be updated once the flood inundation models (tracking number 2017FH1) have been developed	Jason Rohweder
2017FH3	Analyze floodplain vegetation and forestry data	30-Apr-17				Molly Van Appledorn, Nate De Jager
2017FH4	Draft report	30-Sep-17				Molly Van Appledorn, Nate De Jager
2017FH5	Apply ecological relationships to entire system and incorporate into Geodatabase	30-Sep-17				Tim Fox
Modelling future floodplain habitats						
2017FFH1	Format/develop input datasets	30-Mar-17		30-Mar-17	Developed initial communities and ecoregions rasters to use in LANDIS forest succession models.	Jason Rohweder
2017FFH2	Develop flood inundation model extension	30-Mar-17			Framework in place to do the analyses when all the layers are output from the inundation model. See 2017FH1	TBA
2017FFH3	Conduct modelling and write draft report	30-Sep-17				Nate De Jager
Geodatabase						
2017GEO1	Develop Geodatabase/compile all lookup tables and data layers	30-Sep-17				Tim Fox
Landscape Pattern Research and Application						
2017L1	Presentations: Habitat Needs Assessment for the UMR (and related conf. calls and such)	30-Sep-17				De Jager
2017L2	Data/Map Set: Reed canarygrass abundance and distribution in the UMR (Pools 3-13) and areas at risk of invasion	30-Sep-17		1-May-17	In USGS review	De Jager, Rohweder, Hoy (UMESC)
On-Going						
2016L3	Draft Manuscript: Review of Landscape Ecology on the UMR	30-Sep-16	30-Sep-17		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	30-Sep-17		delayed due to work on the HNA-II	Miller & Thomson (UW-L), De Jager Hoy and Rohweder (UMESC)
Intended for distribution						
Manuscript: De Jager, N.R., Rohweder, J.J. In Review. Changes in aquatic vegetation and floodplain land cover in the Upper Mississippi River System (1989-2000-2010). (2016L1) (Environ Monit Assess (2017) 189:77 DOI 10.1007/s10661-017-5774-0)						
Manuscript: Swanson, W., De Jager, N.R., Strauss, E.A., Thomsen, M. In Review. Effects of flood inundation and invasion by <i>Phalaris arundinacea</i> on nitrogen cycling in an Upper Mississippi River floodplain forest. (2016L2) (in USGS Review)						
Manuscript: De Jager, N.R., Swanson, W., Hernandez, D.L., Reich, J., Erickson, R., Strauss, E.A. Effects of flood inundation, invasion by <i>Phalaris arundinacea</i> , and nitrogen deposition on extracellular enzyme activity in an Upper Mississippi River floodplain forest. (2015L5) (in USGS Review)						
Manuscript: Van Appledorn, M., De Jager, N.R., Johnson, K. Considerations for improving floodplain research and management by integrating inundation modeling, ecosystem studies, and ecosystem services (2016L5) (delayed due to HNA II)						

