Upper Mississippi River Restoration Program Coordinating Committee Quarterly Meeting

August 9, 2023

Highlights and Action Items

Program Management

- UMRR has obligated nearly $45 million of its $55 million FY 23 appropriation, as of August 1, 2023. The program is on track to execute over 95 percent of its appropriated funds.
- The President's FY 24 Budget and House and Senate Appropriations committees' energy and water spending measures include $55 million for UMRR. The final appropriation is not yet known.
- The draft FY 24 plan of work for UMRR at $55 million is listed below. The FY 24 draft plan of work is largely consistent with the FY 23 plan of work with the addition of regional project sequencing.
  - Regional Administration and Program Efforts – $1,675,000
    - Regional management – $1,260,000
    - Program database – $100,000
    - Program Support Contract – $140,000
    - Public Outreach – $50,000
    - Regional Project Sequencing – $125,000
  - Regional Science and Monitoring – $15,325,000
    - Long term resource monitoring – $5,500,000
    - Regional science in support of restoration – $8,350,000
    - Regional science staff support – $200,000
    - Habitat evaluation (split across three districts) – $1,275,000
  - Habitat Restoration – $38,000,000
    - Rock Island District – $11,150,000
    - St. Louis District – $13,700,000
    - St. Paul District – $13,050,000
    - Model certification – $100,000
- The UMRR 10-year implementation plan includes 11 projects in feasibility and 12 projects in design or construction. It was updated to reflect small changes to project timelines for Green Island, Pool 12 Forestry, and Oakwood Bottoms HREPs. The Pool 18 Forestry HREP was added to the 10-year plan. A new MVS project is scheduled to start feasibility at the end of FY 23.
- **At the June 28, 2023 Navigation and Ecosystem Sustainability Program (NESP) Coordinating Committee meeting, partners requested UMRR's environmental justice (EJ) approaches be coordinate with similar efforts anticipated through NESP. UMRR continues to consider how to incorporate environmental justice in HREP selection and planning. Recent conversations and decisions include:**

— **On July 11, 2023, the UMRR Program Planning Team (PPT) met to discuss updating the UMRR HREP fact sheet template to include preliminary information on disadvantaged communities.**

— On August 2, 2023 the UMRR Communications and Outreach Team meeting included a presentation from Matt Jones from MVS on EJ communications efforts. **Corps staff can support endeavors to enhance tools or outreach capabilities on EJ and it will not be the sole responsibility of river teams.**

— **The UMRR Coordinating Committee anticipates meeting in September to discuss next steps for incorporating EJ into the HREP project selection process. UMRR and NESP are working toward a programmatic agreement on cultural resources.**

- On July 11, 2023, the UMRR PPT met to coordinate the timeframe for the upcoming HREP selection process. The PPT primarily focused on aligning river teams' schedules with NESP requests to maximize efficient use of time. **The UMRR Coordinating Committee requested that river teams provide endorsed fact sheets by the 3rd quarter of FY 25 (Apr – Jun 2025) for implementation in FYs 26 through 30. The PPT agreed to provide the river teams with the following additional guidance beyond the process in the Charter, including:**

  — Project proposals that physically overlap with completed restoration efforts need to: 1) clearly describe the changed ecological structure, function and processes from when the prior project was completed, 2) describe the additional habitat benefits that will be gained over and above what was provided by the previous project, and 3) be coordinated with and secure concurrence with the respective Corps District HREP Manager and the UMRR Regional Program Manager.

  — Identify and describe (if applicable) opportunities for the project to address Environmental Justice factors related to disadvantaged communities. Corps staff will be available to support this exercise and overall decision-making.

  A recorded webinar on HNA-II is available online at the following link: https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll11/id/3834

  A webinar on the Ecological Status and Trends of the Upper Mississippi and Illinois River Report will be scheduled in September. [Note: The webinar occurred on Thursday, September 7, 2023.]

  The UMRR PPT anticipates meeting in October to discuss updates from the river teams' processes and any adjustments or additional guidance that may be needed.

- **On July 5, 2023, the final UMRR 2015-2025 Strategic Plan Review Report was submitted via email to Coordinating Committee members.** The report describes important partner insights. The report is available at the following link: https://umrba.org/document/umrr-2015-2025-strategic-plan. The Coordinating Committee intends to use the report's findings to inform its priorities for UMRR in the near and long term, particularly as the Committee develops the program's next strategic plan.

- On May 24, 2023 the UMRR Coordinating Committee met to prioritize the top three or four implementation issues. The group identified that the resolution of PPAs and federal easement lands are critical to long term execution of UMRR and that the issue of water level management has fundamentally changed since the issue paper was drafted (NESP & WRDA 2022). The Coordinating Committee established small groups to develop a plan of action to address each implementation issue. **Coordinating Committee members will meet on August 9, 2023 to discuss updates and priorities for FY 24.**

- **ASA(CW) Mr. Michael L. Connor is reviewing the UMRR 2022 Report to Congress prior to transmitting it to Congress. Marshall Plumley is responding to questions. The Corps is drafting a press release and four-page flyer that will be coordinated with the UMRR**

Communications and Outreach Team (COT) for distribution. Case studies on construction, science, and monitoring activities were developed for the report and can serve as a basis for future outreach efforts.

- **The Corps completed interviews for the LTRM Program Manager position, and a selection was made. The successful candidate is expected to be announced at the end of August. [Note: On August 30, 2023, Marshall Plumley announced that Ms. Davi Michl will begin as the new USACE Long Term Resource Monitoring Project Manager on September 5, 2023.]**

- **On August 3, 2023 the UMRR Coordinating Committee convened a virtual meeting to discuss out-year funding scenarios, staffing plans, and programmatic priorities for FY 2024.** Topics to frame the discussion included the existing portfolio of HREP projects and LTRM level of effort, the pace of additional HREPs initiating feasibility, partner capacity, additional WRDA changes, and inflation. Scenarios included drastic cuts to the program at $20 million, stable funding at $55 million, up to the authorized amount of $90 million. **Additional discussions are needed regarding expected staffing levels across agencies to support a higher appropriation and alleviate bottle necks.**

- **A UMRR workshop for both HREP and LTRM personnel is anticipated for spring 2024. A request for availability will be sent to UMRR Coordinating Committee members in August. A planning committee kickoff meeting is anticipated to be held in September.** Potential workshop topics include monitoring and adaptive management, HREP/LTRM integration, HREP design handbook update, and HREP lessons learned among others.

- **The UMRR Coordinating Committee has set a recurring schedule for HREP selection processes to be implemented every five years. The next HREP selection process is underway and river teams are beginning to set schedules and prepare for workshops.**

- **Scoping of the next UMRR strategic planning process is anticipated to occur through a series of meetings in fall 2023.**

Communications

- Snapshot summaries are complete that describe the condition and trends of the UMRS fisheries, floodplain forests, sedimentation, water quality, and aquatic vegetation developed from the most recent Status and Trends Report. **A Communication toolkit was developed to help distribute the snapshots both internally and externally.** Media pitch templates and two announcement templates to deliver snapshot summaries are included in the toolkit recognizing 2023 as a year of high water and the 30th year of annual monitoring for the UMRR partnership. The toolkit includes thumbnail photos relevant to each snapshot summary and higher resolution photos can be provided upon request. **USACE, MN DNR, USGS, UMRBA, and Mississippi River Network expressed a willingness to participate in coordinated messaging about the release of the snapshot summaries.**

- This summer, the UMRR Communications and Outreach Team will focus on supporting a press release and flyer for the 2022 UMRR Report to Congress, preparing activities recognizing the 100th anniversary of the UMR National Wildlife and Fish Refuge in 2024, and distributing the status and trends snapshot summaries using the communications toolkit. The Team will hold future discussions on environmental justice communication. This fall, the Team anticipates finalizing its Team framework and discussing FY 24 priorities. Anne Wurtenberger, in Rock Island District, has taken on the role of co- coordinator for the COT with Rachel Perrine.

UMRR Showcase Presentations

- John Delaney, with USGS, presented on the use of machine learning to evaluate vulnerability and restoration potential of submersed aquatic vegetation. An online, interactive tool for researchers and managers to interact with model outputs is available at the following link: https://rconnect.usgs.gov/SAVVEA/

Habitat Restoration

- MVP's planning priorities include Big Lake – Pool 4 and Robinson Lake. Reno Bottoms is in the design phase with three stages in development. MVP awarded a contract in June for Stages 1, 2, and 3 for Lower Pool 10 HREP. McGregor Lake HREP Stage 1 construction is 95 percent complete, and Stage II was fully awarded. The project uses innovative techniques and beneficial use of dredge material. Harper's Slough HREP, Conway Lake HREP, and Harpers Slough HREP have all been closed out and turned over to USFWS. A hydraulic analysis was completed for the Trempealeau Lake HREP, which is being re-evaluated to improve performance where harmful algal blooms have been problematic.

- MVR's planning priorities include Pool 12 Forestry, Lower Pool 13 Phases I and II, Green Island, and Quincy Bay HREPs. Pool 18 Forestry will be the next HREP to enter feasibility in MVR with a kickoff meeting in the fall. Steamboat Island Stage II remains in design. MVR has four projects in construction: Beaver Island, Steamboat Island Stage I, Keithsburg Division Stages I and II, and Huron Island Stage III. Construction at Huron Island is complete; ERDC is surveying vegetation in June and will conduct additional plantings this summer and assessment in September 2023. Initial monitoring of innovative mussel substrate at Beaver Island has documented a positive response.

- MVS's planning priorities include West Alton Islands and Yorkinut Slough HREPs. Gilead Slough and Reds Landing HREPs were selected to start feasibility in the first quarter of FY 24. The Swan Lake flood damage assessment letter report was approved in July. MVS's design priorities include Clarence Cannon Stage 4, Harlow Island, Oakwood Bottoms, Swan Lake, and Crains Island HREPs. MVS has three projects in construction: Crains Island Stage I, Piasa and Eagles Nest Stage II, and Clarence Cannon. The contractor is on site at Piasa and Eagles Nest to survey and assemble and place pipe.

Long Term Resource Monitoring and Science

- Accomplishments of the third quarter of FY 23 include publication of the following manuscripts and completion report:
  - *Reconstructing missing data by comparing interpolation techniques: Applications for long-term water quality data*
  - *Quantifying ecosystem states and state transitions of the Upper Mississippi River System using topological data analysis*
  - *Low-complexity floodplain inundation model performs well for ecological and management applications in a large river ecosystem*
  - *Upper Mississippi River Restoration Future Hydrology Meeting Series*

- Molly Van Appledorn and Nate De Jager presented to the Society of wetland Scientists on "*Advancing the science and management of the Upper Mississippi River System floodplain by characterizing and mapping inundation regimes.*" The purpose of the presentation was to convey the biophysical

complexity of the UMRS floodplain, to demonstrate two methods of summarizing and mapping inundation, and to show how the work is integrated into management applications and the UMRR program.

- On August 3-4, 2023, a vital rates meeting on microchemistry and genetics was held at the Kibbe Field Station. The purpose was to share findings and develop objectives and approaches for integrating project components.

- The timeline to complete LC/LU dataset processing has been extended into FY 26 due to staff departures. Processing of Pool 17 will be moved forward due to ongoing study needs for floodplain forest. Processing of Pools 20 and 21 will be delayed accommodating Pool 17 advancement. The Upper Open River and ILWW will be processed in FY 26.

- The next UMRR Science Meeting will be held January 16-18, 2024 at UMESC. Two webinars will be held on September 25, 2023 and October 5, 2023 from 12-1:30 p.m. to update the partnership on recently completed and ongoing research projects that have been funded through UMRR science proposals.

- At its July 24, 2023 meeting, the A-Team endorsed all four objectives of the Lower Pool 13 HREP Associated Research Project (HARP). **The UMRR Coordinating Committee endorsed $1,085,726 in funding to support implementation of all four objectives with $827,886 coming from FY 23 funds. The objectives are as follows:**
  - Objective 1 - Pilot a radar wave monitoring system to measure existing (pre-project) wave conditions in Lower Pool 13
  - Objective 2 - Evaluate relationships between wind, waves, and turbidity, and assess the relative contributions of upstream sources and local resuspension to turbidity in the project area
  - Objective 3 - Assess spatial patterns and quantify relationships among wild celery, turbidity, and wave dynamics
  - Objective 4 - Estimate substrate stability and population size, density, and species richness of mussels pre-project.

- The A-Team met on July 24, 2023. The agenda covered the following items:
  - Congratulating Karen Hagerty for her years of service and upcoming retirement on July 31, 2023
  - Announcement of Mark Gaikowski's promotion to USGS Deputy Regional Director for Science.
  - HREP and LTRM programmatic updates
  - A framework to digitize and catalog otoliths collected through the vital rates project.
  - Two-page snapshot summaries communicating the major findings from the 2022 UMRR LTRM status and trends report
  - Review of objectives of the Lower Pool 13 HREP-associated research project
  - Data collection and data entry upgrades to the reinstated macroinvertebrate component
  - Results of LTRM implementation planning included recommended information needs to address
  - Progress on critical USACE and USGS positions searches
  - Updates on the mapping and land cover land use project

  The next A-Team meeting will be virtual and expected to be held in September or October 2023.

- Over the past several months, the *ad hoc* LTRM implementation planning team has drafted objective statements and identified and prioritized information needs using a structured decision- making process. The team is considering the relevance of information needs to both ecosystem understanding and assessment as well as management and restoration along with the depth of current knowledge, cost, opportunity to learn, urgency, and unique capacity of LTRM to address the information need. **The *ad hoc* LTRM implementation planning team presented its recommended list of nine information needs for funding in FY 24 – FY 26, including:**
  - Floodplain ecology: Vegetation change across the system
  - Floodplain ecology: Terrestrial and aquatic herpetofauna
  - Hydrogeomorphic change: Geomorphic trends
  - Aquatic ecology: Aquatic vegetation distribution and changes across the system
  - Aquatic ecology: Native freshwater mussel distribution
  - Aquatic ecology: Macroinvertebrate distribution
  - Aquatic ecology: Lower trophic contribution (phyto- and zooplankton)
  - Aquatic ecology: River gradients from Pool 14 to Pool 25
  - Restoration applications: Learning from restoration and management

  The UMRR Coordinating Committee endorsed the recommended set of information needs. The *ad hoc* LTRM implementation planning team will present a plan for how to most effectively fund each of the remaining information needs through FY 26 to the UMRR Coordinating Committee in October 2023. The team recommended two of those information needs for initial funding with FY 23 funds. The UMRR Coordinating Committee approved partially funding the following two priority implementation planning science needs with FY 23 funds totaling $1,234,516:
  - Hydrogeomorphic change: Geomorphic trends:
  - Aquatic ecology: River gradients from Pool 14 to Pool 25:

<u>Other Business</u>

Upcoming quarterly meetings are as follows:

- **October 2023 – St. Louis**
  - UMRBA quarterly meeting – October 24
  - **UMRR Coordinating Committee quarterly meeting – October 25**
- **February 2024 – Virtual**
  - UMRBA quarterly meeting – February 27
  - **UMRR Coordinating Committee quarterly meeting – February 28**
- **May 2024 – Quad Cities**
  - UMRBA quarterly meeting – May 21
  - **UMRR Coordinating Committee quarterly meeting – May 22**

UMRR COORDINATING COMMITTEE - REGIONAL MANAGEMENT AND PARTNERSHIP COLLABORATION

Upper Mississippi River Restoration
Leading·Innovating·Partnering

Marshall Plumley
Regional Program Manager
St. Paul District
Rock Island District
St. Louis District

9 August 2023

U.S. ARMY
US Army Corps of Engineers

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REGIONAL MANAGEMENT AND PARTNERSHIP COLLABORATION

2

- FY 2023 Fiscal Update and FY 24 Outlook
- Environmental Justice
- 2023 HREP Selection
- Strategic and Operation Plan review
- Implementation Issues
- 2022 Report to Congress
- Program Priorities

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FY 23 APPROPRIATIONS

3

President's Budget	$55,000,000
House	$55,000,000
Senate	$55,000,000
FINAL APPROPRIATION	$55,000,000

