Upper Mississippi River Restoration Program Coordinating Committee Quarterly Meeting

August 12, 2020

Highlights and Action Items

Program Management

- UMRR has obligated over $23 million of its $33.17 million FY 20 funds to-date. Significant upcoming expenditures include McGregor Lake HREP in St. Paul District and Piasa and Eagles Nest in St. Louis District. Unobligated funds at the end of the fiscal year can be used to implement parts of the FY 21 LTRM scope.

- The District is planning for UMRR in FY 21 at a $33.17 million funding scenario, with internal allocations anticipated to be as follows:
  - Regional Administration and Program Efforts – $1,250,000
  - Regional Science and Monitoring – $10,400,000
    - Long term resource monitoring – $5,000,000
    - Regional science in support of restoration – $3,800,000
    - Regional science staff support – $200,000
    - Habitat project evaluations – $1,125,000
    - HNA II/regional project sequencing – $275,000
  - Habitat Restoration – $21,520,000
    - Rock Island District – $7,020,000
    - St. Louis District – $7,125,000
    - St. Paul District – $7,275,000
    - Model certification – $100,000

- **In its WRDA 2020 measure, the House is proposing an increase to UMRR's annual appropriation for HREPs from $22.75 million to $40 million and for LTRM from $10.42 million to $15 million.**

- **On August 7, 2020, the UMRR Coordinating Committee received a request to review revised statements of significance. A call will be convened in September or October to discuss the statements in their final draft form.** The major addition was a description of the various threats to the river ecosystem and how UMRR may help to alleviate those pressures – e.g., climate change, water quality, altered hydrology, ecological connectivity, and aquatic invasive species.

- **A survey regarding the 2015-2025 UMRR Strategic and Operational Plan will be distributed to UMRR partners in the near future. The survey will seek input regarding progress achieved since 2015, priorities for the next five years, and the issue areas to include in the 2022 Report to Congress.**

- On an August 3, 2020 call, the UMRR Program Planning Team (PPT) evaluated the river team's use of the Science Support Team (SST). The PPT agreed to eliminate the formality of the SST and, in light of program integration, continue with a more informal inclusion of HNA experts in the project selection discussions**. Per direction from the UMRR Coordinating Committee, the guidance documents will be revised to include descriptions of the roles and responsibilities of**

project sponsors and the Program Management Team. A step, identifying the need to inform the public and potential non-federal sponsors of the opportunity to participate as a cost-share sponsor will be integrated into the process diagram. The UMRR Coordinating Committee will revisit its endorsement of the guidance documents at its October 2020 quarterly meeting.

- **A call will be convened in September or October for the UMRR Coordinating Committee to discuss modifications to the UMRR Advisory Group Charter**. At a July 30, 2020 meeting, the A-Team was asked to review the A-Team's roles and responsibilities outlined in the Charter. A-Team members requested additional time to complete the review and will revisit the issue at their October 2020 meeting.

- On June 3, 2020, the UMRR Coordinating Committee held a virtual meeting to discuss development of the 2022 Report to Congress. Discussion topics included lessons learned from past reports to Congress, content to include, personnel involved in drafting the report, and a draft schedule for completion. **An *ad hoc* scoping team will develop a scope and schedule for developing the report as well as ideas for content and organization. Members include:**

Jeff Houser	Karen Hagerty	Brian Markert
Matt Vitello	Marshall Plumley	Andrew Stephenson
Sabrina Chandler	Jill Bathke	Kirsten Wallace

- **Rachel Perrine and Jill Bathke are co-leading the UMRR communications team, which is scheduled to convene a meeting on August 27, 2020. The team will review existing documents and determine next steps. Public affairs representatives from UMRR's implementing partners will participate.**

- Communication and outreach activities in the third quarter of FY 20 include the following:

  — Jim Fischer said an article titled *Mississippi River Rising* was published August 1, 2020, in National Wildlife Magazine. The article highlights UMRR projects and includes many interviews from Wisconsin DNR staff. Fischer said National Wildlife Magazine averages 400,000 print readers each issue and more than one million unique online visitors annually.

  — Jeff Janvrin said he discussed HREPs in a presentation to the annual conference of the Wisconsin Association of Agriculture Educators.

  — Tim Yager said sand placement at McGregor Lake has drawn a lot of interest from recreational users and that area law enforcement has been conducting outreach to users regarding unstable sand and safety issues.

  — Marian Muste said he participated in a call with the Corps regarding research opportunities involving artificial islands and dredge materials.

  — Plumley said Kat McCain participated in a virtual outreach activity on June 23, 2020 for the Mighty Mississippi River exhibit as part of the Missouri History Museum's river conservation series. She discussed UMRR's role in the recovery of ecosystems that have been degraded, damaged, or destroyed.

  — Mark Gaikowski said USGS reached out to the Ho Chunk Nation and Prairie Island Indian Community to discuss land cover/use decadal data collection to discuss any concerns of image collection over their lands. A Partners In Action meeting scheduled for August 17, 2020 will highlight land cover/use and UMRR.

  — Gaikowski said the LTRM WQ lab and broader program were highlighted during a recent internal USGS program discussion with the USGS Contaminants Biology Program.

UMRR Showcase Presentations

- Andrew Strassman summarized results of a forest canopy gap study, finding that UMR bottomland forests have vastly more gaps than old growth mesic forest. Comparing the size of gaps to tree size inundation classes may be used to determine whether inundation may affect gap formation and regeneration. Researchers are monitoring a subset of gaps over time to evaluate whether they are closing or expanding. Automated monitoring will help to assess the forests as new data becomes available.

- Megan McGuire showcased a newly created model, which will be used to quantify the habitat benefits of forest management for cost-benefit analyses. The new forest model will be geographically specific to all three districts in the UMR and will evaluate the forest at a plant community-scale. Next steps include model testing, documentation, and review with a goal for certification by the end of October 2020 for use in Reno Bottoms and Green Island HREPs.

USGS Midcontinent Climate Adaptation Science Center

- Olivia LeDee provided an overview of the mission and structure of the climate adaptation science centers (CASCs) and discussed opportunities for partners and projects with the launching of the Midwest CASC. The CASC network mission is to deliver science to help fish, wildlife, water, land, and people adapt to a changing climate. Goals of the CASC network include:
  - Responding to high priority management challenges
  - Fostering substantive, sustained engagement between scientists and managers
  - Providing science to support sound resource management and adaptation
  - Advancing the understanding of the impacts of climate change on fish, wildlife, water, and land

  The CASC structure is similar across all regions and includes a host university and satellite institutions with PIs to work on issues within their expertise. Funds support research fellows, management staff, and federal partners. The Midwest region will include the five UMR states as well as Indiana, Michigan, and Ohio. Future opportunities with the Midwest CASC include a call for proposals in spring 2021, workshops and trainings after a host institution is identified, and technical assistance to help with climate info integration.