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Manuscript: Weeks, A.M., De Jager, N.R., Haro, R.J., Sandland, G.J. 2017. Spatial and temporal relationships between the invasive snail <i>Bithynia tentaculata</i> and submersed aquatic vegetation in Pool 8 of the UMR. (2016L6) (River Res. Applic. Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/rra.3123)						
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. Earth Surface Processes and Landforms. (2015L8) (in USGS Review)						
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 4 - Peterson Lake HREP Water Quality Monitoring – Pre and Post-Adaptive Management Evaluation						
2017PL1	Collection of pre-construction winter water quality data	1-Feb-17		1-Feb-17		Burdis, Moore, DeLain, Lund
2017PL2	Collection of pre-construction summer water quality data	1-Aug-17				Burdis, Moore, DeLain, Lund
2017PL3	Collection of post-construction winter water quality data	February 2018 – 2019(?) Dependent on construction date				Burdis, Moore, DeLain, Lund
2017PL4	Collection of post-construction summer water quality data	February 2018 – 2019(?) Dependent on construction date				Burdis, Moore, DeLain, Lund
2017PL5	Summary report: Tabular and graphical summary of water quality data	February 2018 – 2019(?) Dependent on construction date				Burdis, Moore
Pool 12 Overwintering HREP Adaptive Management Fisheries Response Monitoring						
2017P13a	Collect annual increment of pool-wide electrofishing data	1-Nov-16		1-Nov-16		Bierman and Bowler
2017P13b	Collect annual increment of fyke netting data from backwater lakes	15-Nov-16		15-Nov-16		Bierman and Bowler
2017P13c	Perform otolith extraction from bluegills for aging	1-Dec-16		1-Dec-16		Bierman and Bowler
2017P13d	Age determination of bluegills collected in Fall 2014	1-Feb-17		1-Feb-17		Bierman and Bowler
2017P13e	In-house project databases updated	31-Mar-17		31-Mar-17		Bierman and Bowler
2017P13f	Summary report compiled and made available to program partners	30-Sep-17				Bierman and Bowler
Pool 12 Overwintering HREP Adaptive Management Fisheries Response Monitoring – Pre-project Biological Response Monitoring; Crappie Telemetry –Kehough Lake						
2017AM1	Capture fish and affix radio tags to white crappies in study lakes	1-Nov-16		1-Nov-16		Bierman, Hansen, Bowler, Theiling
2017AM2	Location of tagged fish and update in-house project database	Ongoing through FY17				Bierman, Hansen, Bowler, Theiling
2017AM3	Complete tracking portion of study	30-Sep-17				Bierman, Hansen, Bowler, Theiling
2017AM4	Summary report: Analysis of tracking data and quantification of 80% UD for Stone, Tippy, and Green lakes	30-Sep-17				Bierman, Hansen, Bowler, Theiling
2017AM5	Summary report: Analysis of tracking data and quantification of 80% UD for Kehough lake	30-Sep-18				Bierman, Hansen, Bowler, Theiling
Understanding biological shifts in the UMR due to invasion by <i>Potamogeton crispus</i> -Year 2						
2016PC2	Draft Report: Understanding biological shifts in the UMR due to invasion by <i>Potamogeton crispus</i>	1-Jun-17				Drake, Giblin, Nissen, Kalas

Upper Mississippi River Restoration
LTRM Science in Support of Restoration and Management
FY2017 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Assessing recent rates of sedimentation in the backwaters of Pools 4, 8, and 13 to support river restoration and the Habitat Needs Assessment						
2017ST1	Reestablishment of horizontal and vertical temporary benchmarks, and a data base for horizontal and vertical benchmarks	30-Mar-17		1-Feb-17	Majority of benchmarks found in Pools 4 and 8. Due to poor ice conditions in winter 2016, Pool 13 work will take place in winter 2017.	Rogala, Moore, Kalas, Bierman
2017ST2	Open-water nearshore surveys completed and a database	31-Jul-17		2-Jan-17		Rogala, Moore, Kalas, Bierman
2017ST3	Over-ice surveys completed and a database	30-Mar-17		30-Mar-17		Rogala, Moore, Kalas, Bierman
2017ST4	Data analysis and completion report on sedimentation rates along	30-Sep-17				Rogala, Moore, Kalas, Bierman
Developing and applying trajectory analysis methods for UMRR Status and Trends indicators – Year 2						
2015B16	Draft Manuscript: Fish Trajectory Analysis	30-Sep-16	28-Feb-17		With Minchin for final review	Ickes, Minchin
2016B17	Draft Manuscript: Developing and applying trajectory analysis methods	31-Oct-17				Ickes, Minchin
Statistical Evaluation						
On-Going						
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-17			Gray
Intended for distribution						
Manuscript: Inferring decreases in among- backwater heterogeneity in large rivers using among-backwater variation in limnological variables (2010E1, Rogala, Gray, Houser) (In USGS review)						
Additional Aquatic Vegetation, Fisheries, and Water Quality Research--On-Going Work from previous Fiscal years						
Aquatic Vegetation Component						
2015A7	Data compilation and analysis: Aquatic macrophyte communities and their potential lag time in response to changes in physical and chemical variables	30-Jun-15	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-16	30-Jun-18		Eric Lund, new vegetation component specialist will be taking over this project	Lund
2016A6a	Draft manuscript: Aquatic Plant Response to Large-Scale Island Construction in the Upper Mississippi River.	30-Sep-16	31-Jan-17		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-Aug-17			Yin
Fisheries Component						
2006B6	Draft manuscript: Spatial structure and temporal variation of fish communities in the Upper Mississippi River.	TBD				Chick
2016B14	Draft completion report: Exploring Years with Low Total Catch of Fishes in Pool 26	30-Sep-16	30-Sep-17		Delayed due to moving to new field station Bldg.	Gittinger, Ratcliff, Lubinski, Chick