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FY 2023 FISCAL UPDATE AND FY 2024 OUTLOOK

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FINANCIAL REPORTING

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UMRR Quarterly Budget Report: St. Paul District
FY2023 Q3; Report Date: Wed Jul 12 2023

Habitat Projects

Project Name	Cost Estimates			FY2023 Financials			
	Non-Federal	Federal	Total	Carry In	Allocation	Funds Available	Actual Obligations
Bass Ponds, Marsh, and Wetland	-	$6,300,000	$6,300,000	-	-	-	$127,786
Conway Lake	-	$7,413,000	$7,413,000	-	-	-	$13,007
Harpers Slough	-	$13,675,000	$13,675,000	-	-	-	-$153,762
Lower Pool 10 Island and Backwater Complex	-	$17,000,000	$17,000,000	-	$3,248,000	$3,248,000	$1,865,898
Lower Pool 4, Big Lake	-	$18,000,000	$18,000,000	-	$550,000	$550,000	$357,517
McGregor Lake	-	$23,550,000	$23,550,000	$183,743	$6,600,000	$6,783,743	$7,465,815
Rams Bottoms	-	$10,000,000	$10,000,000	$59,603	$200,000	$259,603	$217,404
Robinson Lake, MN	-	$12,000,000	$12,000,000	-	$550,000	$550,000	$182,989
Total	-	$107,938,000	$107,938,000	$243,346	$11,148,000	$11,391,346	$10,076,654

Habitat Rehabilitation

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
District Program Management	-	-	-	$494,283
Total	-	-	-	$494,283

Regional Program Administration

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
Habitat Eval/Monitoring	-	-	-	$279,831
Total	-	-	-	$279,831

	Carry In	Allocation	Funds Available	Actual Obligations
St. Paul Total	$243,346	$11,148,000	$11,391,346	$10,850,768

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FINANCIAL REPORTING

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UMRR Quarterly Budget Report: Rock Island District
FY2023 Q3; Report Date: Wed Jul 12 2023

Habitat Projects

Project Name	Cost Estimates			FY2023 Financials			
	Non-Federal	Federal	Total	Carry In	Allocation	Funds Available	Actual Obligations
Beaver Island	-	$25,288,000	$25,288,000		$300,000	$300,000	$118,921
Green Island, IA	-	$16,600,000	$16,600,000	$23,581	$400,000	$423,581	$533,372
Huron Island	-	$15,773,000	$15,773,000	$65,698	-	$65,698	$34,198
Kellhsburg Division	-	$29,643,000	$29,643,000	-	$6,600,000	$6,600,000	$568,432
Lower Pool 13	-	$25,288,000	$25,288,000	$48,000	$400,000	$448,000	$323,994
Lower Pool 13 (Phase II)	-	-	-	$21,339	$400,000	$421,339	$226,981
Pool 12 (Forestry)	-	-	-	$93,705	$600,000	$693,705	$380,128
Pool 12 Overwintering	-	$20,870,822	$20,870,822	$1,998	-	$1,998	$1,998
Quincy Bay, IL	-	-	-	$12,312	$600,000	$612,312	$465,387
Rice Lake, IL	$7,280,000	$13,459,763	$20,739,763	$115,525	-	$115,525	-
Steamboat Island	-	$41,977,000	$41,977,000	-	$3,952,000	$3,952,000	$6,120,857
TBD	-	-	-	-	$60,000	$60,000	$3,001
Total	$7,280,000	$188,899,585	$196,179,585	$341,755	$13,302,000	$13,643,755	$8,776,659

Habitat Rehabilitation

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
District Program Management	-	-	-	$468,497
Total	-	-	-	$468,497

Regional Program Administration

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
Adaptive Management		$200,000	$200,000	$148,667
Habitat Eval/Monitoring	$450	$1,275,000	$1,275,450	$144,247
Model Certification/Regional HREP	-	$100,000	$100,000	$27,862
Public Outreach		$50,000	$50,000	$8,009
Regional Program Management	$2,993	$1,900,000	$1,902,993	$938,393
Regional Project Sequencing		$123,000	$123,000	$72,212
Total	$3,443	$3,250,000	$3,253,443	$1,362,603

Regional Science and Monitoring

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
Long Term Resource Monitoring	-	$5,500,000	$5,500,000	$3,187,392
Science in Support of Restoration/Management	-	$8,350,000	$8,350,000	$5,918,281
Total	-	$13,850,000	$13,850,000	$9,105,673

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FINANCIAL REPORTING

UMRR Quarterly Budget Report: St. Louis District
FY2023 Q3; Report Date: Wed Jul 12 2023

Habitat Projects

Project Name	Cost Estimates			FY2023 Financials			
	Non-Federal	Federal	Total	Carry In	Allocation	Funds Available	Actual Obligations
Clarence Cannon	-	$29,800,000	$29,800,000	-	$950,000	$950,000	$453,935
Crains Island	-	$36,562,000	$36,562,000	-	$1,900,000	$1,900,000	$95,687
Gilead Slough	-	$11,000,000	$11,000,000	-	$350,000	$350,000	$79,020
Harlow Island	-	$37,971,000	$37,971,000	-	$925,000	$925,000	$134,068
Oakwood Bottoms	-	$29,000,000	$29,000,000	-	$575,000	$575,000	$787,599
Piasa - Eagle's Nest Islands	-	$26,746,000	$26,746,000	$31,151	$8,300,000	$8,331,151	$7,851,523
West Alton Missouri Islands	-	-	-	$21,510	$425,000	$446,510	$254,343
Yorkinut Slough, IL	-	$8,500,000	$8,500,000	$13,681	$375,000	$388,681	$622,637
Total	-	$179,579,000	$179,579,000	$66,342	$13,250,000	$13,316,342	$10,278,812

Habitat Rehabilitation

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
District Program Management	-	-	-	$544,907
Total	-	-	-	$544,907

Regional Program Administration

Subcategory	FY2023 Financials			
	Carry In	Allocation	Funds Available	Obligations
Habitat Eval/Monitoring	-	-	-	$338,684
Total	-	-	-	$338,684

	Carry In	Allocation	Funds Available	Actual Obligations
St. Louis Total	$66,342	$13,250,000	$13,316,342	$11,162,403

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FY23 PLAN OF WORK
54.5%

	Budget	Obligations as of 1 April
TOTAL FY22 Program	**$55,000,000**	**$29,964,536**
Regional Administration and Program Efforts	**$ 1,550,000**	**$656,669**
Regional Management	$ 1,280,000	
Program Database	$ 100,000	
Program Support Contract (UMRBA)	$ 120,000	
Public Outreach	$ 50,000	
Regional Science and Monitoring	**$15,450,000**	**$ 4,619,854**
LTRM (Base Monitoring)	$ 5,500,000	
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 8,350,000	
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000	
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,275,000	
Report to Congress	$ 125,000	
District Habitat Rehabilitation Efforts (Planning and Construction)	**$38,000,000**	**$24,688,013**
St. Paul District	$11,148,000	$ 8,201,393
Rock Island District	$13,502,000	$ 7,657,472
St. Louis District	$13,250,000	$ 8,829,148
Model Cert.	$ 100,000	

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FY23 PLAN OF WORK
81.24%

	Budget	Obligations as of 1 August
TOTAL FY22 Program	**$55,000,000**	**$44,683,710**
Regional Administration and Program Efforts	**$ 1,550,000**	**$ 1,103,496**
Regional Management	$ 1,280,000	
Program Database	$ 100,000	
Program Support Contract (UMRBA)	$ 120,000	
Public Outreach	$ 50,000	
Regional Science and Monitoring	**$15,450,000**	**$10,173,723**
LTRM (Base Monitoring)	$ 5,500,000	
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 8,350,000	
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000	
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,275,000	
Report to Congress	$ 125,000	
District Habitat Rehabilitation Efforts (Planning and Construction)	**$38,000,000**	**$33,406,491**
St. Paul District	$11,148,000	$ 10,906,307
Rock Island District	$13,502,000	$ 10,145,920
St. Louis District	$13,250,000	$ 12,322,589
Model Cert.	$ 100,000	$ 31,675

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FY 24 APPROPRIATIONS

President's Budget	$55,000,000
House	$55,000,000
Senate	$55,000,000
FINAL APPROPRIATION	?

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FY24 DRAFT PLAN OF WORK

	Budget
TOTAL FY24 Program	**$55,000,000**
Regional Administration and Program Efforts	**$ 1,675,000**
Regional Management	$ 1,260,000
Program Database	$ 100,000
Program Support Contract (UMRBA)	$ 140,000
Public Outreach	$ 50,000
Regional Project Sequencing	$ 125,000
Regional Science and Monitoring	**$15,325,000**
LTRM (Base Monitoring)	$ 5,500,000
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 8,350,000
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,275,000
District Habitat Rehabilitation Efforts (Planning and Construction)	**$38,000,000**
St. Paul District	$11,150,000
Rock Island District	$13,700,000
St. Louis District	$13,050,000
Model Cert.	$ 100,000

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FY 24 PRESIDENTS BUDGET

HREP Feasibility

- Lower Pool 4 Big Lake, WI
- Robinson Lake, MN
- Pool 12 Forestry, IL
- Quincy Bay, IL
- Lower Pool 13 Phase II
- Pool 18 Forestry FY 23
- TBD 4th Qtr FY 24
- West Alton Islands, MO
- Gilead Slough, IL
- Reds Landing, IL
- TBD 4th Qtr FY 24

HREP Design & Construction

- McGregor Lake, WI
- Lower Pool 10 Islands, IA
- Reno Bottoms, MN
- Keithsburg Division, IL
- Steamboat Island, IA
- Lower Pool 13, IA
- Green Island, IA
- Clarence Cannon, MO
- Crains Island, IL
- Piasa and Eagles Nest Islands, IL
- Harlow Island, MO
- Oakwood Bottoms, IL

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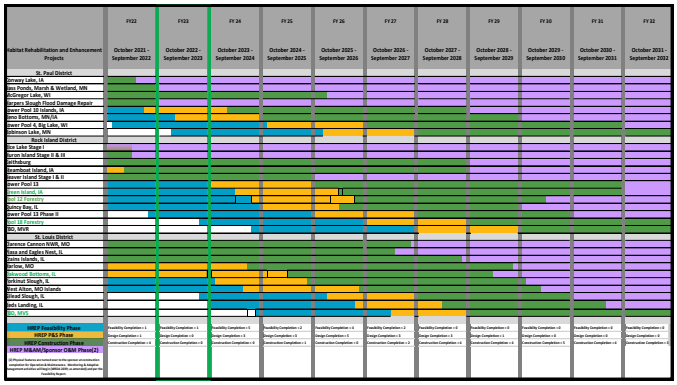

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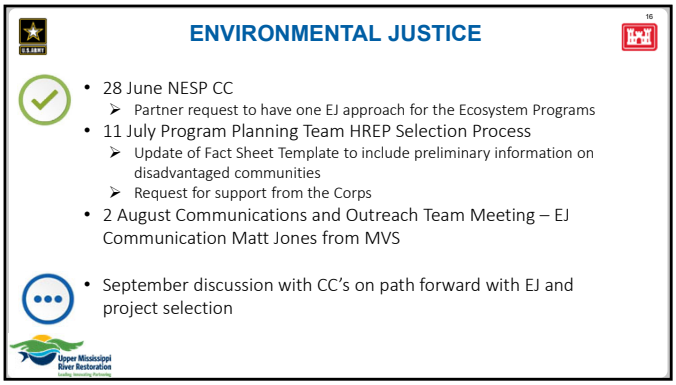

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17

18

SO WHAT IS THE NEED?

- **BLUF: Approved Fact Sheets available to the Program by the 3rd quarter of FY 25 (Apr – Jun 2025) for use in the FY 26- FY 30 timeframe.**
- Considerations
  - By FY 26, the 7 remaining Fact Sheets will be 7 years old at that point and may no longer reflect current habitat needs, partner priorities or sponsor capabilities.
  - Projects that have already begun feasibility, on occasion, are not completed or do not move into construction for various reasons. This will result in the need to start some of those remaining 7 projects earlier than anticipated.
  - Assuming stable funding, the program will need to initiate feasibility work on 12 additional HREPs from FY 26 – FY 30 to maintain habitat restoration progress and ensure an adequate number of projects in planning, design, and construction.
  - If additional funding is provided to UMRR under the $90M authorization, more that the anticipated 12 new starts will likely occur.

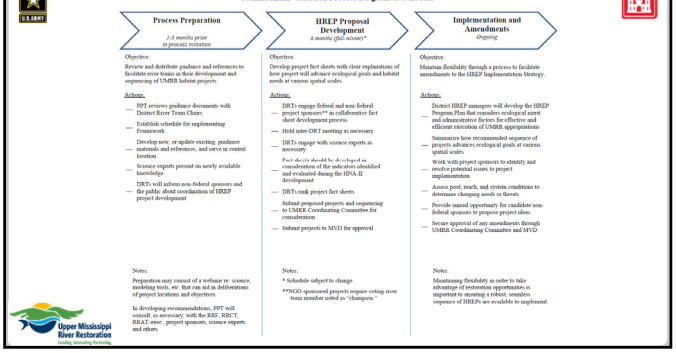
19

GOALS OF THE PROCESS

- Optimize investment in restoring, rehabilitating, and maintaining the quantity and quality of fish and wildlife habitat leading to a healthier and more resilient Upper Mississippi River ecosystem.
- Ensure that UMRR habitat projects address UMRS ecological needs at pool, reach, and system scales by building on existing HREP sequencing mechanisms and integrating the Habitat Needs Assessment-II (HNA-II) and other planning efforts into project selection.
- Enhance public understanding of and trust in the decision-making process by making HREP evaluation criteria explicit, transparent, and consistent.
- Retain the flexibility necessary to ensure efficient, effective program execution and apply adaptive management principles to project planning, design, and implementation.

20

UMRR HREP Selection Process Diagram & Schedule



21

CURRENT DIRECTION FOR RIVER TEAMS

- Limit fact sheets to four pages (excluding maps).
- Projects should be developed in consultation with federal, state, and nonprofit organization sponsors. Nonprofit organization participation will be facilitated through a "champion" voting member on the river team.
- Decision support tools can be developed as needed and upon request, following initial collaborative project development process. Data layers are available for agency use and Corps GIS experts can be made available to assist river teams as needed.
- Use decision logs and record discussions throughout the process to ensure transparency and adequate understanding and buy-in and to inform future project selection efforts.
- Invite candidate cost-sharing nonprofit organizations to consider submitting an HREP proposal. The PPT has provided the river teams with a template invitation letter. Other references for how to engage nonprofit organizations throughout the planning process include the UMRR HREP Selection Process Diagram Schedule, UMRR HREP Selection Goals, Roles, and Responsibilities, and UMRR HREP Fact Sheet Template.
- Describe whether and how projects will maintain (e.g., ensure indicator remains green) or improve (e.g., move the indicator from red to yellow) for each respective HNA-II indicator. A Corps planner will be available to support this exercise and overall decision-making.
- Structured decision-making exercises can be used as needed. Past iterations have utilized evaluation matrices and paired-comparisons for project ranking.

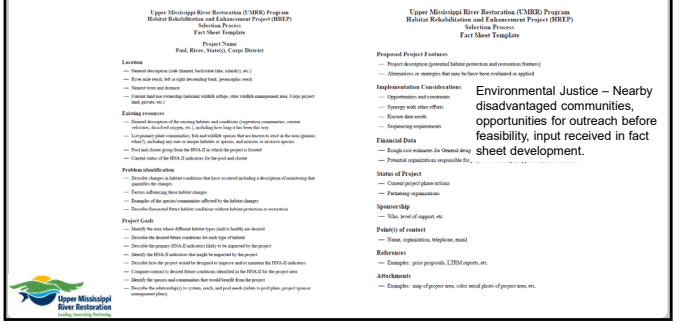
22

ADDITIONAL DIRECTION FOR RIVER TEAMS

- Project proposals that physically overlap with completed restoration efforts need to: 1) clearly describe the changed ecological structure, function and processes from when the prior project was completed, 2) describe the additional habitat benefits that will be gained over and above what was provided by the previous project, and 3) be coordinated with and secure concurrence with the respective Corps District HREP Manager and the UMRR Regional Program Manager.
- Identify and describe (if applicable) opportunities for the project to address Environmental Justice factors related to disadvantaged communities. Corps staff will be available to support this exercise and overall decision-making.