Habitat Restoration

- MVP's planning priorities include Reno Bottoms and Lower Pool 10. Reno Bottoms is planning to incorporate the forest model after it is approved. Alternatives are being evaluated for Lower Pool 10, and TSP selection is anticipated in fall 2020. The district's design priority is McGregor Lake. Four bids were received on August 11 with a low bid of $17.5 million. A contract award is anticipated for mid-September. Construction at Conway Lake is approximately 45 percent complete. Bass Ponds is anticipated to begin construction in October 2020. Given the urban proximity of the project, signage will be posted to explain the project and construction activities. Placement of 70,000 cubic yards of dredge material was coordinated with USACE Operations and resulted in $1 million of savings to the HREP. A plans and specs package is being completed to address repairs on three islands and backwater areas at Harpers Slough.

- MVR's planning priorities include Steamboat Island, Lower Pool 13, Green Island, and Pool 12 Forestry. The final package for Steamboat Island is anticipated to be sent to MVD for approval by the end of August. A virtual mini-charette was held June 22-24 for Lower Pool 13. Identification of alternatives has begun for Green Island and the Pool 12 Forestry PDT is being established.

Design work for Keithsburg Division Stage II is anticipated to be completed in September 2020. Construction on Huron Island Stage II is awaiting completion of surveys, while Stage III is delayed due to COVID-19-related travel restrictions. Dredging is underway at Beaver Island. The Quincy Bay fact sheet was submitted to Mississippi Valley Division (MVD) for approval.

- MVS anticipates submitting the feasibility report for Oakwood Bottoms in fall 2020 to MVD. Feasibility continues for Yorkinut Slough with a virtual site visit scheduled for August 13, 2020. Planning for West Alton Islands is anticipated to kick off in early FY 21. A design contract for Piasa and Eagles Nest is anticipated to be awarded in September 2020. Plans and specs are being finalized for Harlow Island for a future outyear award. Wet conditions have disrupted work at Crains Island. Exterior berm setback and pump stations are being constructed at Clarence Cannon. Reforestation and warranty work continue at Ted Shanks. Three fact sheets were sent to MVD for approval.

Long Term Resource Monitoring and Science

- Accomplishments of the third quarter of FY 20 include publication of the following manuscripts:
  - Environmental factors controlling phytoplankton dynamics in a large floodplain river with emphasis on cyanobacteria.
  - Exploring silica stoichiometry on a large floodplain riverscape.
- The University of Wisconsin – La Crosse received funding from the Nation Academy of Sciences for the 2020 Summer Research Experience for Undergraduates program. UWL faculty wrote grants with support and guidance from UMESC staff. Four projects selected for funding focused on water quality, phytoplankton, and floodplain forest data. The four projects were:
  - Classification of Upper Mississippi River Floodplain Forests
  - Characterizing Water Quality Responses to High Discharge Events using High-frequency Sensor Data
  - Spatial and Temporal Patterns in River Phytoplankton and Cyanobacteria Communities
  - Using Time-series Analysis of Water Quality Sensor Data to Understand Shared Seasonality

  Recordings of the final 15 minute presentations are available at https://uwlax.webex.com/uwlax/ldr.php?RCID=cb8d7f34e0f04e53bec2ca877d239872.
- Water quality lab standard reference sample results show that LTRM water quality labs are rated excellent for phosphorous, nitrite, and nitrate as N. Lab staff recently conducted extensive calibration of new equipment to show comparability with replaced equipment and ensure validity of testing.
- An internal draft of LTRM's third status and trends report is complete. **A-Team members will be asked to review the report in September. A final draft is anticipated for December 2020 to help inform the 2022 Report to Congress.**
- COVID-19 restrictions prevented Wisconsin and Minnesota from conducting some fixed site water quality sampling and electrofishing. Minnesota was unable to hire interns for vegetation sampling, but completed sampling on time with other staff assisting. Wisconsin and Iowa delayed starting vegetation sampling by one week. Iowa suspended all LTRM sampling July 30 due to a field station staff member and, shortly thereafter, seasonal staff member, testing positive for COVID-19, but sampling is scheduled to resume mid-August.

- No vegetation rake sampling on the Illinois River will occur in conjunction with the lock closures because of COVID-19-related travel restrictions. Aerial photos will be collected as part of the 2020 land cover/use flights and may provide some information. Fish sampling is ongoing and is utilizing the full LTRM SRS design. Fisheries teams will collect chlorophyll and turbidity for water quality at sites in Alton, Peoria, Starved Rock, and Marseilles pools during period two and three fish sampling. MVR staff are deploying two sondes at sites in Starved Rock pool for the duration of the closures to measure several parameters including turbidity and chlorophyll.
- Land cover/use aerial imagery collection is complete for Pools 11, 12, and 13 and is ongoing for Pools 14 and 15. It is not yet known if impacts from the August 10, 2020 derecho in Iowa will be captured in the aerial imagery.
- UMRR's FY 20 LTRM allocation under full funding includes $6.3 million ($5.0 million for base monitoring and $1.3 million for analysis under base). An additional $2.5 million is available for science in support of restoration and management. LTRM funds would be similarly allocated in FY 21 under full funding. If UMRR's authorization is increased, as proposed in House WRDA language, significant strategic planning would be needed for LTRM.
- The A-Team met via webinar on July 31, 2020. Topics discussed included impacts of COVID-19 on agency policies and work during the 2020 field/work season, the effectiveness of various LTRM gear for detecting Asian carp (particularly young of the year individuals) along the leading edge of the invasion, and the A-Team's science proposal ranking process. The A-Team also reviewed the roles and responsibilities of the A-Team outlined in the 2013 UMRR Advisory Group Charter. A-Team members requested additional time to consider recommendations and the A-Team will review this topic again at their October meeting. Jeff Houser requested that individuals from each state be ready to review the upcoming LTRM status and trends document during September. All representatives indicated they should be able to accommodate that schedule. The A-Team's October meeting will be held via webinar.