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Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Water Quality Component						
2015D15	Analysis of Lake Pepin rotifers; data from 2012-2014	30-Jun-15	30-Jun-17			Burdis
2015D16	Draft manuscript: Trends in water quality and biota in segments of Pool 4, above and below Lake Pepin	27-Feb-15	30-Jun-17			Burdis
Intended for Distribution						
Manuscript: 2016B12: Ward, D.L., A. F. Casper, T. D. Counihan, J. M. Bayer, I. R. Waite, J. J. Kosovich, C. G. Chapman, E. R. Irwin, J. S. Sauer, B. S. Ickes, and A. J. McKerrow. 2017. Long-Term Fish Monitoring in Large Rivers: Utility of “Benchmarking” across Basins. <i>Fisheries</i> Vol. 42 , Iss. 2. DOI: 10.1080/03632415.2017.1276330						
Manuscript: An Assessment of Long Term Changes in Fish Communities within Large Rivers of the United States Counihan, Ickes, Casper, Sauer 2016B13 (resubmitting to PLOS One)						
LTRM Report: Anderson, Alison M.; Casper, Andrew F.; McCain, Kathryn N.S. 2017. Fish Indicators of Ecosystem Health: Upper Mississippi River System INHS Technical Report 2017 (16)						
Manuscript: Gibson-Reinemer, D.K., Chick, J.H., VanMiddlesworth, T.D. et al. 2017. Widespread and enduring demographic collapse of invasive common carp (<i>Cyprinus carpio</i>) in the Upper Mississippi River System. <i>Biol Invasions</i> . doi:10.1007/s10530-017-1405-5						
Manuscript:2016D17: Robert M. Burdis & Jodene K. Hirsch (2017) Crustacean zooplankton dynamics in a natural riverine lake, Upper Mississippi River, <i>Journal of Freshwater Ecology</i> , 32:1, 240-258, DOI: 10.1080/02705060.2017.1279080						
USACE UMRR LTRM Technical Support						
2017COE1	Quarterly update submitted to the LTRM Management Team	31-Dec-16		31-Dec-16		McCain, Theiling, Potter
2017COE2	Quarterly update submitted to the LTRM Management Team	30-Mar-17				McCain, Theiling, Potter
2017COE3	Quarterly update submitted to the LTRM Management Team	30-Jun-17				McCain, Theiling, Potter
2017COE4	Quarterly update submitted to the LTRM Management Team	30-Sep-17				McCain, Theiling, Potter
UMRR LTRM Team Meeting						
2017FM1	Meeting date coordination	16-Jan-17		16-Jan-17		All LTRM Staff
2017FM2	Agenda development	10-Feb-17		10-Feb-17		All LTRM Staff, led by UMESC
2017FM3	Meeting logistics	On-Going		Complete		Sauer
20157M4	Meeting participation	Week of March 27, 2017		Complete		All LTRM Staff
A-Team and UMRR-CC Participation On-going						
Estimating backwater sedimentation resulting from alluvial fan formation						
2017SED1	Land cover GIS datasets identifying areas of potential alluvial fan formation	30-Sep-17				Rogala, Hansen, Nelson
2017SED2	Draft contract report summarizing findings and providing recommendations for expanding the project system-wide	31-Dec-17				Rogala, Hansen, Nelson
2017SED3	Final Report	30-Jun-18				Rogala, Hansen, Nelson
Advancing our understanding of habitat requirements of fish assemblages using multi-species models						
2017FA1	Draft report on period-specific inferences on environmental gradients and species-environment associations by period	15-Feb-18				Bouska, Gray
2017FA2	Final Report	15-Sep-18				Bouska, Gray
Investigation of metabolism, nutrient processing, and fish community in floodplain water bodies of the Middle Mississippi River						
2017MMF1	Fish and water quality databases completed	30-Aug-17				Sobotka
2017MMF2	Draft report completed - will detail differences between the floodplain habitats and the main channel and associations between fish community and water quality attributes with connectivity of the water body to floodwaters or the main channel	30-Dec-17				Sobotka
2017MMF3	Final Report	30-Jun-18				Sobotka