23

FACT SHEET TEMPLATE CHANGE


Upper Mississippi River Restoration (UMRR) Program
Habitat Rehabilitation and Enhancement Project (HREP)
Selection Process
Fact Sheet Template

Project Name
Pool, River, State(s), Corps. District

Location
Existing resources
Problem identification
Project Goals

Upper Mississippi River Restoration (UMRR) Program
Habitat Rehabilitation and Enhancement Project (HREP)
Selection Process
Fact Sheet Template

Proposed Project Features
Implementation Considerations
Financial Data
Status of Project
Sponsorship
Point(s) of contact
References
Attachments

Environmental Justice – Nearby disadvantaged communities, opportunities for outreach before feasibility, input received in fact sheet development.

24

SUPPORT TO RIVER TEAMS

- HNA II Webinar
  - https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll11/id/3834
  - https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll11/id/3834
- Ecological Status and Trends of the Upper Mississippi and Illinois River 2021
  - https://pubs.er.usgs.gov/publication/ofr20221039
  - Webinar: Scheduling e-mail will go out by the end of August

25

SUPPORT TO RIVER TEAMS

- Data layers to support decision making, viewers, and GIS staff.
- EJ staff support to follow up on opportunities identified during project proposal development.
- Other as identified by the River Teams as them progress.

26

OVERALL SCHEDULE JULY 2023 – MAY 2025

	FY23 October 2022 - September 2023	FY 24 October 2023 - September 2024	FY 25 October 2024 - September 2025	FY 26 October 2025 - September 2026
Funding Scenarios				
UMRR Workshop				
Future HREP Selection				
UMRR Strategic Plan				

27

SCHEDULE

- October 2023 PPT Meeting – Check in, updates, course adjustments
- May 2024 PPT Meeting – As needed
- August 2024 PPT Meeting – Fact Sheets for River Team (Policy)
- February 2025 UMRR CC – Presentation by River Teams
- May 2025 UMRR CC – Endorsement of Fact Sheets

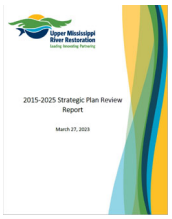
28

2015 -2025 STRATEGIC AND OPERATIONAL PLAN REVIEW

29

2015 - 2025 STRATEGIC AND OPERATIONAL PLAN REVIEW

- Final Report distributed 5 July 2023.
- https://umrba.org/document/umrr-2015-2025-strategic-plan.



30

IMPLEMENTATION ISSUES

31

IMPLEMENTATION ISSUES

Purpose: To identify and describe the variety of issues that have the potential to affect the most efficient implementation of UMRR in the future.

Process: With each Report to Congress (RTC), there has been an attempt to ID and discuss the status of issues that may hinder implementation of UMRR. Last completed an IIA in 2013, updated for 2016 RTC, and held some discussions in 2017. In 2021, the UMRR Coordinating Committee identified the following issues for paper development, including updating three existing issues papers and drafting some new ones:

Issues:

- Project Partnership Agreements (PPAs)*
- Engaging non-traditional sponsors
- Floodplain Regulations
- External Communications
- Federal Easement Lands
- Watershed Inputs and Climate Change
- Water Level Management

*Requires action by Congress to address

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IMPLEMENTATION ISSUES

Timeline:

- November 2021, the UMRR Coordinating Committee reviewed draft problem statements.
- March 2022, the UMRR Coordinating Committee reviewed draft papers and provided comments.
- August 2022, the UMRR Coordinating Committee met to:
  - Review comments and draft responses and resolve unanswered questions
- November 2022 Final Issue Papers distributed minus recommendations
- **24 May 2023 the UMRR Coordinating Committee met to prioritize the top three or four issues and consider the following questions:**
  - **Do I and my organization want to lead this action**
  - **If I do not what to lead it, is there someone I want to lead it?**

33

IMPLEMENTATION ISSUES

24 May Outcomes:

- Resolution of PPAs and Federal Easement Lands are critical to long term execution of the Program.
- Water Level Management has fundamentally changed since the Issue Paper was drafted (NESP & WRDA 2022).
- Small groups to proceed with discussions on a plan of action

Federal Easement Lands	Water Level Management	Project Partnership Agreements	Watershed Inputs and Climate Change	Engaging Non-traditional Project Sponsors	External Communications*	Floodplain Regulations
USACE	UMRBA	UMRBA	UMRR CC	UMRBA	USACE	IL
		IL	MN	MN	UMRR CC	UMRBA
			MO	USACE	UMRR COT	
			USGS			

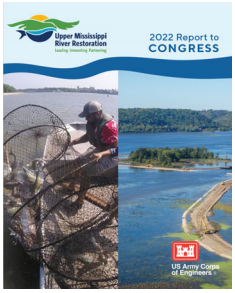
- Next Step: This afternoon's discussion small group status updates and priorities for FY 24

34

2022 REPORT TO CONGRESS

35

REPORT TO CONGRESS



Letters of Support

- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- U.S. Environmental Protection Agency
- Upper Mississippi River Basin Association
- Missouri Department of Conservation
- Iowa Department of Natural Resources
- Minnesota Department of Natural Resources
- Wisconsin Department of Natural Resources
- Illinois Department of Natural Resources
- The Nature Conservancy
- Audubon of Minnesota, Iowa & Missouri
- American Rivers
- Mississippi Interstate Cooperative Resource Association

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PROGRAM PRIORITIES

- LTRM Project Manager Position
- Funding Scenarios
- UMRR Workshop
- Future HREP Selection
- UMRR Strategic Plan

37

PROGRAM PRIORITIES

- **LTRM Project Manager Position**
  - Interdisciplinary
  - GS 12
  - Open both within the Federal Government and the Public
  - Location is negotiable within the three USACE District Offices
  - **Interviews complete and a selection made. Announcement and hopefully on board by the end of the month.**

38

PROGRAM PRIORITIES

- **Funding Scenarios Discussion**
  - **Met 3 August to review and discuss scenarios**
  - Stable funding at $55M, $90M, Somewhere in between, Something less. Variable funding.
  - Existing portfolio of HREP projects and LTRM level of effort
  - Pace of additional HREPs initiating feasibility
  - Partner capacity
  - Additional WRDA changes, inflation
  - Example: Stable funding at $55M, existing level of effort, existing level of partner support (people), no authorization changes, low inflation impact
- **Next Steps: Further refinement and staffing plan**

39

PROGRAM PRIORITIES

- **UMRR Workshop**
  - Last HREP Workshop in 2019
  - **Request for availability will go out in August**
  - Potential topics
    - ✓ Monitoring and Adaptive Management
    - ✓ HREP/LTRM Integration
    - ✓ HREP Design Handbook Update
    - ✓ HREP Lessons Learned
    - ✓ ?

40

PROGRAM PRIORITIES

- **Future HREP Selection**
  - Last completed 2020. UMRR Charter 2021
  - Need: Approved Fact Sheets available for 3rd quarter FY 25 Program (Apr - Jun 2025)
  - Next Steps: Coordinate need and timeframe (June) with Program Planning Team (UMRR Regional Program Manager, Coordinating Committee, HREP Program Managers and River Team Chairs. Focus on aligning River Team schedules with similar requests to maximize efficient use of time.
  - **River Teams are beginning to set schedules and prepare for workshops**

41

PROGRAM PRIORITIES

- **UMRR Strategic Plan**
  - Long term need: Develop the next UMRR Strategic and Operational Plan for the 2026-2036 planning horizon.
  - Short term need: Begin scoping of programmatic effort to develop the next UMRR Strategic Plan.
  - The current Plan took nearly two years to develop.
  - Next steps: Engage with the UMRR CC on scoping. Most likely a series of meetings beginning Fall of 2023.

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PROGRAM PRIORITIES

	FY23 October 2022 - September 2023	FY 24 October 2023 - September 2024	FY 25 October 2024 - September 2025	FY 26 October 2025 - September 2026
Funding Scenarios				
UMRR Workshop				
Future HREP Selection				
UMRR Strategic Plan				

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DISCUSSION

44

UMRR Status and Trends Report Snapshot Summaries

Andrew Stephenson

July 24, 2023

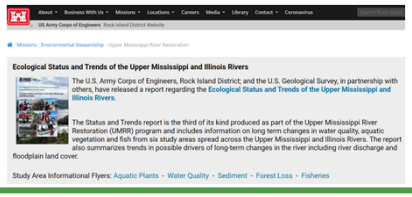
1

S&T Snapshot Summary Communication Toolkit

The UMRR program has developed snapshot summaries highlighting the most important observations about the river's ecological health and how long-term monitoring can inform how the river's ecological resources can be sustained and restored.

They focus on **fisheries, floodplain forest loss, sedimentation, water quality,** and **aquatic vegetation**.

The five snapshot summaries are available on the UMRR website.



2

S&T Snapshot Summary Communication Toolkit

This communication toolkit was developed to assist UMRR partners in disseminating these snapshot summaries and information to their respective stakeholders.

Two announcement templates to deliver snapshot summaries in discrete events are provided recognizing **2023 as a year of high water** and the **30th year of annual monitoring for the UMRR partnership**.

Pitch templates were developed to send the snapshot summaries to **internal** and **external audiences**.

3

The Message (1/3)

The Upper Mississippi River System is complex; state and federal agencies use science to inform restoration actions.

Thanks to long term monitoring, periodical aerial surveys, and continued analysis, we know more about the rivers' ecosystem than ever before.

Continued monitoring will help us assess the impacts of management actions on these resources in the future to help us build a healthier river ecosystem.

4

The Message (2/3)

The UMRR partnership has been monitoring the health of the Upper Mississippi River System for 30 years, creating the most complete understanding of any large river in the world. UMRR monitors fish communities, water quality, and aquatic vegetation annually – here are three stories from the biggest dataset on one of the world's largest river ecosystem in the world:

- Upper Mississippi and Illinois River Experience Widespread and Regional Changes in Fish Communities
- Aquatic Plants Expand and Water Clarity Improves in Portions of the Upper Mississippi River
- Water Quality has Improved in the Upper Mississippi and Illinois River but Challenges Remain

5

The Message (3/3)

In 2023, much of the river system experienced major to moderate flooding with some areas recording top five records for high water. Here are two stories on the impacts of increased flooding in the Upper Mississippi River System:

- Upper Mississippi and Illinois Rivers Floodplains Experience Widespread Loss of Forested Areas
- Sediment Changes the Depth and Shape of the Upper Mississippi River

6

Announcement Samples

Celebrating the most complete understanding of any large river ecosystem in the world and the cooperative monitoring that led us here

The Upper Mississippi River Restoration (UMRR) program, implemented through a partnership of federal and state agencies, nongovernmental organizations and individuals, has released five snapshot summaries on the ecological status and trends of the Upper Mississippi River System. Three of these summaries outline important findings from long term annual monitoring of water quality, aquatic plants, and fisheries across Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The UMRR partnership has been monitoring the river system for three decades, building the most complete understanding of any large river ecosystem in the world. Here are three stories from the largest dataset for a large river ecosystem:

- Upper Mississippi and Illinois River Experience Widespread and Regional Changes in Fish Communities
- Aquatic Plants Expand and Water Clarity Improves in Portions of the Upper Mississippi River
- Water Quality has Improved in the Upper Mississippi and Illinois River but Challenges Remain

Continued annual monitoring will inform river management and investments in the coming years and help develop new tools and models to better understand and manage the ecosystem in the face of a changing river.

(Use banner photos F1, AP1, WQ1)

7

Pitch Templates

The goal of these snapshot summaries is to provide you and other interested parties with valuable information on the Upper Mississippi River System (UMRS), allowing greater reach of the latest research to more community members. The summaries tell stories on trends in fish communities, recovery of some aquatic plant populations, decreased nutrient and sediment pollution in the rivers.

We hope [intended media outlet] can use these summaries to discuss complex interdisciplinary issues on the UMRS. We ask that you share these summaries and the stories within with your audience and your partners to increase awareness of what's happening on the UMRS.

8

Photos

Thumbnail photos relevant to each snapshot summary are included below. Higher resolution photos can be provided upon request.

The Upper Mississippi River Restoration (UMRR) program has produced the most extensive fisheries dataset for a great river in the world. Because of this effort, we now know forage fish, a vital food source for larger fish and wildlife of the Upper Mississippi River System, are declining in some areas. (Use Photo F3)

Please contact Andrew Stephenson at astephenson@umrba.org or Erin Spry at espry@umrba.org for high resolution photos.

Photos Available:

Photo credits:
F1: Jason DeBoer
F2: Nick Schlesser
F3: University of Illinois
F4: Prairie Research Institute
F5: Illinois Natural History Survey

9

Contacts – Authors and A-Team

Report authors to topic specific sections.

A-Team for general takeaways from the report and importance of science to management of the UMRS.

Jeff Houser
U.S. Geological Survey
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(507) 494-6214

Shawn Giblin
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(608) 785-9995

10

UMRR COT Discussion – August 2

Two Releases:

Celebrating 30 years of monitoring through partnership in the UMRS:
- Fisheries
- Aquatic Vegetation
- Water Quality

Acknowledging high water in 2023 and its impacts on the UMRS:
- Floodplain forests
- Sediment

Pitch templates to media outlets and within agencies: (Mississippi Ag and Water Desk

Are you able to participate in a coordinated message about the release of the snapshot summaries? If so, how?

- USACE MVP (Shannon Bauer)
- USGS (Randy Hines)
- MN (Greg Husak)
- Mississippi River Network (Michael Anderson)

11

Mississippi River Network – August 3

Erin Spry provided an overview of UMRR, the status and trends report, why we made the snapshot summaries, what's in them, what's in the communication toolkit, and our intentions with the toolkit. Discussion included:

- Environmental justice component of the discussion as a direct response to the status and trends report
- Reminder to not assume the needs of communities and instead invite them to speak for themselves.
- Request for more direct instructions on content to roll out in the next month.

12

Future Project

- Identify communities that may be most impacted by the trends identified in the Snapshot Summaries, create and test communications tools to reach those communities. We need to make those connections.
- The snapshot summaries are a tool to bring new folks in on what's happening on the river - and that focus should be retained in future efforts, with new strategies incorporated into our communications toolkit as we learn more information.

13

UMRR COMMUNICATION AND OUTREACH TEAM
Update

1

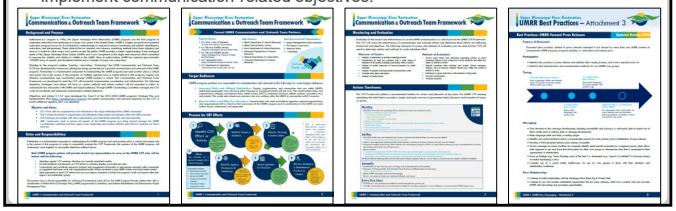
Summer 2023 Focus Areas

- Support for:
  - 2022 UMRR Report to Congress
  - UMR NWFR 100th Anniversary
  - LTRM Status & Trends Report Rollout
- UMRR Environmental Justice Communication

2

UMRR COT Framework

- Continued development of the COT Framework … *Finalizing soon!*
- Purpose: "…assist the COT with successful communication, coordination and collaboration…to communicate key information with UMRR and target audiences…Through UMRR CC oversight, the COT works to coordinate and implement communication-related objectives."