Other Business

Upcoming quarterly meetings are as follows:

- **October 2020 – Remote**
  - UMRBA quarterly meeting – October 27
  - **UMRR Coordinating Committee quarterly meeting – October 28**
- **February 2021 – Remote**
  - UMRBA quarterly meeting – February 23
  - **UMRR Coordinating Committee quarterly meeting – February 24**
- **May 2021 – TBD**
  - UMRBA quarterly meeting – May 25
  - **UMRR Coordinating Committee quarterly meeting – May 26**

UMRR COORDINATING COMMITTEE - REGIONAL MANAGEMENT AND PARTNERSHIP COLLABORATION

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

12 Aug 2020

Upper Mississippi River Restoration
Leading · Innovating · Partnering

US Army Corps of Engineers

UMRR PROGRAM OVERVIEW

- FY 2020 Fiscal Update and FY 21 Outlook
- Statements of UMRR National Significance
- 2015-2025 Strategic and Operation Plan Review
- 2013 Advisory Groups Charter Review
- 2022 Report to Congress
  - Implementation Issues
- Communication Team and Lower Illinois Pilot Project
- External Communications and Outreach Events

USGS science for a changing world
US Army Corps of Engineers
USDA

FINANCIAL REPORTING

UMRR Quarterly Budget Report: St. Paul District
FY2020 Q3, Report Date: Fri Jul 24 2020

Habitat Projects

Project Name	Cost Estimates Non-Federal	Cost Estimates Federal	Cost Estimates Total	FY2020 Financials Carry In	FY2020 Financials Allocation	FY2020 Financials Funds Available	FY2020 Financials Actual Obligations
Bass Ponds, Marsh, and Wetland		$6,300,000	$6,300,000	-	$100,000	$100,000	$4,328,853
Conway Lake		$7,413,000	$7,413,000	-	$300,000	$300,000	$148,152
Harpers Slough		$13,675,000	$13,675,000	-	-	-	$81,766
Lower Pool 10 Island and Backwater Complex		$17,000,000	$17,000,000	$29,702	$430,000	$479,702	$364,938
McGregor Lake		$23,550,000	$23,550,000	$32,067	$5,930,000	$5,962,067	$611,190
Reno Bottoms		$10,000,000	$10,000,000	-	$300,000	$300,000	$240,941
Total		$77,938,000	$77,938,000	$61,769	$7,100,000	$7,161,769	$5,778,799

Habitat Rehabilitation

Subcategory	FY2020 Financials Carry In	Allocation	Funds Available	Obligations
District Program Management	-	-	-	$834,145
Total	-	-	-	$834,145

Regional Program Administration

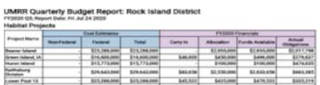
Subcategory	FY2020 Financials Carry In	Allocation	Funds Available	Obligations
Habitat Eval/Monitoring	-	-	-	$200,452
Regional Program Management	-	-	-	-
Total	-	-	-	$200,452

	Carry In	Allocation	Funds Available	Actual Obligations
St. Paul Total	$61,769	$7,100,000	$7,161,769	$6,813,396

FINANCIAL REPORTING

UMRR Quarterly Budget Report: Rock Island District
FY2020 Q3, Report Date: Fri Jul 24 2020

Habitat Projects



Habitat Rehabilitation

Regional Program Administration

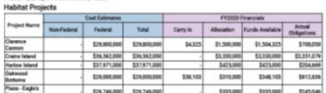
Regional Science and Monitoring

	Carry In	Allocation	Funds Available	Actual Obligations
Rock Island Total	$175,180	$19,130,000	$19,305,180	$6,762,288

FINANCIAL REPORTING

UMRR Quarterly Budget Report: St. Louis District
FY2020 Q3, Report Date: Fri Jul 24 2020

Habitat Projects



Habitat Rehabilitation

Regional Program Administration

	Carry In	Allocation	Funds Available	Actual Obligations
St. Louis Total	$46,872	$6,940,000	$6,986,872	$5,844,784

FY20 PLAN OF WORK

	Budget	Obligations 3nd Qtr
TOTAL FY20 Program	**$33,170,000**	**$21,420,469**
Regional Administration and Program Efforts	**$ 1,250,000**	**$ 887,253**
Regional Management	$ 1,000,000	
Program Database	$ 100,000	
Program Support Contract (UMRBA)	$ 100,000	
Public Outreach	$ 50,000	
Regional Science and Monitoring	**$10,500,000**	**$ 3,520,214**
LTRM (Base Monitoring)	$ 5,000,000	
($4,570,000 FY 19 + $430,000 FY 20)		
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 3,800,000	
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000	
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,125,000	
HNA II/Regional Project Sequencing	$ 375,000	
District Habitat Rehabilitation Efforts (Planning and Construction)	**$21,420,000**	**$17,013,002**
Rock Island District	$ 7,280,000	
St. Louis District	$ 6,940,000	
St. Paul District	$ 7,100,000	
Model Cert.	$ 100,000	

FY20 PLAN OF WORK

	Budget	As of Right Now
TOTAL FY20 Program	**$33,170,000**	***$ 23,088,816***
Regional Administration and Program Efforts	**$ 1,250,000**	
Regional Management	$ 1,000,000	**69.6%**
Program Database	$ 100,000	
Program Support Contract (UMRBA)	$ 100,000	
Public Outreach	$ 50,000	
Regional Science and Monitoring	**$10,500,000**	
LTRM (Base Monitoring)	$ 5,000,000	
($4,570,000 FY 19 + $430,000 FY 20)		
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 3,800,000	FY 21 Scope
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000	
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,125,000	
HNA II/Regional Project Sequencing	$ 375,000	
District Habitat Rehabilitation Efforts (Planning and Construction)	**$21,420,000**	
Rock Island District	$ 7,280,000	
St. Louis District	$ 6,940,000	Piasa & Eagles Nest
St. Paul District	$ 7,100,000	McGregor Lake
Model Cert.	$ 100,000	

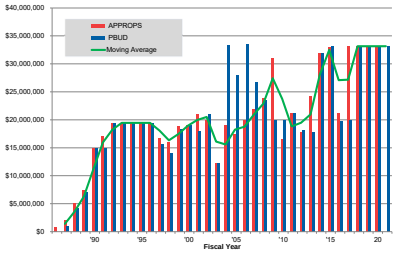
FY 21 APPROPRIATIONS

President's Budget	$ 33,170,000
House	33,170,000
Senate	?
FINAL APPROPRIATION	?

FY21 DRAFT PLAN OF WORK

	Budget	Change from FY 20
TOTAL FY21 Program	**$33,170,000**	
Regional Administration and Program Efforts	**$ 1,250,000**	
Regional Management	$ 1,000,000	
Program Database	$ 100,000	
Program Support Contract (UMRBA)	$ 100,000	
Public Outreach	$ 50,000	
Regional Science and Monitoring	**$10,400,000**	**($100,000)**
LTRM (Base Monitoring)	$ 5,000,000	
UMRR Regional Science In Support Rehabilitation/Mgmt. (MIPR's, Contracts, and Labor)	$ 3,800,000	
UMRR Regional (Integration, Adapt. Mgmt.)	$ 200,000	
Habitat Evaluation (split between MVS,MVR,MVP)	$ 1,125,000	
Report to Congress	$ 275,000	
District Habitat Rehabilitation Efforts (Planning and Construction)	**$21,520,000**	**$100,000**
Rock Island District	$ 7,020,000	($260,000)
St. Louis District	$ 7,125,000	$185,000
St. Paul District	$ 7,275,000	$175,000
Model Cert.	$ 100,000	

UMRR PROGRAM APPROPRIATION/BUDGET HISTORY



FY1985 to FY2020

UMRR TEN YEAR OUTLOOK

POTENTIAL WRDA CHANGES TO UMRR

Senate version is neutral

House version contains

SEC. 308. UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM.
Section 1103(e) of the Water Resources Development Act of 1986 (33 U.S.C. 652(e)) is amended—
(1) in paragraph (3), by striking "$22,750,000" and inserting "$40,000,000"; and
(2) in paragraph (4), by striking "$10,420,000" and inserting "$15,000,000".