Upper Mississippi River Restoration
LTRM Science in Support of Restoration and Management
FY2017 Scope of Work

Tracking number	Milestone	Original Target Date	Modified Target Date	Date Completed	Comments	Lead
Mapping the thermal landscape of the Upper Mississippi River: A Pilot Study						
2017TL1	Draft report on feasibility and utility of surface water temperature map	30-Dec-17				Jankowski, Robinson, Ruhser
2017TL2	Final report and data distribution	30-Mar-18				Jankowski, Robinson, Ruhser
Evaluation of a System-Wide Floodplain Inundation Model for Ecological Applications						
2017FH6	Site selection and field protocol finalization	31-Mar-17		31-Mar-17		Van Appledorn, Moore, Fischer, Bierman, Chick, Herzog, and Casper
2017FH7	Preparation and deployment of temperature loggers	30-Apr-17				Van Appledorn, Moore, Fischer, Bierman, Chick, Herzog, and Casper
2017FH8	Conduct spatially-extensive field sampling effort during high river stage	30-Jun-17				Van Appledorn, Moore, Fischer, Bierman, Chick, Herzog, and Casper
2017FH9	Conduct spatially-extensive field sampling effort during moderate to moderately-low river stages	31 August, 2017				Van Appledorn, Moore, Fischer, Bierman, Chick, Herzog, and Casper
2017FH10	Retrieve temperature loggers	30-Sep-17				Van Appledorn, Moore, Fischer, Bierman, Chick, Herzog, and Casper
2017FH11	Post-processing and analysis of logger data and water-edge mapping	31-Oct-17				Van Appledorn
2017FH12	A written summary of validation results will be submitted as a supplement to the Habitat Needs Assessment II that identifies potential sources of UMRS inundation model error, discusses the validity of the model's assumptions, and provides guidance on appropriate model use.	31-Dec-17				Van Appledorn

ATTACHMENT C

Additional Items

- **Future Meeting Schedule** *(C-1)*
- **Frequently Used Acronyms (1/24/2017)** *(C-2 to C-7)*
- **UMRR Authorization, As Amended (1/27/15)** *(C-8 to C-11)*
- **UMRR (EMP) Operating Approach (5/06)** *(C-12)*

**QUARTERLY MEETINGS
FUTURE MEETING SCHEDULE**

AUGUST 2017	
<u>Onalaska/La Crosse, Wisconsin</u>	
August 8	UMRBA Quarterly Meeting
August 9	UMRR Coordinating Committee Quarterly Meeting

NOVEMBER 2017	
<u>St. Paul, Minnesota</u>	
November 6	UMRBA WQEC Meeting
November 7	UMRBA Quarterly Meeting
November 8	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
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.