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Upcoming Actions and Topics

- Finalization of COT Framework
- Continued support for 2022 UMRR Report to Congress and LTRM Status & Trends Report rollout
- Minnesota Department of Natural Resources ~ Communication Initiatives, Success Stories, and Lessons Learned (September)
- Calendar Year 2024 Strategy and Anticipated Efforts (November)

4

UMRR Communication and Outreach Team

Points of Contact:

Rachel Perrine
USACE-RPEDN-PD-F @ MVR
Rachel.E.Perrine@usace.army.mil

Anne Wurtenberger
USACE-RPEDN-PD-F @ MVR
Anne.C.Wurtenberger@usace.army.mil

5

UMRR LTRM Implementation Planning Update

UMRR Coordinating Committee Quarterly Meeting
8 August 2023
La Crosse, Wisconsin

1

Implementation Planning

Why? To prepare for potential increased funding resulting from increased UMRR authorization under WRDA 2020

Goal: Develop a set of portfolios of actions that best address UMRR management and restoration information needs

2

Implementation Planning Group

- Kirk Hansen IADNR
- Jim Lamer IRBS
- Molly Sobotka MDC
- Matt Vitello MDC
- Rob Burdis MDNR
- Nick Schlesser MDNR
- Neil Rude MDNR
- Andrew Stephenson UMRBA
- Davi Michl USACE
- Rob Cosgriff USACE
- Karen Hagerty USACE (retired)
- Matt Mangan USFWS
- Steve Winter USFWS
- Kristen Bouska USGS
- Nate De Jager USGS
- Jeff Houser USGS
- Jennie Sauer USGS (retired)
- Robb Jacobson USGS
- Jim Fischer WDNR
- Madeline Magee WDNR

Facilitators:
David Smith (USGS, retired)
Max Post van der Burg (USGS)

Additional expertise:
Danelle Larson (USGS)
Teresa Newton (USGS)

3

Progress

- Identified **information needs** not being addressed by ongoing monitoring and science
- Developed **criteria** for assessing the expected benefit of addressing each information need
- Estimated **cost** of addressing each information needs
- Applied an **optimization** approach for identifying the collection of information needs that would produce the most benefit for a given cost if successfully addressed
- **Selected subset of information needs** for additional development
- **Recommend information needs** to address during FY24 – 26.

4

Criteria for estimating expected benefit of addressing information need

- Relevance & Importance: Ecosystem Understanding/Assessment
- Relevance & Importance: Management and Restoration
- Depth of Current Knowledge
- Opportunity to Learn

5

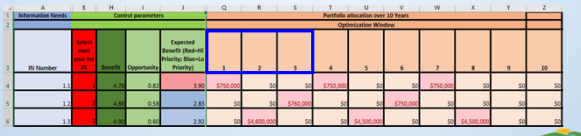
Optimization

- Included:
  - Expected Benefit
  - Estimated Cost
  - Minimum number of years needed to obtain expected benefit
  - Annual funds available
- Allocated funds across years to maximize total expected benefit over 10 year period.

6

Worksheet

- Choose when to start on resolving information need
- Track costs and remain under budget cap
- Maximize total benefit

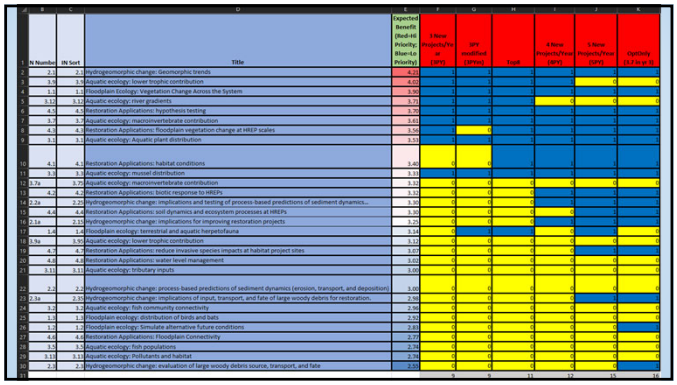


7

Scenarios considered

1. Use algorithm to optimize total expected benefits over 10 years
   - Results in **highest total benefits** over 10 years
   - Selects greatest number of information needs, but…
   - Selects more smaller effort/cost information needs rather than fewer larger effort/cost information needs.
2. Use algorithm optimize total expected benefits but constrain number of new starts each year (3, 4 or 5)
   - Selects large information needs with highest expected benefits
   - Selects fewer information needs with larger individual expected benefits
3. Select information needs with high individual expected benefits
   - Fewer Large information needs with larger expected benefits

8



9

Information needs selected for further consideration

- 1.1 FP Veg. change across system
- 1.4 Terr. and aquat. herpetofauna & birds/bats
- 2.1 Geomorphic trends
- 3.1 Aquatic plant distribution
- 3.3 Mussels
- 3.7 Macroinvertebrates*
- 3.9 Lower trophic contribution
- 3.12 River gradients
- 4.1 Restoration: Habitat conditions
- 4.3 Restoration: FP HREP scale vegetation change
- 4.5 Restoration: Hypoth. testing

10

Modifications to list of information needs

- 1.1 FP Veg. change across system
- 1.4 Terr. and aquat. herpetofauna & ~~birds/bats~~
- 2.1 Geomorphic trends
- 3.1 Aquatic plant distribution
- 3.3 Mussels
- 3.7 Macroinvertebrates*
- 3.9 Lower trophic contribution
- 3.12 River gradients
- 4.1 Restoration: Habitat conditions
- 4.3 Restoration: FP HREP scale vegetation change
- 4.5 Restoration: Hypoth. testing

11

Recommended List of Information Needs

- 1.1 FP Veg. change across system
- 1.4 Terr. and aquat. herpetofauna & ~~birds/bats~~
- 2.1 Geomorphic trends
- 3.1 Aquatic plant distribution
- 3.3 Mussels
- 3.7 Macroinvertebrates*
- 3.9 Lower trophic contribution
- 3.12 River gradients
- 4.1 Restoration: Habitat conditions
- 4.3 Restoration: FP HREP scale vegetation change
- 4.5 Restoration: Hypoth. testing

- 1.1 FP Veg. change across system
- 1.4 Terr. and aquat. herpetofauna
- 2.1 Geomorphic trends
- 3.1 Aquatic Plant distribution
- 3.3 Mussels
- 3.7 Macroinvertebrates*
- 3.9 Lower trophic contribution
- 3.12 River gradients
- 4.5 Learning from HREPs (4.1, 4.3, 4.5)

12

Recommended Information Needs for FY 24 - 26

- **Floodplain ecology**: Vegetation change across the system
- **Floodplain ecology**: Terrestrial and aquatic herpetofauna
- **Hydrogeomorphic change**: Geomorphic trends
- **Aquatic ecology**: Aquatic vegetation distribution and changes across the system
- **Aquatic ecology**: Native freshwater mussel distribution
- **Aquatic ecology**: Macroinvertebrate distribution
- **Aquatic ecology**: Lower trophic contribution (phyto- and zooplankton)
- **Aquatic ecology**: River gradients from Pool 14 to Pool 25
- **Restoration applications**: Learning from restoration and management

13

Floodplain Ecology: Floodplain vegetation change across the system

- **Goal**: A quantitative understanding of how the vegetation of the entire UMRS has changed since historical conditions (pre-lock and dam) as well as over the past 30 to 40 years.
- **How results will be used**: Understanding how and why the floodplain vegetation communities have changed can identify effective management and restoration actions to sustain floodplain ecosystems of the UMRS

14

Floodplain Ecology: terrestrial and aquatic herpetofauna (amphibians and reptiles)

- **Goal**: Understanding the status of floodplain amphibian and reptile populations in relation to changing environmental conditions
- **How the results will be used**:
  - Assess ecosystem health and resilience
  - Improve management and restoration by identifying project features that could improve habitat condition and use
  - Prepare for emerging issues
  - Develop a management guide for amphibians and reptiles based on findings

15

Hydrogeomorphic change: Geomorphic trends

- **Goal**: A predictive understanding of how the mosaic of habitats of the UMRS will change over time. That is, Where, how, and to what degree is the geomorphology of the river and floodplain changing and expected to change over planning horizons of decades to centuries?
- **How the results will be used**
  - Integrated understanding of changes in hydrology and geomorphology is fundamental to understanding the resilience of the UMRS and for planning sustainable research projects

16

Aquatic ecology: Aquatic plant distribution

- **Goal**: To better understand the current limitations of submersed, emergent and floating plants. That is, what are the factors which limit aquatic plant distribution and (re)establishment throughout the UMRS?
- **How the results will be used**: a better understanding of what limits aquatic vegetation where it remains scarce can guide the location and type of appropriate actions for the restoration and management of aquatic vegetation

17

Aquatic ecology: Native freshwater mussel distribution

- **Goal**: Quantify the distribution, abundance, and assemblage structure of native freshwater mussels throughout the UMRS ecosystem.
- **How the results will be used**:
  - Assess the health and resiliency of the UMRS
  - Predict how mussel assemblages may respond to changing environmental conditions (e.g., climate change; increased navigation traffic)
  - Identify hotspots for abundance and diversity that will facilitate prioritization of areas for restoration efforts and avoidance of areas for restoration projects
  - Track changes in species richness, including species of greatest conservation need.

18

Aquatic ecology: Lower trophic contribution (phytoplankton and zooplankton)

- **Goal**: Establish baseline conditions in the UMRS and investigate relationships between plankton and environmental conditions. That is, what are the abundance, distribution, and status of phytoplankton and zooplankton in the UMRS?
- **How the results will be used**:
  - Indicators of the health and resilience of the UMRR
  - Assessing ecological response to ongoing environmental changes

19

Aquatic ecology: Macroinvertebrate contribution

- **Goal**: Better understand the contribution of macroinvertebrates to the health and resilience of the UMRS to inform restoration and management
- **How the results will be used**:
  - Indicator of the health and resilience of the UMRS.
  - Better understand the causes and consequences of changes in other components of the ecosystems (water quality, vegetation, fisheries, etc).
  - May broaden the aspects of habitat considered in selecting HREPS and designing their features.

20

Aquatic ecology: river gradients from Pool 14 to Pool 25

- **Goal**:
  - Short-term: Further develop this information need based on existing data and partnership information needs in this region of the UMRS.
  - Long-term: Better understand the gradients in WQ conditions, vegetation distribution and abundance and fish populations across Pools 14 to 25.
- **How the results will be used**:
  - Inform assessment of UMRS ecosystem health and resilience
  - Inform selection and design of restoration projects and management decisions in the UMRS.

21

Restoration Applications: Learning from restoration and management

- **Goals**:
  - Build capacity to learn from restoration and management actions across the UMRS.
  - Reduce uncertainties regarding the response to those actions
  - Enhance the capacity of LTRM to provide technical expertise as part of HREP project development teams
- **How the results will be used**:
  - To improve our understanding of how the UMRS responds to restoration and management actions and use that information to improve future action

22

Recommended Information Needs for FY 24 - 26

- **Floodplain ecology**: Vegetation change across the system
- **Floodplain ecology**: Terrestrial and aquatic herpetofauna
- **Hydrogeomorphic change**: Geomorphic trends
- **Aquatic ecology**: Aquatic vegetation distribution and changes across the system
- **Aquatic ecology**: Native freshwater mussel distribution
- **Aquatic ecology**: Macroinvertebrate distribution
- **Aquatic ecology**: Lower trophic contribution (phyto- and zooplankton)
- **Aquatic ecology**: River gradients from Pool 14 to Pool 25
- **Restoration applications**: Learning from restoration and management

23

FY 23 Funding Scenarios

1. Fully fund 3 years of 2.1 Geomorphic Trends with FY 23 funds (**Scenario 1**)
2. Partially fund 2.1 (fund PI position for 3 years) and partially fund(initial research scientist for 3 years) one of the following:
   1. 3.9 Lower trophic contributions (**Scenario 2**)
   2. 3.12 River gradients (**Scenario 3**)
   3. 3.1 Vegetation Change Across (**Scenario 4**)

24

FY 23 Funding Scenarios

1. Fully fund 3 years of 2.1 Geomorphic Trends with FY 23 funds (**Scenario 1**)
2. Partially fund 2.1 (fund PI position for 3 years) and partially fund(initial research scientist for 3 years) one of the following:
    1. 3.9 Lower trophic contributions (**Scenario 2**)
    2. 3.12 River gradients (**Scenario 3**)
    3. 3.1 Vegetation Change Across (**Scenario 4**)

25

Next steps

- Request UMRR CC endorsement of:
    - List of 8 information needs to address through FY26
    - Two information needs recommended for initial funding with FY 23 funds
- Substantial additional work to work out the details of how to most effectively fund each of the 8 information needs through FY 26.
    - Results of that work will be presented at the next A team meeting and the October UMRR CC

26

Recommended Information Needs for FY 24 - 26

- **Floodplain ecology**: Vegetation change across the system
- **Floodplain ecology**: Terrestrial and aquatic herpetofauna
- **Hydrogeomorphic change**: Geomorphic trends
- **Aquatic ecology**: Aquatic vegetation distribution and changes across the system
- **Aquatic ecology**: Native freshwater mussel distribution
- **Aquatic ecology**: Macroinvertebrate distribution
- **Aquatic ecology**: Lower trophic contribution (phyto- and zooplankton)
- **Aquatic ecology**: River gradients from Pool 14 to Pool 25
- **Restoration applications**: Learning from restoration and management

27

Recommended FY 23 Funding Scenario

Partially fund the following information needs

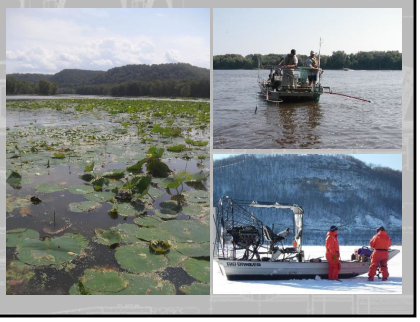
2.1 Hydrogeomorphic change: Geomorphic trends

3.12 River gradients from Pool 14 to Pool 25

28

UMRR MONITORING AND SCIENCE UPDATE

Marshall Plumley
Rock Island District
9 August 2023



US Army Corps of Engineers

1

UMRR MONITORING & SCIENCE FY23

$55 Million UMRR Program

2 SOWs in FY23

SOW for LTRM base monitoring
$5.5M

SOW for science in support (analysis under base)
$1.5M

Both SOWs together are equivalent to a fully funded UMRR LTRM element $7.0M

Science in Support of Restoration & Management
(combined with analysis under base into 1 SOW)
$6.85M

TOTAL: $13.85M

2

UMRR MONITORING & SCIENCE FY23

Endorsed and funded in March

Science in Support of Restoration and Management

A. LTRM balance	$ 331,508
B. Ecohydrology	$ 469,973
C. LCU processing (last year)	$ 335,238
D. Vital Rates consolidated report	$ 52,788
E. Macroinvertebrate contaminants	$ 77,483
F. Herbarium	$ 21,649
G. Future landscape modeling	$ 600,136
H. Equipment (field stations, UMESC)	$ 659,268
I. adjustments	($ 45,894)
J.	
Subtotal	**$2,502,149**

3

FY2022 SCIENCE PROPOSALS (ENDORSED IN MAY)

Scoping and vetting new technology and methods for use in future hydrographic and topographic surveys	Strange (UMESC), Kalas (WI DNR)	$ 403,952
Avian associations with management in the UMRS: filling knowledge gaps for habitat management	Hohman (Audubon), Kirsch (UMESC)	$ 388,776
Filling in the gaps with FLAMe: Spatial patterns in water quality and cyanobacteria across connectivity gradients and flow regimes in the Lower Impounded Reach of the UMR	Loken, Kreiling, Jankowski (UMESC), Stanley (UW-Madison)	$ 482,217
Substrate stability as an indicator of abiotic habitat for the UMR benthic community	Newton (UMESC)	$ 351,852
SUB-TOTAL		$1,626,797

4

UMRR MONITORING & SCIENCE FY23

Science in Support of Restoration and Management

High Priority Items (March)	$ 2,502,149
Priority FY22 proposals (May)	$ 1,626,797
UMESC topobathy support for FY23	$ 220,449
Remaining LTRM funding	$ 2, 730,711

5

UMRR MONITORING & SCIENCE FY23

Science in Support of Restoration and Management

Remaining LTRM items for FY23 & funding $ 2, 730,711

A. Pool 13 HARP	$ 827,886*
B. Initiating work on 2 LTRM Information Needs	$ 1,234,516
	$ 2,062,502
C. Topobathy pilot studies	$ 314,000**

6

LTRM Science Highlights

Photo by: University of Illinois, Prairie Research Institute, Illinois Natural History Survey