STATEMENTS OF SIGNIFICANCE

Revised Statements from 24 March Discussion

- Organized by categories
  - » Natural Resources, Culture, Recreation, Navigation, Partnership and Economic
  - » Reflect the values of the Partnership
  - » Focused on what we want to communicate
- Set of concerns for the River
- Threats to areas of significance

STATEMENTS OF SIGNIFICANCE

Threats
- Climate Change
- Water Quality
- Altered Hydrology
- Ecological Connectivity
- Aquatic Invasive Species

Role of UMRR
- HREP
- LTRM
- Integration

Summary Statement

Storytelling and Soundbites

2015 – 2025 STRATEGIC AND OPERATIONAL PLAN

Some Feedback

- Going Well: HREP selection, resilience, indicators, promoting the value both program elements, transparent decision making
- Areas to Improve: Adaptive management, restoration effects on indicators and resilience, outreach is no ones regular job, communicate meaningful, relevant and timely restoration and science knowledge
- Next Step: **Survey to UMRR practitioners**

2013 ADVISORY GROUP CHARTER REVIEW

Activities

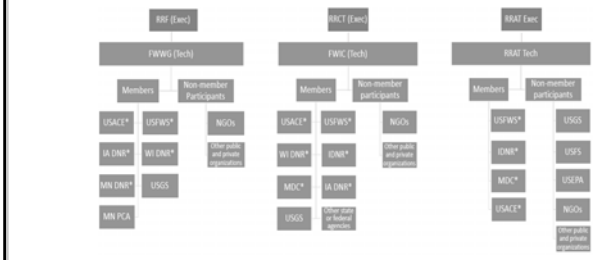
- HREP selection process improvement (May)
- A- Team Mtg (30 July)
- Role of Science Support Team (SST) discussion (3 Aug)

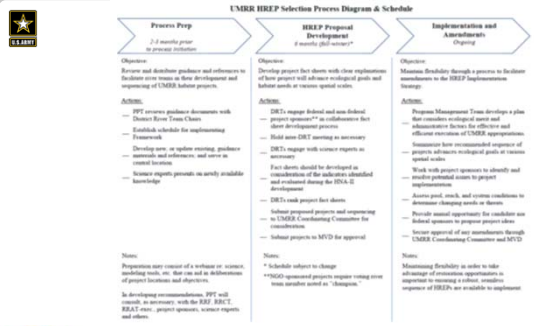
2013 ADVISORY GROUP CHARTER REVIEW

Document Updates

- HREP Selection Process Goals, Roles, and Responsibilities
- UMRR HREP Selection Process and Diagram

2013 ADVISORY GROUP CHARTER REVIEW



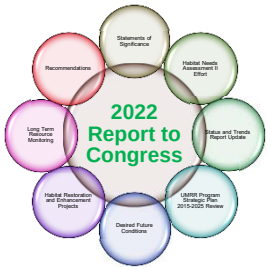


2013 ADVISORY GROUP CHARTER REVIEW

- Next Steps
  - Revised charter with todays updates included as read ahead for October
  - Endorsement of revised charter October

REPORT TO CONGRESS

- June 3 Discussion
  - Lessons learned from past RTC
  - Content
  - Who drafts the report
  - Schedule
- US FWS Refuges, USGS UMESC, MN,IA, IL, MO, WI, US EPA, USACE (MVP, MVR, MVS), UMRBA



2022 REPORT TO CONGRESS

Outcomes

- Lessons Learned - Value of the partnership perspective & value of RTC to partners, accomplishments (resilience conceptual frameworks, HNA-II and habitat restoration), what do we say about NESP?
- Content – Partner contributions, Strategic Plan Review, integrating HREP and LTRM sections, continued challenges (PPA's)

2022 REPORT TO CONGRESS

Ad hoc Scoping Team

- Jeff Houser
- Matt Vitello
- Sabrina Chandler
- Karen Hagerty
- Marshall Plumley
- Jill Bathke
- Brian Markert
- Andrew Stephenson
- Kirsten Wallace

2022 REPORT TO CONGRESS

UMRR Repor to Congress 2022			
Product	Start Date	Finish Date	Activity
Report to Congress		Nov 2018	*HNA II Complete***
	Jun 2020	Jun 2020	RTC Planning Mtg #1
	Jun 2020	Dec 2020	Additional RTC planning mtgs, report content agreed upon, themes, target audiences, section author(s) established, schedule coordinated with MVD, HQ, ASA(CW) States and Agencies, document management, logistics etc.
		Oct 2020	*Statements of Significance Complete* *2015-2025 Strategic Plan Review Complete*
		Dec 2020	*Draft Status & Trends Available*
		Apr 2021	*Desired Future Conditions Complete*
	Jan 2021	Jul 2021	Draft RTC Sections
	Aug 2021	Nov 2021	Draft RTC
	Dec 2021	Jan 2022	RTC Editing
		Feb 2022	Draft RTC Complete
	Mar 2022	Apr 2022	UMRR State & Agency Review
		Apr 2022	Letters of Support
	May 2022	Jun 2022	Mississippi Valley Division Review
	Jun 2022	July 2022	HQ/ASA(CW) Draft Report Review
		Aug 2022	Final Draft RTC Complete
	Aug 2022	Sep 2022	Mississippi Valley Division Review
	Oct 2022	Nov 2022	HQ/ASA (CW) Final Review & Approval
	Nov 20 2022	Nov 30 2022*	Final delivery of RTC

UMRR COMMUNICATIONS TEAM & LOWER ILLINOIS PILOT PROJECT

EXTERNAL COMMUNICATIONS & OUTREACH EVENTS

Forest Canopy Gaps: Working to understand forest health in the Upper Mississippi River System

Andrew Strassman[1], Andy Meier[2], Dr. Ly e Guyon[3], Dr. Meredith Thomson[4], Alexandra Oines[4], Dr. Nate De Jager[1], Stephanie Sattler[1], Erin Hoy[1], Ben Vandermyde[2], Robert Cosgriff[2].