August 2023
La Crosse, WI

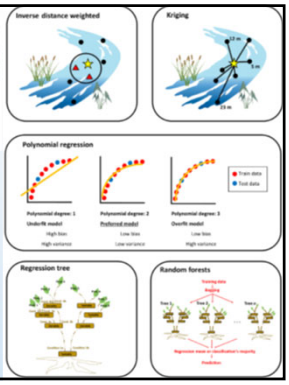
1

LIMNOLOGY and OCEANOGRAPHY: METHODS

ASLO

Reconstructing missing data by comparing interpolation techniques: Applications for long-term water quality data

Danelle M. Larson, Wako Bungula, Amber Lee, Alaina Stockdill, Casey McKean, Frederick "Forrest" Miller, Killian Davis, Richard A. Erickson, Enrika Hlavacek



- The authors compared 7 interpolation methods for dealing with missing data and expanding the LTRM water quality dataset
- The random forests method was very accurate with low spatial and temporal variability across the entire UMRS, indicating the model worked well.
- The authors provide a roadmap and data analysis scripts for doing interpolations with any big dataset, including LTRM data

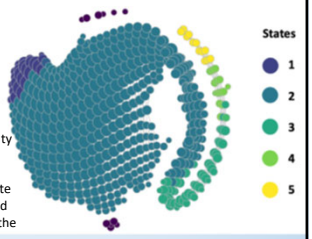
2

PLOS COMPUTATIONAL BIOLOGY

RESEARCH ARTICLE

Quantifying ecosystem states and state transitions of the Upper Mississippi River System using topological data analysis

Danelle Marie Larson, Wako Bungula, Casey McKean, Alaina Stockdill, Amber Lee, Frederick Forrest Miller, Killian Davis

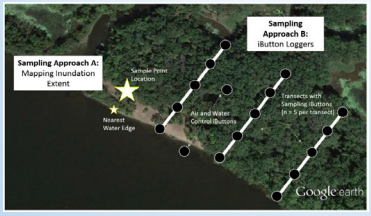


- The authors used a new mathematical tool set called topological data analysis (TDA) that identified 5 water quality states for the LTRM study reaches
  - State 1 = "clear water" state
  - State 2 = "status quo", highly variable water quality state
  - States 3-5 = "turbid states", with state 5 the most turbid
- TDA tools showed several types of state transitions during the past 30 years, including
  - Annual seasonal transitions as expected (very clear during winter)
  - Multiple transitions into the turbid state (state 2 → state 3) in Pool 13 since 2015
  - State transitions from random, extreme events like floods

3

Publication: Van Appledorn, M., N.R. De Jager, & J.J. Rohweder. 2023. Low-complexity floodplain inundation model performs well for ecological and management applications in a large river ecosystem. JAWRA https://doi.org/10.1111/1752-1688.13152.

Purpose: evaluate the UMRS systemic inundation model using independent, empirical datasets



Approach:

- A coupled empirical sampling design
  - Spatially extensive, temporally limited sampling that mapped land-water interface under two contrasting flow conditions
  - Spatially limited, temporally extensive sampling that used an array of temperature loggers deployed for a growing season in two areas per reach
- Data collection took place in LTRM study reaches with the help of LTRM field stations (**thank you!**)

4

Results for spatially extensive, temporally limited sampling:

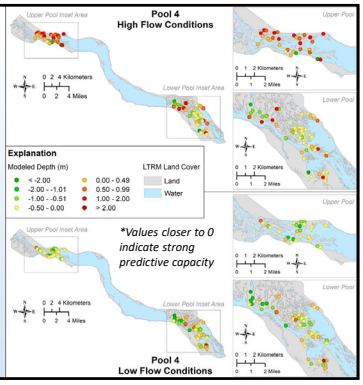
- Model performance differed among study reaches and flow conditions; model generally underestimated depth for low-flow conditions (but never >0.33m for pool-wide median value)
- Little geographic bias in model discrepancies under high- and low-flow conditions

Results for spatially limited, temporally extensive sampling:

- Excellent prediction of # of inundation events
- High agreement between observed and simulated event duration (median discrepancy was 0 days)

Implications:

- Model is well-suited for ecological and management applications in UMRS
- No obvious systematic biases
- Users should still consider model assumptions when interpreting results



5

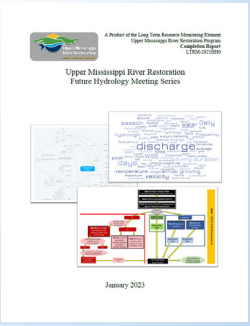
Van Appledorn, M., and L. Sawyer. 2023. Upper Mississippi River Restoration Future Hydrology Meeting Series. Completion Report, LTRM-2021HH6.

Purpose:

- Document UMRR priorities for understanding climate changed hydrology
- Identify potential datasets and/or approaches for addressing those priorities
- Develop a blueprint for acquiring a dataset of hydrologic projections for the UMRS)

Contents:

- Narrative describing meeting series, points of discussion, and decisions
- Appendices of all meeting-related materials, including agendas, read-aheads/homework, homework responses, collaboration documents used during the meeting, and action steps for acquiring a hydrologic projections dataset



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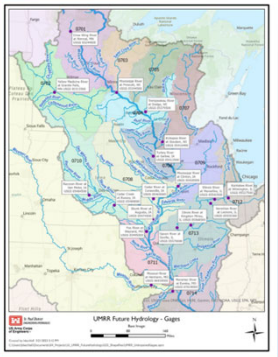


LOCA-VIC-mizuRoute Data Product Evaluation

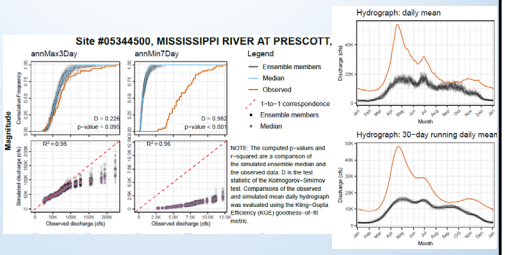
- Identified in UMRR meeting series as a potential off-the-shelf product of hydrologic projections
- Evaluated the data product at 19 gages representing all 4-digit HUCs that span the basin's physiography and climate patterns.
- Goal: ensure LOCA-VIC-mizuRoute output data were reliable for applications in the mainstem UMRS.
- We compared modeled vs observed discharge from 1951 – 2005 using summaries of 8 hydrologic characteristics:
  1. Magnitude of 7-day annual minimum Q
  2. Magnitude of 3-day annual maximum Q
  3. Date of 7-day annual minimum Q
  4. Date of 3-day annual maximum Q
  5. Date of center of mass
  6. Daily summary hydrograph
  7. 30-day summary hydrograph
  8. Daily duration curve

7

LOCA-VIC-mizuRoute Data Product Evaluation

Results: the LOCA-VIC-mizuRoute data product appears unsuitable for applications in the UMRS

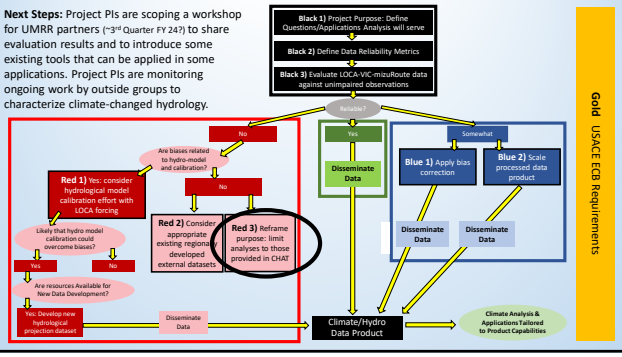
- Substantial underestimates of discharge across all gages
- Inability to capture correct seasonal patterns in the annual hydrograph across all gages



8

LOCA-VIC-mizuRoute Data Product Evaluation

Next Steps: Project PIs are scoping a workshop for UMRR partners (~3rd Quarter FY 24?) to share evaluation results and to introduce some existing tools that can be applied in some applications. Project PIs are monitoring ongoing work by outside groups to characterize climate-changed hydrology.



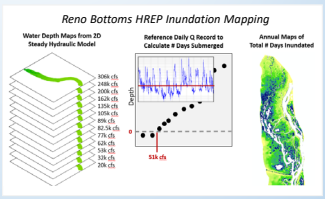
9

Van Appledorn, M., and N.R. De Jager. 2023. Advancing the science and management of the Upper Mississippi River System floodplain by characterizing and mapping inundation regimes. Invited oral presentation, Society of Wetland Scientists, 27-30 June 2023.

Presentation Goals: To convey the biophysical complexity of the UMRS floodplain, to demonstrate two methods of summarizing and mapping inundation, and to show how the work is integrated into management applications and the UMRR program.

Topics:

- UMRS Systemic Inundation Model
  - Systemic patterns in inundation diversity
  - Changing inundation regimes over 83-years in P3-P10
  - Modeling floodplain forest dynamics
  - Ecosystem and resiliency assessments
- Reno Bottoms HREP
  - Making 2D hydraulic model outputs temporally explicit for ecological applications
  - Simulating forest responses to alternative hydrologic and reedcanary grass management scenarios



10

Vital rates, microchemistry & genetics synthesis

Kibbe Field Station, August 3rd & 4th

Purpose: share findings and develop objectives and approaches for integrating project components

- Missouri State University
  - Dr. Quinton Phelps
  - Hae Kim
- Southern Illinois University
  - Dr. Greg Whitledge
  - Shaley Valentine, PhD candidate
- University of Illinois Urbana-Champaign
  - Dr. Milton Tan
  - Dr. Joel Corush
  - Roberto Cucalón, PhD student
- Illinois Natural History Survey
  - Dr. Jim Lamer
- U.S. Geological Survey
  - Dr. Kristen Bouska

11

Changes in Mapping Statistics and Reasoning

	Frames FY22 Plan	Frames FY23 Plan
FY2021	1754.5	1754.5
FY2022	1594.5	1594.5
FY2023	1603	1603
FY2024	1720	1033
FY2025	1598	1271
FY2026	0	1014
Sum	*8270*	*8270*

- Decreased to one 100% mapper and one 100% QA/QC'er
  - Erin Hoy, 20+ years experience mapping on UMRS completing mapping
  - Andrew Strassman, 10+ years experience mapping on UMRS completing QA/QC
- Looked to balance mapping needs of the Partnership against realistic abilities of mapping team
  - Looked to group pools based on geographic location to match similar vegetation and increase the efficiency of fieldwork
  - Looked to spread area and mapping complexity equally over FY24 and FY25 with remaining mapping in FY26

12

Overview of LCU2020 Mapping Schedule

Pool/Reach	Field Status	New Plan FY22	New Plan FY23	Pool/Reach	Field Status	New Plan FY22	New Plan FY23
St Croix	Done	FY 23 Complete	FY 23 Complete	Pool 18	FY 24	FY 25 Complete	FY 25 Complete
Pool 1	Done	FY 23 Complete	FY 23 Complete	Pool 19	FY 24	FY 25 Complete	FY 25 Complete
Pool 2	Done	FY 23 Complete	FY 23 Complete	Pool 20	FY 24	FY 24 Complete	FY 25 Complete
Pool 3	Done	FY 23 Complete	FY 23 Complete	Pool 21	FY 24	FY 24 Complete	FY 25 Complete
Pool 4	Done	FY 21 Complete	FY 21 Complete	Pool 22	FY 23	FY 24 Complete	FY 24 Complete
Pool 5	Done	FY 24 Complete	FY 24 Complete	Pool 24	FY 23	FY 24 Complete	FY 24 Complete
Pool 5A	Done	FY 24 Complete	FY 24 Complete	Pool 25	FY 23	FY 24 Complete	FY 24 Complete
Pool 6	Done	FY 24 Complete	FY 24 Complete	Pool 26	Done	FY 21 Complete	FY 21 Complete
Pool 7	Done	FY 23 Complete	FY 23 Complete	OR 1	FY 25	FY 25 Complete	FY 26 Complete
Pool 8	Done	FY 21 Complete	FY 21 Complete	OR 2	Done	FY 21/22 Complete	FY 21/22 Complete
Pool 9	Done	FY 22 Complete	FY 22 Complete	IR-Lockport	FY 25	FY 24 Complete	FY 26 Complete
Pool 10	Done	FY 22 Complete	FY 22 Complete	IR-Brandon	FY 25	FY 24 Complete	FY 26 Complete
Pool 11	Done	FY 23 Complete	FY 23 Complete	IR-Dresden	FY 25	FY 24 Complete	FY 26 Complete
Pool 12	Done	FY 22 Complete	FY 22 Complete	IR-Marseilles	FY 23	FY 24 Complete	FY 26 Complete
Pool 13	Done	FY 21 Complete	FY 21 Complete	IR-Starved Rock	FY 23	FY 24 Complete	FY 26 Complete
Pool 14	FY 24	FY 25 Complete	FY 25 Complete	IR-Peoria	FY 23	FY 24 Complete	FY 25 Complete
Pool 15	FY 24	FY 25 Complete	FY 25 Complete	IR-La Grange	Done	FY 22 Complete	FY 22 Complete
Pool 16	FY 24	FY 25 Complete	FY 25 Complete	IR-Alton	Done	FY 23 Complete	FY 23 Complete
Pool 17	FY 23	FY 25 Complete	FY 24 Complete				

13

Pools moved from FY25 to FY24 (-1 Year Completion)

Pool/Reach	Field Status	New Plan FY22	New Plan FY23	Pool/Reach	Field Status	New Plan FY22	New Plan FY23
St Croix	Done	FY 23 Complete	FY 23 Complete	Pool 18	FY 24	FY 25 Complete	FY 25 Complete
Pool 1	Done	FY 23 Complete	FY 23 Complete	Pool 19	FY 24	FY 25 Complete	FY 25 Complete
Pool 2	Done	FY 23 Complete	FY 23 Complete	Pool 20	FY 24	FY 24 Complete	FY 25 Complete
Pool 3	Done	FY 23 Complete	FY 23 Complete	Pool 21	FY 24	FY 24 Complete	FY 25 Complete
Pool 4	Done	FY 21 Complete	FY 21 Complete	Pool 22	FY 23	FY 24 Complete	FY 24 Complete
Pool 5	Done	FY 24 Complete	FY 24 Complete	Pool 24	FY 23	FY 24 Complete	FY 24 Complete
Pool 5A	Done	FY 24 Complete	FY 24 Complete	Pool 25	FY 23	FY 24 Complete	FY 24 Complete
Pool 6	Done	FY 24 Complete	FY 24 Complete	Pool 26	Done	FY 21 Complete	FY 21 Complete
Pool 7	Done	FY 23 Complete	FY 23 Complete	OR 1	FY 25	FY 25 Complete	FY 26 Complete
Pool 8	Done	FY 21 Complete	FY 21 Complete	OR 2	Done	FY 21/22 Complete	FY 21/22 Complete
Pool 9	Done	FY 22 Complete	FY 22 Complete	IR-Lockport	FY 25	FY 24 Complete	FY 26 Complete
Pool 10	Done	FY 22 Complete	FY 22 Complete	IR-Brandon	FY 25	FY 24 Complete	FY 26 Complete
Pool 11	Done	FY 23 Complete	FY 23 Complete	IR-Dresden	FY 25	FY 24 Complete	FY 26 Complete
Pool 12	Done	FY 22 Complete	FY 22 Complete	IR-Marseilles	FY 23	FY 24 Complete	FY 26 Complete
Pool 13	Done	FY 21 Complete	FY 21 Complete	IR-Starved Rock	FY 23	FY 24 Complete	FY 26 Complete
Pool 14	FY 24	FY 25 Complete	FY 25 Complete	IR-Peoria	FY 23	FY 24 Complete	FY 25 Complete
Pool 15	FY 24	FY 25 Complete	FY 25 Complete	IR-La Grange	Done	FY 22 Complete	FY 22 Complete
Pool 16	FY 24	FY 25 Complete	FY 25 Complete	IR-Alton	Done	FY 23 Complete	FY 23 Complete
Pool 17	FY 23	FY 25 Complete	FY 24 Complete				

14

Pools moved FY25 Completion (+1 year)

Pool/Reach	Field Status	New Plan FY22	New Plan FY23	Pool/Reach	Field Status	New Plan FY22	New Plan FY23
St Croix	Done	FY 23 Complete	FY 23 Complete	Pool 18	FY 24	FY 25 Complete	FY 25 Complete
Pool 1	Done	FY 23 Complete	FY 23 Complete	Pool 19	FY 24	FY 25 Complete	FY 25 Complete
Pool 2	Done	FY 23 Complete	FY 23 Complete	Pool 20	FY 24	FY 24 Complete	FY 25 Complete
Pool 3	Done	FY 23 Complete	FY 23 Complete	Pool 21	FY 24	FY 24 Complete	FY 25 Complete
Pool 4	Done	FY 21 Complete	FY 21 Complete	Pool 22	FY 23	FY 24 Complete	FY 24 Complete
Pool 5	Done	FY 24 Complete	FY 24 Complete	Pool 24	FY 23	FY 24 Complete	FY 24 Complete
Pool 5A	Done	FY 24 Complete	FY 24 Complete	Pool 25	FY 23	FY 24 Complete	FY 24 Complete
Pool 6	Done	FY 24 Complete	FY 24 Complete	Pool 26	Done	FY 21 Complete	FY 21 Complete
Pool 7	Done	FY 23 Complete	FY 23 Complete	OR 1	FY 25	FY 25 Complete	FY 26 Complete
Pool 8	Done	FY 21 Complete	FY 21 Complete	OR 2	Done	FY 21/22 Complete	FY 21/22 Complete
Pool 9	Done	FY 22 Complete	FY 22 Complete	IR-Lockport	FY 25	FY 24 Complete	FY 26 Complete
Pool 10	Done	FY 22 Complete	FY 22 Complete	IR-Brandon	FY 25	FY 24 Complete	FY 26 Complete
Pool 11	Done	FY 23 Complete	FY 23 Complete	IR-Dresden	FY 25	FY 24 Complete	FY 26 Complete
Pool 12	Done	FY 22 Complete	FY 22 Complete	IR-Marseilles	FY 23	FY 24 Complete	FY 26 Complete
Pool 13	Done	FY 21 Complete	FY 21 Complete	IR-Starved Rock	FY 23	FY 24 Complete	FY 26 Complete
Pool 14	FY 24	FY 25 Complete	FY 25 Complete	IR-Peoria	FY 23	FY 24 Complete	FY 25 Complete
Pool 15	FY 24	FY 25 Complete	FY 25 Complete	IR-La Grange	Done	FY 22 Complete	FY 22 Complete
Pool 16	FY 24	FY 25 Complete	FY 25 Complete	IR-Alton	Done	FY 23 Complete	FY 23 Complete
Pool 17	FY 23	FY 25 Complete	FY 24 Complete				

15

Pools moved FY26 Completion (+2 years)

Pool/Reach	Field Status	New Plan FY22	New Plan FY23	Pool/Reach	Field Status	New Plan FY22	New Plan FY23
St Croix	Done	FY 23 Complete	FY 23 Complete	Pool 18	FY 24	FY 25 Complete	FY 25 Complete
Pool 1	Done	FY 23 Complete	FY 23 Complete	Pool 19	FY 24	FY 25 Complete	FY 25 Complete
Pool 2	Done	FY 23 Complete	FY 23 Complete	Pool 20	FY 24	FY 24 Complete	FY 25 Complete
Pool 3	Done	FY 23 Complete	FY 23 Complete	Pool 21	FY 24	FY 24 Complete	FY 25 Complete
Pool 4	Done	FY 21 Complete	FY 21 Complete	Pool 22	FY 23	FY 24 Complete	FY 24 Complete
Pool 5	Done	FY 24 Complete	FY 24 Complete	Pool 24	FY 23	FY 24 Complete	FY 24 Complete
Pool 5A	Done	FY 24 Complete	FY 24 Complete	Pool 25	FY 23	FY 24 Complete	FY 24 Complete
Pool 6	Done	FY 24 Complete	FY 24 Complete	Pool 26	Done	FY 21 Complete	FY 21 Complete
Pool 7	Done	FY 23 Complete	FY 23 Complete	OR 1	FY 25	FY 25 Complete	FY 26 Complete
Pool 8	Done	FY 21 Complete	FY 21 Complete	OR 2	Done	FY 21/22 Complete	FY 21/22 Complete
Pool 9	Done	FY 22 Complete	FY 22 Complete	IR-Lockport	FY 25	FY 24 Complete	FY 26 Complete
Pool 10	Done	FY 22 Complete	FY 22 Complete	IR-Brandon	FY 25	FY 24 Complete	FY 26 Complete
Pool 11	Done	FY 23 Complete	FY 23 Complete	IR-Dresden	FY 25	FY 24 Complete	FY 26 Complete
Pool 12	Done	FY 22 Complete	FY 22 Complete	IR-Marseilles	FY 23	FY 24 Complete	FY 26 Complete
Pool 13	Done	FY 21 Complete	FY 21 Complete	IR-Starved Rock	FY 23	FY 24 Complete	FY 26 Complete
Pool 14	FY 24	FY 25 Complete	FY 25 Complete	IR-Peoria	FY 23	FY 24 Complete	FY 25 Complete
Pool 15	FY 24	FY 25 Complete	FY 25 Complete	IR-La Grange	Done	FY 22 Complete	FY 22 Complete
Pool 16	FY 24	FY 25 Complete	FY 25 Complete	IR-Alton	Done	FY 23 Complete	FY 23 Complete
Pool 17	FY 23	FY 25 Complete	FY 24 Complete				

16

Upcoming

- UMRR Science Webinars
  - 25 September 12:00 – 1:30
  - 05 October 12:00 – 1:30
- UMRR 2024 Science Meeting
  - 16 – 18 January 2024
  - Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin

17

Lower Pool 13 HARP*: Understanding wind dynamics and contributing factors of water clarity, aquatic vegetation, and native freshwater mussels

*HREP associated research project

Upper Mississippi River Restoration Coordinating Committee Quarterly Meeting
9 August 2023
La Crosse, Wisconsin
Read-ahead pages E15 – E26

Upper Mississippi River Restoration

18

Learning Opportunity

- Brainstorming session at 2022 UMRR Science Meeting
  - Physical drivers
    - Sediment resuspension
    - Upstream turbidity
    - Substrate composition
    - Velocity
  - Ecological responses
    - Aquatic vegetation
    - Mussels
  - Portfolio of physical and ecological responses and interactions

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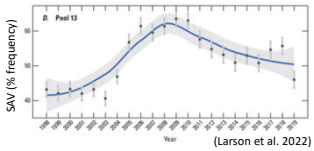
Collaborators

- USGS: Kristen Bouska, Kathi Jo Jankowski, Danelle Larson, Teresa Newton, Jeff Houser, Luke Loken, Angus Vaughan
- IA DNR: Dave Bierman, Seth Fopma, Ashley Johnson
- USACE: Jesse McNinch, Elizabeth Bruns, Steve Gustafson, Dillan Laaker, Rachel Malburg, Kara Mitvalsky, Anton Stork
- USFWS: Steve Winter

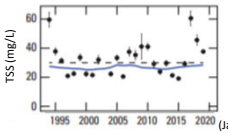
20

Background

- Prevalence of submersed aquatic vegetation, especially wild celery (*Vallisneria americana*), increased from 1998 to 2008 but has since declined in Pool 13
- Water clarity in Pool 13 has exceeded criteria established for maximum TSS that permit submersed aquatic vegetation in more than half of years since 1994



(Larson et al. 2022)



(Jankowski 2022)

21

Background

- Concern regarding further loss of wild celery prompted natural resource managers to propose an HREP to improve conditions for submersed aquatic vegetation
  - Water clarity
  - Velocity
- Secondarily to aquatic vegetation, resource managers recognized the opportunity to diversify flow and substrate characteristics in the project area to benefit mussels

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Objectives

(1) Pilot a radar wave monitoring system to measure existing (pre-project) wave conditions in Lower Pool 13;

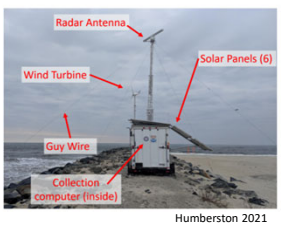
(2) Evaluate relationships between wind, waves, and turbidity, and assess the relative contributions of upstream sources and local resuspension to turbidity in the project area;

(3) Assess spatial patterns and quantify relationships among wild celery, turbidity, and wave dynamics through additional pre-project water clarity and aquatic vegetation field collections and deployment of wave sensors;

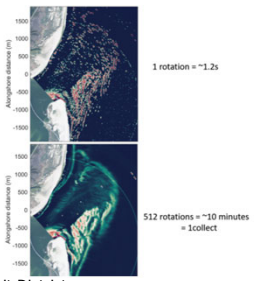
(4) Estimate substrate stability and population size, density, and species richness of mussels pre-project and determine if areas with stable substrates (RSS<1) have more robust mussel assemblages relative to areas with unstable (RSS>1) substrates.

23

Objective 1 - Pilot a radar wave monitoring system to measure existing (pre-project) wave conditions in Lower Pool 13



Humberston 2021

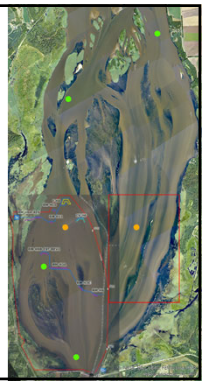


- Collaborators
  - Jesse McNinch and Rachel Malburg, USACE Detroit District

24

Objective 2 - Evaluate relationships between wind, waves, and turbidity, and assess the relative contributions of upstream sources and local resuspension to turbidity in the project area

- Data collection
  - Existing weather stations (wind speed and direction)
  - Six continuous turbidity sensors
  - Two continuous wave sensors
  - One Acoustic doppler velocity meter (near-bed water velocity)
- Data analysis
  - Assess relationships between wind speed/direction & wave height and period
  - Spatial and temporal patterns in turbidity and associations with wind, waves and upstream delivery
  - Threshold analyses to detect velocity or wave characteristics associated with resuspension
  - Time series analyses of threshold exceedance to estimate contribution of resuspension
- Collaborators
  - New hire, UMESC
  - Kristen Bouska, USGS UMESC
  - Kathi Jo Jankowski, USGS UMESC
  - Elizabeth Bruns, USACE Rock Island District
  - Ashley Johnson, IA DNR



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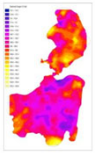
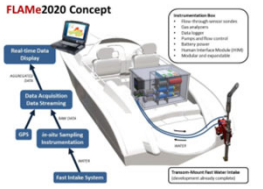
Objective 3 - Assess spatial patterns and quantify relationships among wild celery, turbidity, and wave dynamics



- Data collection
  - Spatial patterns in turbidity and chlorophyll (FLAMe surveys)
    - Project area and control
    - Six surveys across a range of discharges
    - 2024 and 2025
  - Augment LTRM SRS vegetation
    - Project area only
    - +55 sites/year
    - 2023 – 2025
- Analyses
  - Wild celery habitat suitability model
    - Bathymetry, waves, turbidity, chlorophyll, velocity
- Collaborators
  - New hire, UMESC
  - Kathi Jo Jankowski, USGS UMESC
  - Luke Loken, USGS UMid
  - Ashley Johnson, IA DNR
  - Seth Fopma, IA DNR
  - Danelle Larson, USGS UMESC

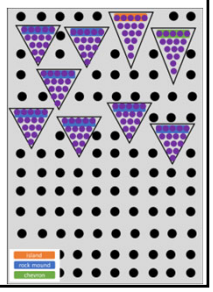


https://flame.wisc.edu/

26

Objective 4: Estimate substrate stability and population size, density, and species richness of mussels pre-project.

- Do areas with stable substrates have more robust mussel assemblages than areas with unstable substrates?
- Data collection
  - 300 systematic sites in project area (~10 m apart in feature footprint, ~50 m apart elsewhere)
  - **Mussels**: species identity, number live, age, shell length
  - **Substrate**: substrate composition, substrate resistance (penetrometer), sediment sample for particle size analysis
- Data analysis
  - **Mussels**: population size, density, species richness
  - **Substrate**: particle size analysis (estimate D50 and D84), and estimate relative substrate stability (RSS)
  - **Combined**: model mussel responses to RSS
- Collaborators
  - Teresa Newton, USGS UMESC
  - Angus Vaughn, USGS UMESC
  - Anton Stork, USACE Rock Island District
  - Kristen Bouska, USGS UMESC



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Products

- A minimum of four manuscripts on the topics of:
  1. Wind, wave, turbidity interactions
  2. Contributions of sediment resuspension and upstream delivery to local turbidity
  3. Spatial patterns in, and correspondence among, wave dynamics, turbidity, and aquatic vegetation
  4. Linkages between native freshwater mussel assemblages and substrate stability
- Data products - Baseline, pre-project information for post-construction assessments on the effects of specific project features on wave dynamics, velocity, substrate, water clarity, aquatic vegetation, and mussels

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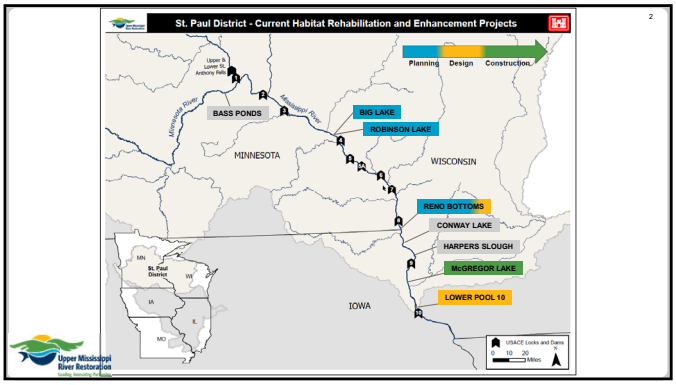
HABITAT RESTORATION – DISTRICT REPORTS

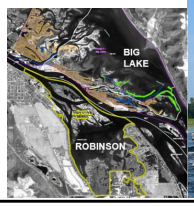
1



2

PLANNING

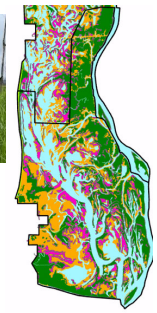
- **Robinson Lake – Pool 4, MN**
  - Site Visit (2 Aug)
  - Measure Development Meeting
- **Big Lake – Pool 4, WI**
  - TSP Milestone Meeting (21 Jul)
  - DQC (Aug)
  - Concurrent Reviews (Sep)



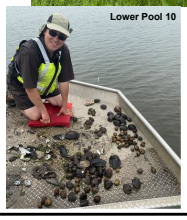
3

DESIGN

- **Reno Bottoms HREP – Pool 9, MN/IA**
  - SOW 3 proposed Stages
  - A/E: Value Engineering Study (7-10 Aug)
    - VE Report (Sep)
  - Continue forestry surveys (Stage 1)
  - Award A/E for Design (Stage 2 – FY24)



- **Lower Pool 10 HREP – Pool 10, IA**
  - Awarded A/E for Design (June)
  - Continue Stages 1, 2, 3 P&S
    - Geotechnical borings / environmental sediment testing
    - Mussel surveys
  - 65% Review Stage 1 (Fall)



4

CONSTRUCTION

- **McGregor Lake HREP – Pool 9, WI**
  - Stage I: 95% Complete
  - Stage II: Fully awarded (Feb)
  - Beneficial use: 1/2M cy granular
  - Innovative techniques

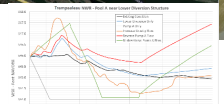
CLOSE-OUT

- ✓ **Bass Ponds HREP – MN River**
- ✓ **Conway Lake HREP – Pool 9, IA**
- ✓ **Harpers Slough HREP – Pool 9, IA**
  - All 3 Projects turned over to USFWS

5

OTHER ACTIVITIES

- **Trempealeau HREP – Pool 6**
  - Completed hydraulic analysis
  - Agency concurrence