U.S. Geological Survey Upper Midwes Env onmen a Sciences Cen er
U.S. Army Corps of Engineer s
Lew s and Cla k Commun ty Collega National Grea Rivers Reseа ch & Education Cen er
University of Wisconsin – La Crosse


Credit Andrew Strassman/USGS

U.S Depar ment of the nter or
U.S. Geo og cal Su vey

Forest Gap Study Thanks

Forest Gap Study Presentation Overview

- Problem – Why forest gaps matter
- Goals – Why studying forest gaps matters
- Methods – How we are studying forest gaps
- Analysis – Are we seeing the forest and the trees?
- Project summary
- Q&A


Credit Andrew Strassman/USGS

Background – Forest Gaps happen

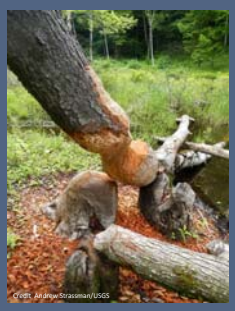
- UMRS bottomland forests are critica
  - Glue together the floodplain
  - Provide important habitat
- Forest Gap format on is a natural process
  - Provides diverse habitat
  - Allows forest succession
  - Contributes to coarse woody debris
  - Occurs across different spatial and tempora scales
- In forested landscapes, gaps will close with time
  - Surrounding tree infill
  - New tree regenerat on
- Gaps will close, unless….
  - Tree regenerat on is suppressed


Credit Andrew Strassman/USGS

Problem – Are gaps closing like they used to?

- Are forest conditions similar enough to when the Upper Mississippi River (UMR) bottomland forests were established to promote continued regenerat on?
- Concerns:
  - Invas ve species
    - Japanese hops and reed canarygrass
    - Buckthorn and honeysuckle
    - Dutch elm disease, hickory wilt, oak wilt
    - Emerald ash borer and gypsy moth
  - Increased herbivory
    - Deer, beaver, vo es
  - Changing climate and hydroperiod
    - Warmer and wetter for longer?

Are seedlings escaping to the canopy to close gaps?


Credit Andrew Strassman/USGS

Problem – How do gaps differ and is that something we can change

If gaps are not closing like they used, why not?

- Are there differences in the metrics between gaps that are closing and gaps that are stay ng open or expanding?
- Are there metrics in gaps we can observe remote y to determine if gaps will or will not close?
  - Which gaps will heal on their own?
  - Which gaps need active management to heal?
- Why heal the gaps (you said they were a good and natural thing!)
  - Bottom and forest helps glue the Mississippi River floodplain together
  - Mature and interior bottom and forest offers critical habitat for several species


Credit Andrew Strassman/USGS

Project Goals

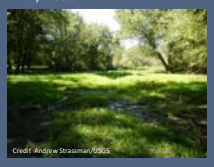
- Determine if gaps that are not closing are different from gaps that are closing
  - Can we detect why some gaps close and some do not
  - Is that reason the same for all gaps that do not close
- Answers to gap metrics
  - Can we remote y detect which gaps will close and which will not
- Repeatab e data
  - Need metrics that can be recomputed as better data becomes available or at the very least rev s ted every ten years


Credit: Andrew Strassman/USGS

USGS

Methods

- Definition what a forest gap is Basically any canopy hole the size of 1 large tree or bigger
- Create code to analyze ex sting UMRR data including Land Use/Land Cover, Flood Inundation data, and Lidar
- Create forest canopy gap layers showing where gaps occur and populate each gap with 17 unique attributes
- Have image analyst rev ew and attribute subset of gaps
- Conduct field work on very limited sample of UMRS forest gaps for long term monitoring
- Analyze data


Credit: Andrew Strassman/USGS

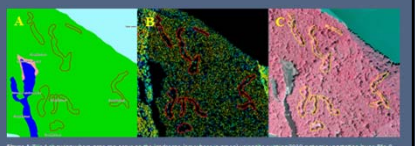


Figure 1: Tile A showing where gaps can occur on the landscape (anywhere in green) using the existing 2010 systemic vegetation layer, Tile B showing the lidar point cloud along the eastern shore of Railroad Island in Pool 13 with gaps delineated in red, and Tile C showing these same gaps in the 2010 systemic CIR imagery set.

USGS

Analysis – What have we found so far

There are a lot of gaps in the forests of the UMR (results limited to study area of Pools 8, 9, 13, 21, 24, upper 26, and lower Alton):

- 21,301 gaps between 0.1 2.0 acre
  - 1 gap per 4.7 ac of surveyed forest
  - Forest is 7.1% gap
- 31,918 gaps 0.065 4.0 acre
  - 1 gap per 3.1 ac of surveyed forest
  - Forest is 9.4% gap
- Vast number of forest gaps in UMR below 0.065 acre (our 1 tree size)


Credit: Andrew Strassman/USGS

USGS

Analysis – How does this compare?

- Runkle (1982) notes 9.5% gap in mesic old growth forest
  - Differences:
    - Runkle measured much smaller gap
    - Smaller gaps account for majority of 9.5%
    - Largest gap surveyed by Runkle <0.5 acre and we found many gaps >0.5 acre
  - Take Away
    - UMR bottomland forest have vastly more gaps than this old growth mesic forest

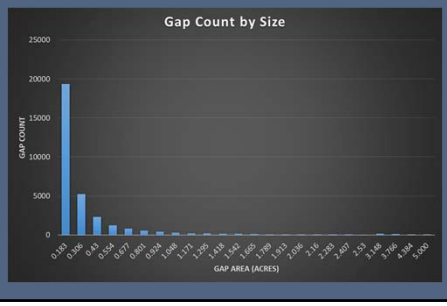
Runkle, J.R 1982. Patterns of disturbance in some old growth mesic forest of eastern North America. Ecology 63: 1533 1546.