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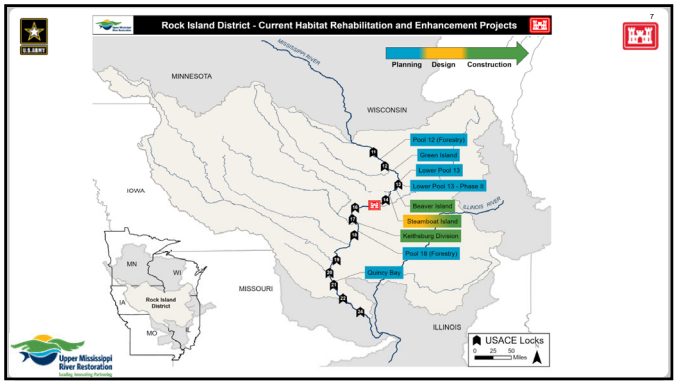
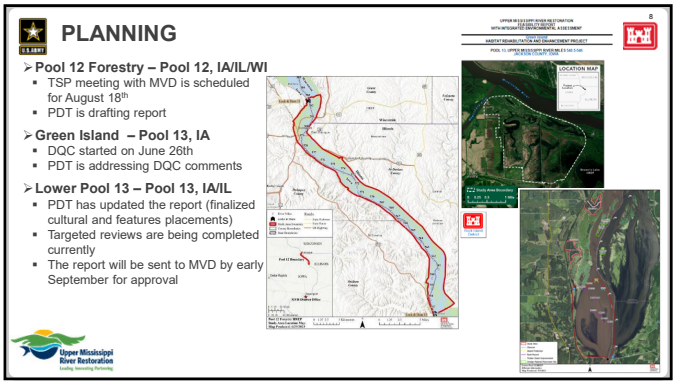

Rock Island District - Current Habitat Rehabilitation and Enhancement Projects
Planning
Design
Construction
MINNESOTA
WISCONSIN
IOWA
ILLINOIS
MISSOURI
Pool 12 (Forestry)
Green Island
Lower Pool 13
Lower Pool 13 - Phase II
Beaver Island
Steamboat Island
Keithsburg Division
Pool 18 (Forestry)
Quincy Bay
Rock Island District
USACE Locks
Upper Mississippi River Restoration

7


PLANNING
Pool 12 Forestry – Pool 12, IA/IL/WI
TSP meeting with MVD is scheduled for August 18th
PDT is drafting report
Green Island – Pool 13, IA
DQC started on June 26th
PDT is addressing DQC comments
Lower Pool 13 – Pool 13, IA/IL
PDT has updated the report (finalized cultural and features placements)
Targeted reviews are being completed currently
The report will be sent to MVD by early September for approval
Upper Mississippi River Restoration

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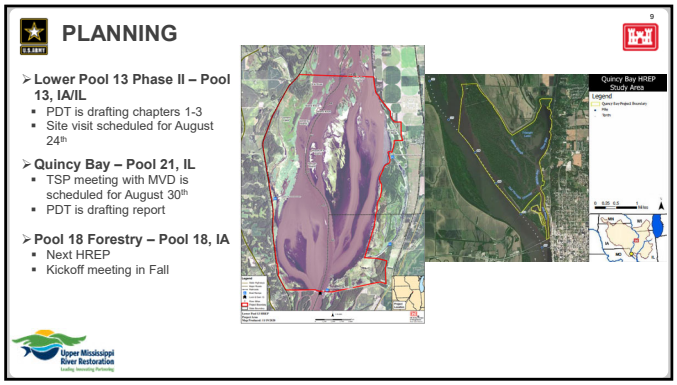
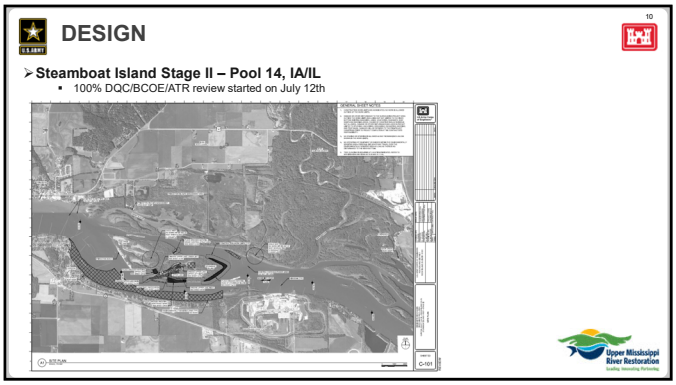

PLANNING
Lower Pool 13 Phase II – Pool 13, IA/IL
PDT is drafting chapters 1-3
Site visit scheduled for August 24th
Quincy Bay – Pool 21, IL
TSP meeting with MVD is scheduled for August 30th
PDT is drafting report
Pool 18 Forestry – Pool 18, IA
Next HREP
Kickoff meeting in Fall
Quincy Bay HREP Study Area
Upper Mississippi River Restoration

9


DESIGN
Steamboat Island Stage II – Pool 14, IA/IL
100% DQC/BCOE/ATR review started on July 12th
Upper Mississippi River Restoration

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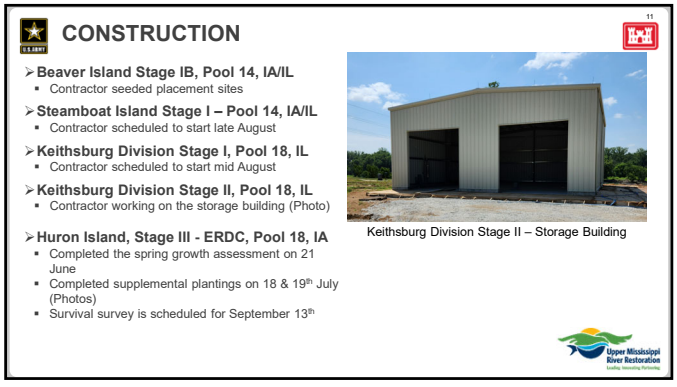
CONSTRUCTION
Beaver Island Stage IB, Pool 14, IA/IL
Contractor seeded placement sites
Steamboat Island Stage I – Pool 14, IA/IL
Contractor scheduled to start late August
Keithsburg Division Stage I, Pool 18, IL
Contractor scheduled to start mid August
Keithsburg Division Stage II, Pool 18, IL
Contractor working on the storage building (Photo)
Huron Island, Stage III - ERDC, Pool 18, IA
Completed the spring growth assessment on 21 June
Completed supplemental plantings on 18 & 19th July (Photos)
Survival survey is scheduled for September 13th
Keithsburg Division Stage II – Storage Building
Upper Mississippi River Restoration

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HURON ISLAND - PHOTOS
Upper Mississippi River Restoration

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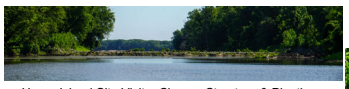
OTHER ACTIVITIES

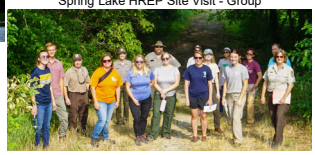
- **Forestry Multiple Award Task Order Contract (MATOC)**
  - Awarded contracts on July 7th
- **PER Site Visits**
  - Completed Spring Lake HREP site visit on 29 June
  - Completed Huron Island HREP site visit 06 July
  - Completed Pool 12 Overwintering site visit 20 July
  - Pool 11 Island HREP – scheduled for August 30th

Stone Lake HREP Site Visit – Tree Planting



Huron Island Site Visit – Closure Structure & Plantings

Spring Lake HREP Site Visit - Group



13

ROCK ISLAND DISTRIPHOTOS

Beaver Island – Mussel substrate Spring 2021

14

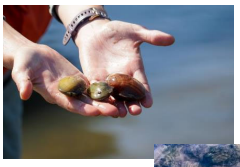
ROCK ISLAND DISTRIPHOTOS

Beaver Island – Mussel substrate Spring 2021

15

PHOTOS

RRCT Beaver Island Site Visit 2022



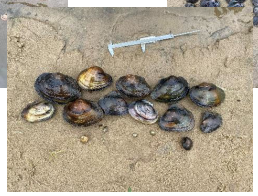
Mussels

16

PHOTOS

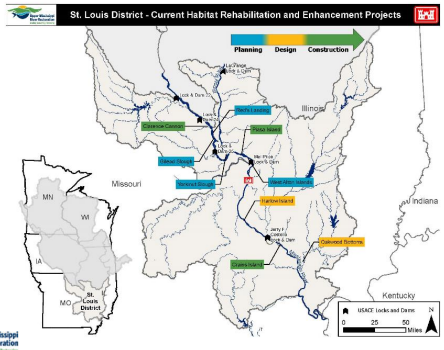
Beaver Island Mussel Survey 2023

Mussels



17

St. Louis District - Current Habitat Rehabilitation and Enhancement Projects



18

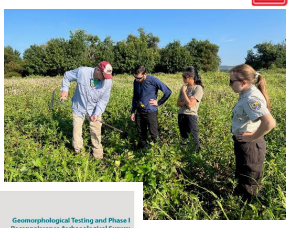
PLANNING

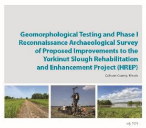
West Alton Islands, MO, HREP (Pool 26)
- Continue Feasibility Planning
- IPR with MVD 25 Sept
- TSP with MVD 1st Qtr.
- Public Comment 1st Qtr.

Yorkinut Slough, IL HREP (IL River)
- Cultural Survey Completed
- Targeted ATR on Draft Report wrapping up mid Aug
- IPR with MVD 5 Sept
- Submit Draft Report for Approval Sept / Oct

Other Activities
- Swan Lake Flood Damage Assessment Letter Report Approved July 2023

New Feasibility Studies (Pool 25)
- 1st Qtr FY 24 Initiate study activities
- Gilead Slough, IL FWS – Collected Bathymetry
- Reds Landing, IL IDNR





19

DESIGN

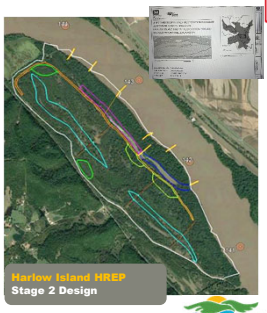
Clarence Cannon
- Stage 4, Remaining Items P&S Package FY24

Crains Island, IL HREP (Open River)
- Stage 2, Earthwork and Excavation P&S Package Complete

Harlow Island, IL HREP (Open River)
- Stage 2, P&S underway
- P&S ATR Aug
- P&S DQC Sept

Swan Lake, IL HREP Flood Damage Rehabilitation
- Letter Report Approved July 2023
- P&S Package FY24 / FY25

Oakwood Bottoms, IL, HREP (Open River)
- Complete P&S packages 4th Qtr. FY23
  - Pump Station
  - Well Pumps - completed
  - North & South Units Earthwork / Water Control Structures



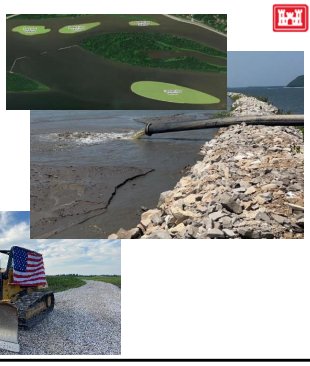
20

CONSTRUCTION

Crains Island, IL HREP (Open River) FWS
- Channel Modification Fall 2023
- Stage 2 Construction Award FY24 (Pending Funding Availability)

Piasa & Eagles Nest, IL HREP (Pool 26) IDNR
- Stage II – Side Channel Excavation and Island Construction
- Contract Awarded 2 Feb 2023 $11.0M
  - Task Orders issued for $8.7M
- Material placement underway

Clarence Cannon Refuge, MO (Pool 25)
- Exterior Berm (Levee) Setback
  - Substantially complete. Fall Seeding
- Reforestation Fall 2023
  - Initial tree planting stage scheduled



21

Limited Distribution - *results are preliminary*

Using explainable machine learning to evaluate vulnerability and restoration potential of submersed aquatic vegetation

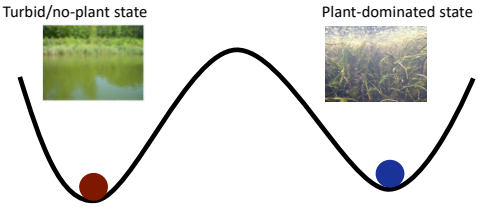
John Delaney, Biologist, U.S. Geological Survey
Danelle Larson, LTRM aquatic vegetation component lead, U.S. Geological Survey

1

Acknowledgments

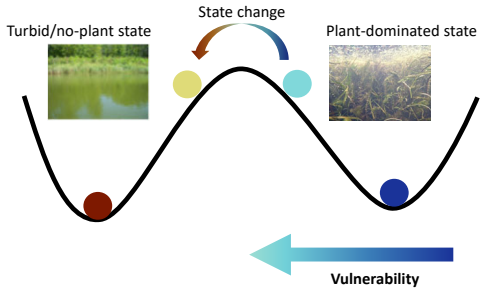
2

Upper Mississippi River ecosystems states



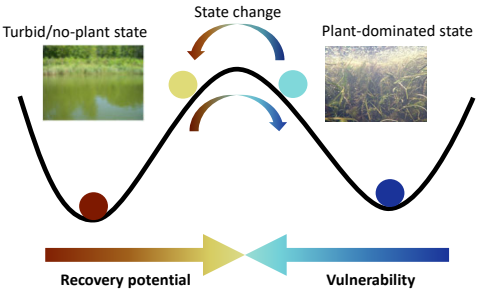
3

Upper Mississippi River ecosystems states



4

Upper Mississippi River ecosystems states



5

Research Goals

1) Can we create a predictive model to show where SAV occurs?
2) What predictor variables best explain SAV presence?
3) Which sites have greater restoration potential, and what environmental predictors might we manipulate to restore SAV at that site?

4) Create an online, interactive tool for researchers and managers to interact with the model outputs

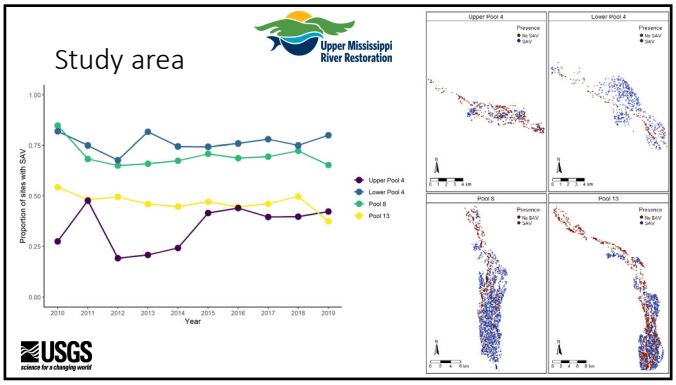
6

Methods

USGS

7

Study area



USGS

8

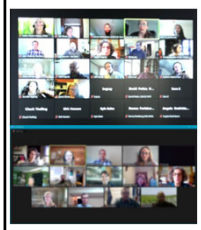
Habitat suitability using a Random forest model

- Can handle different types of variables
- Robust to outliers
- Captures complex relationships

USGS

9

Predictors



Final set of predictors
Water depth (m)
Suspended solids (mg/L)
Substrate (type)
Distance to nearest SAV (m)
Distance from main channel (m)
Lentic connectivity (%)
Weighted wind fetch (km)
Chlorophyll a concentration (µg/L)
Total nitrogen (mg/L)
Previous 3-year summer low flow days (days)

USGS

10

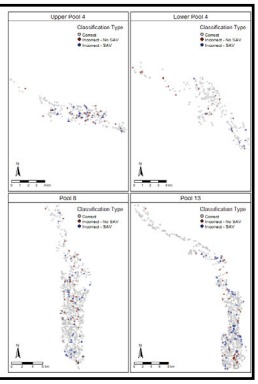
Results

USGS

11

Model performance

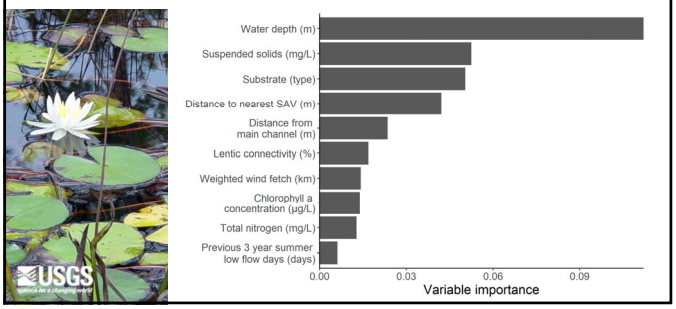
- Accuracy = 89%
- No obvious spatial bias of inaccuracies