Credit: Andrew Strassman/USGS

USGS

Analysis – What have we found so far

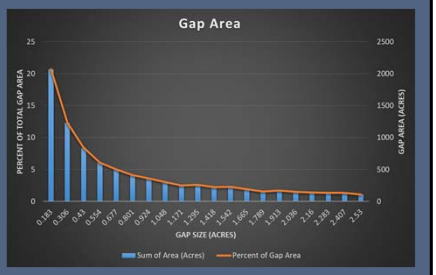
Gap distribution by size
- Lots and lots of small gaps



USGS

Analysis – What have we found so far

Small gaps account for the majority of the total gap area
- One third of the total gap area from gaps ≤0.306 acre
- Over one half of the total gap area from gaps ≤0.677 acre

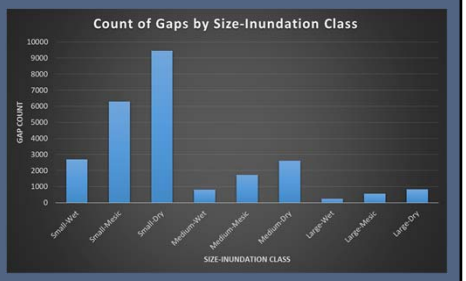


USGS

Analysis – What have we found so far

Small, dry gaps are easy to find while large, wet gaps are few and far between

- Small and dry gaps are still at least one treefall in size and flooded (they are not upland forest)
- Graph does not normalize gap count to inundation class areal coverage



USGS

Analysis – What have we found so far

When the inundation class area is accounted for, much of the apparent difference in gap commonness changes

- Small gaps still the most common
- Trends much less clear
- Small gaps in wet habitat the most common

USGS

Project Summary – What we have learned so far

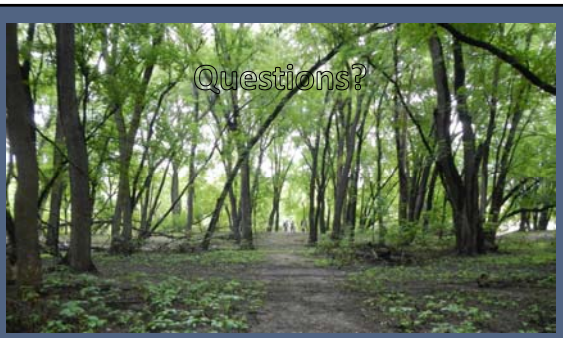
- There are a lot of gaps in the UMR bottomland forests , but we can detect them remotely
- The majority of gaps are likely one treefall gap or smaller, but there are still lots of bigger gaps
- There are patterns of gap distribution in the UMR, but need to investigate if they are significant
- Analysis of field data is ongoing to understand the patterns in individual URM forest gaps

USGS

Next steps – Where do we go from here?

- Complete the analysis of all data
- Finalize and publish results
- Work to monitor a subset of gaps over time to see if they are closing or expanding
- Create a plan to automate the monitoring of all UMRS gaps as new data comes in

USGS



USGS

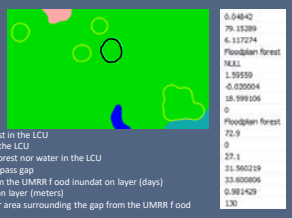
Extra Technical Slides

(no peaking!!!)

USGS

Methods – R script gap attribution

- Building code to attribute each gap correctly was much more challenging than creating the gaps
- Created **17** different attributes for **32,360** gaps:
  - Area of the gap (hectares)
  - Perimeter the gap (meters)
  - Gap area/perimeter rat o
  - Gap dom nant land cover/ and use from LCU Layer (31 class)
  - Gap interior vegetation cover type (31 class)
  - Gap average canopy height from lidar (meters)
  - Gap min mum canopy height from lidar (meters)
  - Gap max mum height from lidar (meters)
  - Percentage of the gap perimeter that is non forest in LCU
  - Majority forest type of a 150 meter buffer surrounding the gap (31 class)
  - Percentage of the 150 meter buffer area surrounding the gap that is forest in the LCU
  - Percentage of the 150 meter buffer area surrounding the gap is water in the LCU
  - Percentage of the 150 meter buffer area surrounding the gap is neither forest nor water in the LCU
  - Percentage of the 150 meter buffer area surrounding the gap that is first pass gap
  - Average inundat on length during the growing season with n the gap from the UMRR f ood inundat on layer (days)
  - Average inundat on depth with n the gap from the UMRR f ood inundat on layer (meters)
  - Median Julian day of max mum inundat on depth of the 150 meter buffer area surrounding the gap from the UMRR f ood inundat on layer



0.04842
79.15289
6.117274
Floodplain forest
NULL
1.59559
-0.020004
18.599106
0
Floodplain forest
72.9
0
27.1
31.560219
33.600806
0.981429
130

USGS

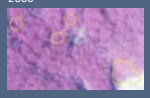
Methods – Image Interpretation

Rather than re y on just lidar, we are also having an image nterpreter rev ew gap polygons to determine
1) if they are an actual forest gap, and
2) what type of vegetat on is in the bottom of the gap.

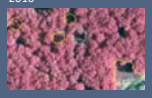
- Used to confirm R script resu ts integrity
- Lidar, while very good at height, is still bad at vegetat on type and this is critical for understand gap regenerat on potential

1989

2000



2010



2010 LCU

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Methods Choosing gaps for field survey

After a short rev ew of the lidar gaps, it became apparent that many were not gaps. This included areas that:

- Were willow shrublands
- Were permanent ponds
- Were LCU mapping artifacts (edge not gap)
- Were forested (time change due to old lidar)

Used the different attributes to remove as many "not a gap from the pool as possible

- Removed approximately 72% of the gaps from the field survey pool based upon these attributes

USGS

Methods – Gap stratification

Gaps are divided by two metrics

- Size
  - Small (≥0.1 0.25 ac)
  - Medium (>0.25 – 0.75 ac)
  - Large (>0.75 – 2.0 ac)
- Flood Duration
  - Dry (>0 20 days)
  - Mesic (>20 40 days)
  - Wet (>40 100 days)

Size Category	Forest Hydrology Category		
	Dry	Mesic	Wet
Small	Dry Small	Mesic Small	Wet Small
Medium	Dry Medium	Mesic Medium	Wet Medium
Large	Dry Large	Mesic Large	Wet Large

USGS

Method Field reconnaissance gap selection

Sitting in front of a computer only gets you so far….

- Provided researchers with randomly selected gaps
- Researchers sampled 3 gaps in each of the 9 categories for a tota of 27 gaps
- Teams were deployed in each of the three USACE districts
- 27 gaps were surveyed on:
  - Pools 8/9 (St. Pau District)
  - Pool 13/21 (Rock Island District)
  - Pool 24/26/Lower Alton (St. Louis District)
- Total of +/ 81 gaps surveyed (it was a difficult year in the field)
- Each gap, canopy edge, and surround forest were surveyed for:
  - Vegetat on and canopy characteristics
  - Soil composition
  - Forest condition
- Each plot can have up to 24 quadrats where data is collected per Figure 2

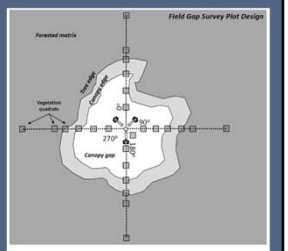

Figure 2. Generalized layout of field sampling in a hypothetical forest gap.

USGS

Sources

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De Jager, N.R., M. Thomsen, and Y. Yin. 2012. Threshold effects of flood duration on the vegetat on and soils of the Upper Mississippi River floodplain, USA. Forest Ecology and Management 270: 135 146.

Hodges, J.D. 1997. Development and ecology of bottom and hardwood sites. Forest Ecology and Management 90: 117 125.

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Seymour, R.S., A.S. White, and P.G. de Maynadier. 2002. Natural disturbance reg mes in northeastern North America—evaluating silvicultural systems using natural scales and frequencies. Forest Ecology and Management 155: 357 367.

Sousa, W.P. 1984. The role of disturbance in natural communities. Annual Review of Ecology and Systematics 15: 353 391.

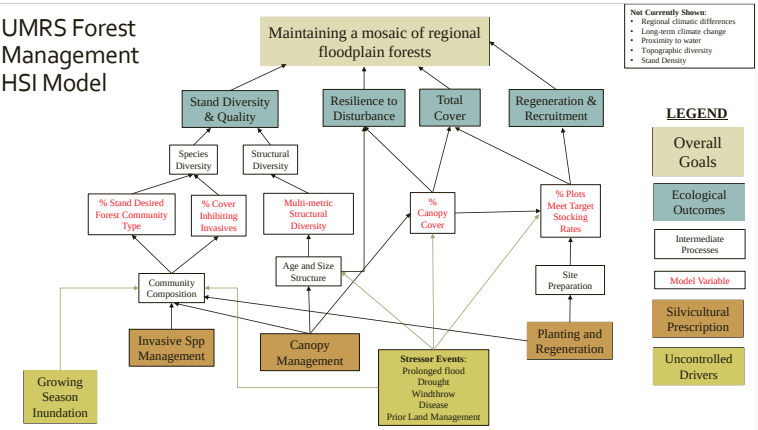
Stanturf, J.A., E.S. Gardiner, J.P. Shepard, C.J. Schweitzer, C.J. Portwood, and L.C. Dorris, Jr. 2009. Restorat on of bottomland hardwood forests across a treatment intensity gradient. Forest Ecology and Management 2009: 1803 1814.

USGS

Floodplain Forest Habitat Model Development

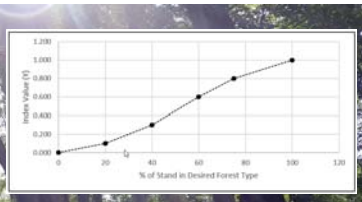
- Objective: quantify the habitat benefits of forest management
  - Used during the planning phase of ecosystem restoration projects
  - UMRS geographic region
- Collaborative, rapid model development workshop (June 9-10)
- Led by ERDC (Kyle McKay and Todd Swannack) and Nate Richards
- Participants: USACE, FWS, WI DNR, Audubon

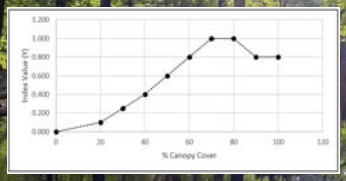
UMRS Forest Management HSI Model

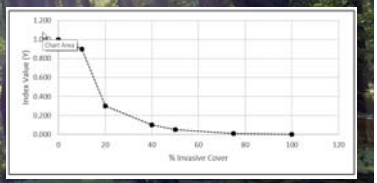


Variables

- Canopy Cover
- Desired Forest Type
- Invasive Cover

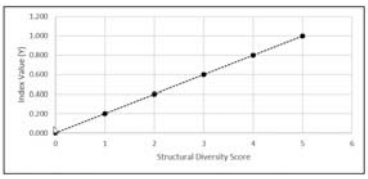


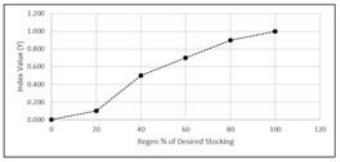




Variables, Cont.

- Regeneration
- Structural Diversity
  - Multi-variable index





BUILDING STRONG®
and Taking Care of People!

Next Steps

- Model testing
- Model documentation
- Model review
- Certification
  - Goal: by end of October
- Use to evaluate HREPS!
  - Reno
  - Green Island
  - Others?

Perspectives of Partners

The workshop format was well organized.

Many opportunities for sharing perspectives, observations and data.

Will be very valuable to quantify quality of existing and desired forest types with common metrics for UMR.

Will be useful at the project scale for alternative analysis for an HREP objective that has long been difficult to quantify.

Great improvement to be able to calculate benefits of changes in forest type as it becomes established.

Minnesota Slough and Reno Bottoms, Pool 9, Mississippi River, MN\IA

BUILDING STRONG®
and Taking Care of People!

Stephen Winter, Bruce Henry, Andrew Beebe, William (Billy) Reiter-Marolf, Jeff Janvrin

Perspectives of Partners – Wish List

Forest types can be cross-walked to species identified by FWS Refuges ROCs and State Wildlife Action Plans

- Providing a cross-walk of species use of forest types in the model documentation would increase planning team understanding of why a forest objective is important.

Many other models are in need of development or updating based on data collected by UMRR and the partners. This workshop approach would be an efficient method for this.

Perspectives of Partners – Wish List Where to start generating list of next HEP models

For example, systemic species/guilds identified as FWS Refuges' ROCs

- American Bittern
- Bald Eagle
- Divers
- Grasshopper Sparrow
- Prothonotary Warbler
- Sturgeon
- Yellow-billed Cuckoo
- Red Shouldered Hawk
- Dabblers
- Pectoral Sandpiper
- Freshwater Mussels

And a variety of aquatic habitat types

Midwest Climate Adaptation Science Center

UMRR Coordinating Committee Meeting

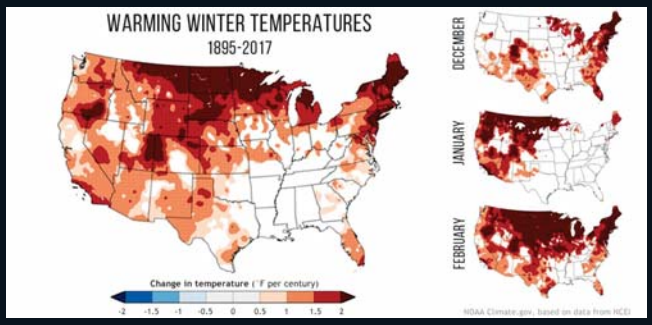
Olivia LeDee and Jeff Ziegeweid

8.12.2020

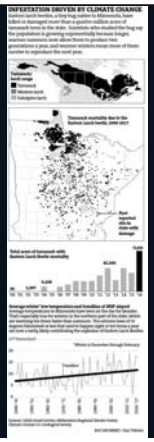
Outline

1) Midwest Climate Issues and Adaptation
2) Climate Adaptation Science Centers (CASC), Mission and Structure
3) Launching the Midwest CASC
4) Partners and Projects
5) Next Steps and Opportunities