USGS

12

Variable importance



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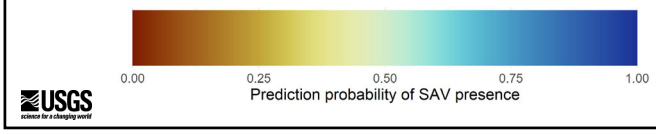
Prediction probabilities



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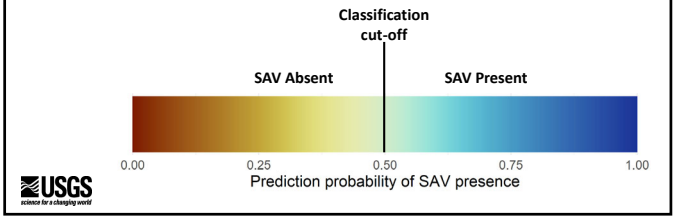
Prediction probabilities



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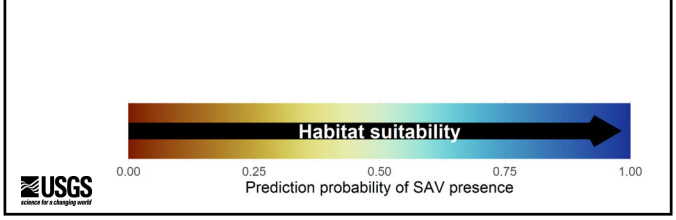
Prediction probabilities



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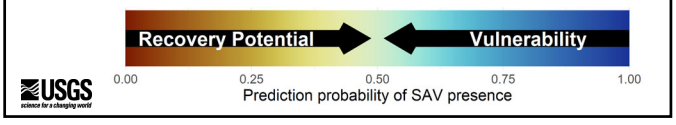
Integrating habitat suitability modeling with ecosystem states framework



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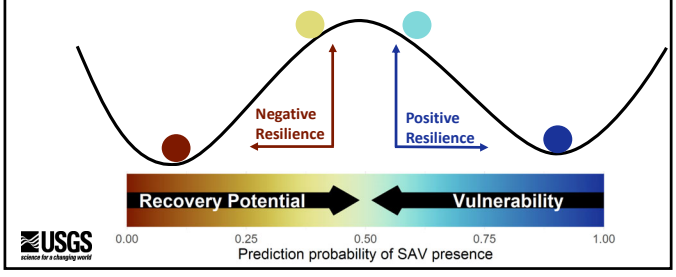
Integrating habitat suitability modeling with ecosystem states framework



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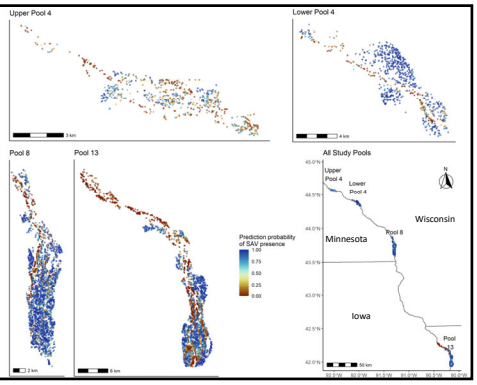
Spatial distribution



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How is the model making its predictions?

- Shapley values
  - From cooperative game theory (Shapley, 1952)
  - Estimates both the magnitude and the direction (+/-) of the contribution
  - We used the *fastshap* package (Greenwell, 2020) in R

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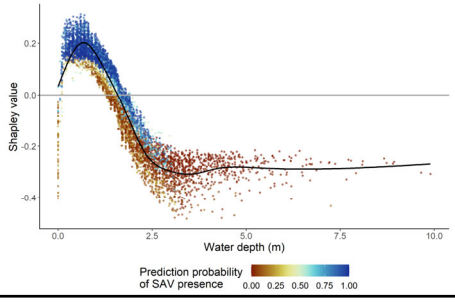
Shapley-based dependence plot



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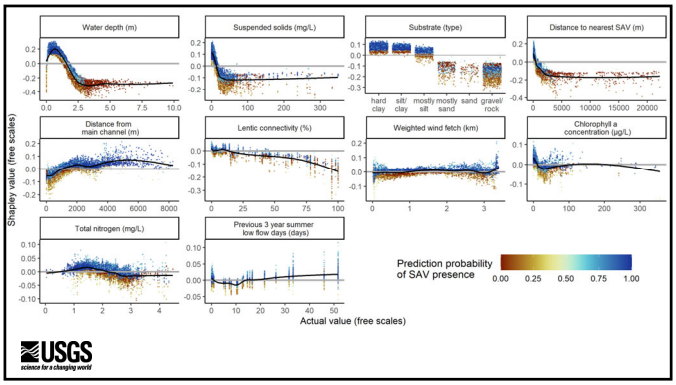

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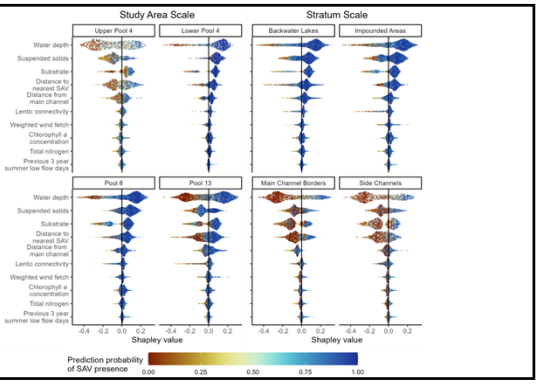

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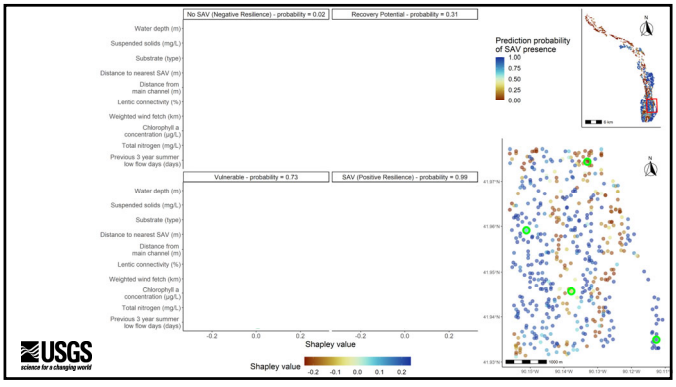

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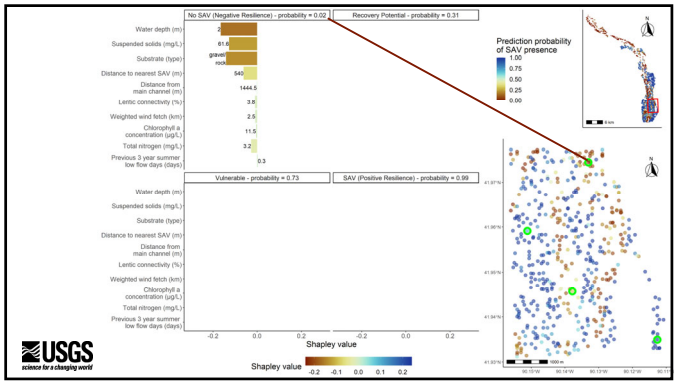

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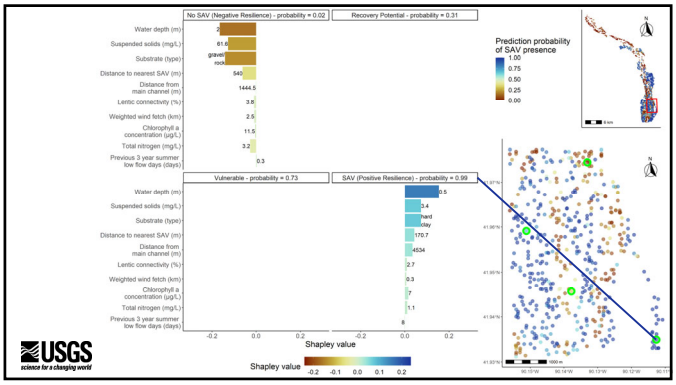

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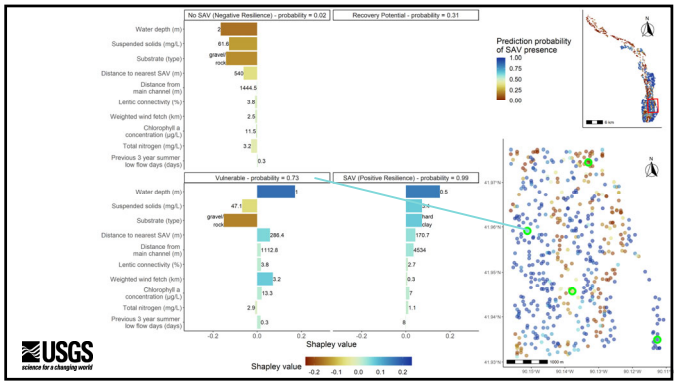

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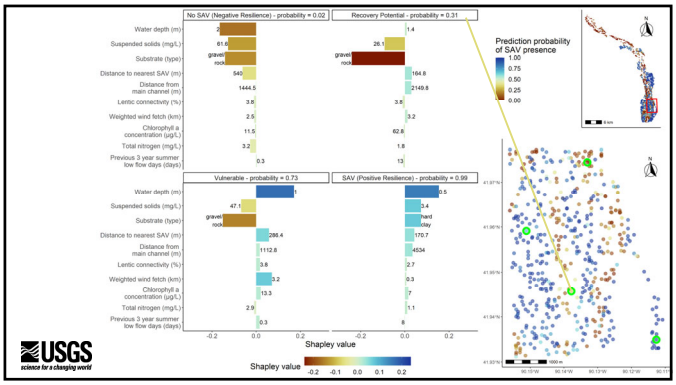

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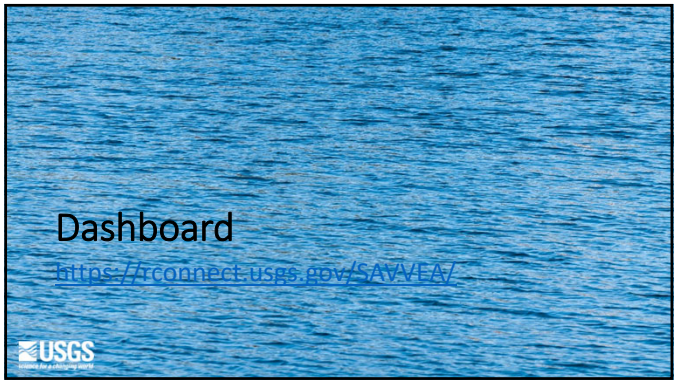

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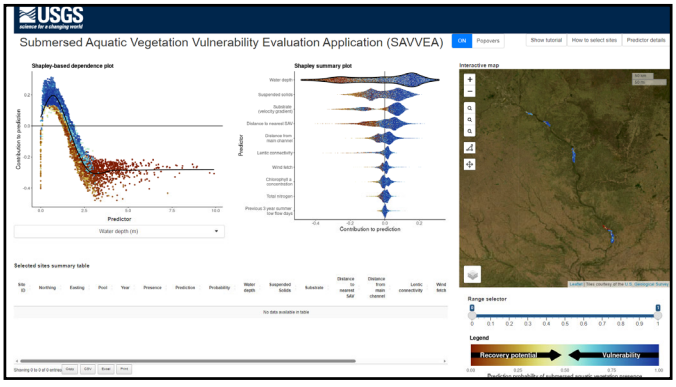

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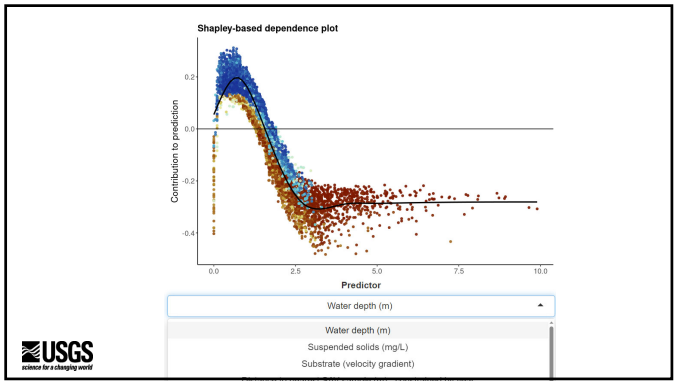

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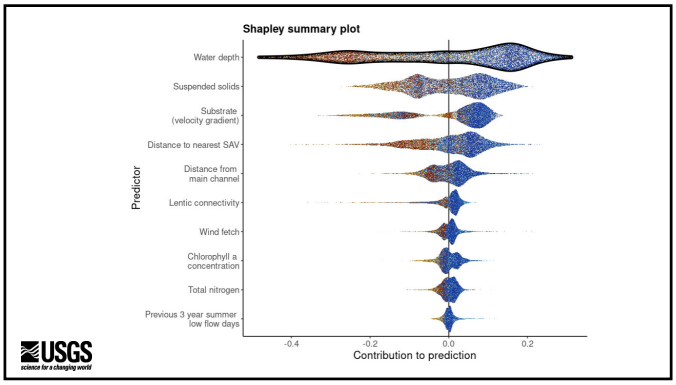

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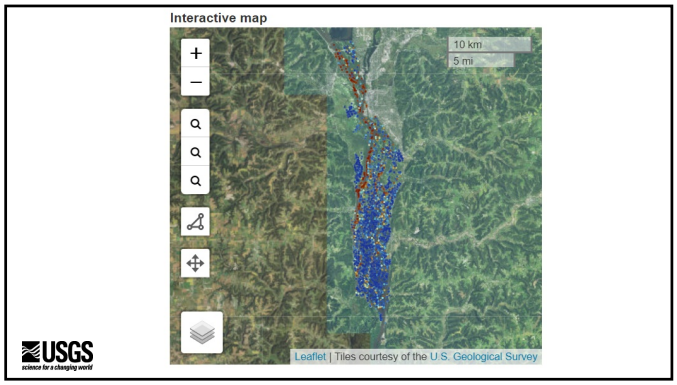

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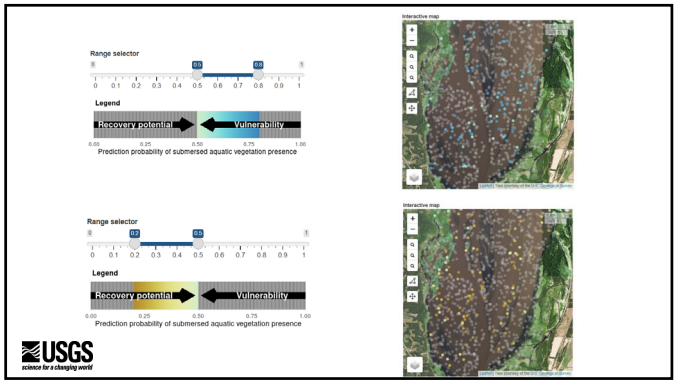

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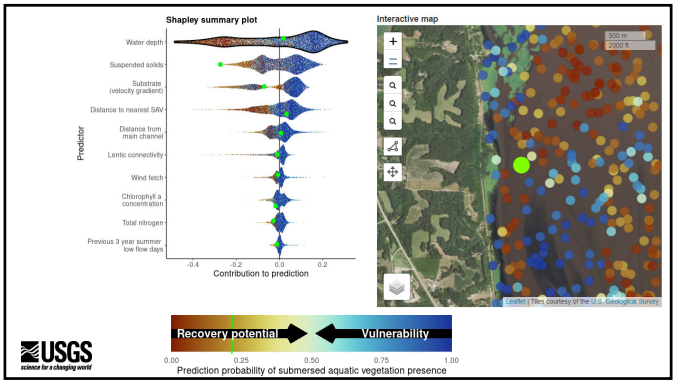

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Questions?

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