Warming Winters: Observed



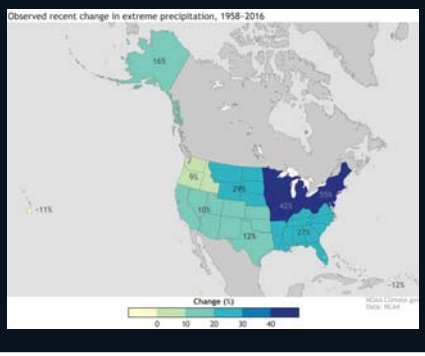
Eastern Larch Beetle



Heavy Rainfall: Observed

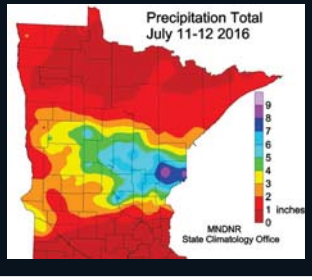
Heavy downpours are increasing nationally, especially over the last three to five decades.

Largest increases are in the Midwest and Northeast.



Heavy Rainfall: MN

From 1973-2019, Minnesota has seen 17 mega-rains, a sharp uptick since 2000.



Climate Adaptation

Strategic action, anticipatory or reactionary, to address the current or expected effects of climate change. May moderate harm or take advantage of beneficial changes.

Not business as usual

"The best way to predict your future is to create it"

CASC Network Mission

Delivering science to help fish, wildlife, water, land, and people adapt to a changing climate.

Credit: Nikles

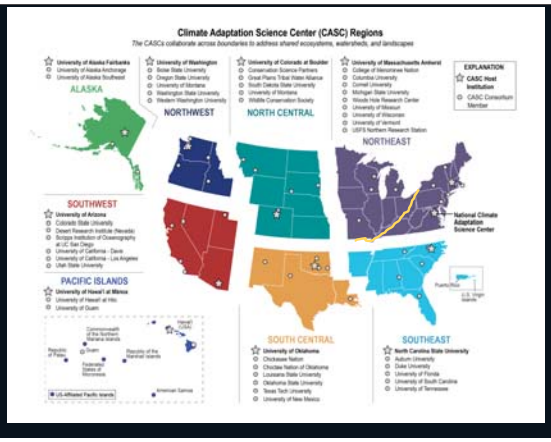
Goals

Respond to high priority management challenges

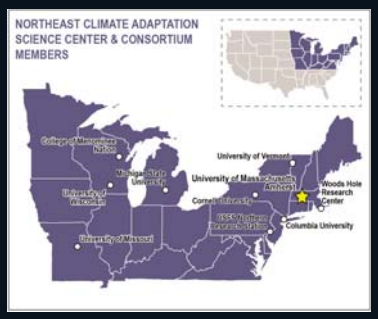
Foster substantive, sustained engagement between scientists and managers.

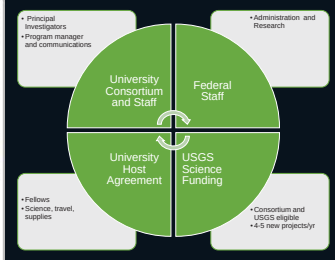
Provide science to support sound resource management and adaptation.

Advance the understanding of the impacts of climate change on fish, wildlife, water, and land



Structure





Engagement and Coordination

- Advisory Committee
- Strategic Science Plan
- Partner Coordination
- Tribal Engagement
- Fellows Training
- Technical Assistance

Credit: NPS

Midwest CASC

The Northeast Climate Adaptation Science Center currently encompasses 21 states with divergent climates and adaptation needs. The recommendation includes $4,000,000 to establish a Midwest Climate Adaptation Science Center to focus on and address the threats to natural and human communities in Midwest states and develop a more tailored strategic science agenda (HR 116-100)

Credit: Lynch

FY 2020 Research Priorities

Research Priorities:
- Expanding Climate Science for Fish and Wildlife Management
- Science to Steward the Great Lakes and Atlantic Coasts in an Era of Climate Change
- Coupling of Freshwater and Terrestrial Systems Under Climate Change
- Climate Science on the Changing Invasive Plant, Pest, and Pathogen Landscape

Projects should target one or more issues faced by natural and/or cultural resource managers from federal, state, and/or Tribal government, generate knowledge to address that challenge, and engage resource managers in meaningful ways.

Projects can be focused on:
- expansion, engagement, synthesis, or implementation
- climate impact science
- novel research in the design and evaluation of climate adaptation

FY2020 Research Solicitation

Statements of Interest:
95 statements, requesting over $38 million

Proposals:
19 received, requesting over $8 million

Selected Projects:
12 proposals selected for funding, ~$3.3 million

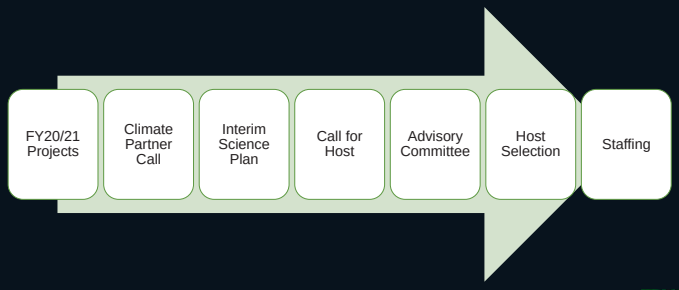
New MW CASC Projects

Principal Investigators	Institutions	Project Goals
Gretchen Hansen Jordan Read	UMN-TC USGS WMA	Quantified relations between environmental changes and responses of target fish species will be used to generate lake-level population predictions for prioritizing climate adaptation management decisions.
Benjamin Zuckerberg	UW-Madison	Quantified relations between changing winter climates and phenotypes of snowshoe hares and ruffed grouse will be used to determine the effectiveness of translocation and forestry management as tools of climate-change adaptation.
David “Bo” Bunnell	USGS GLSC	Quantified relations among water currents, temperatures, zooplankton abundance, and recruitment of yellow perch and alewife in the Great Lakes will be used to predict future population responses that inform management decisions.
Owen McKenna	USGS NPWRC	Quantified site-specific and regional changes in hydrology of critical waterfowl habitat will inform management decisions to sustain resilient wetlands.
Mark Wiltermuth	USGS UMESC	Managers can use the developed framework to quantify the risk of AIS dispersion for several possible climate scenarios.

Regional Climate Partners

- Great Lakes Integrated Sciences + Assessments (NOAA)
- Wisconsin Initiative on Climate Change Impacts
- Northern Institute of Applied Climate Sciences
- Midwest Climate Hub (USDA)
- Regional Climate Services (NOAA)
- Midwest Regional Climate Center (NOAA)
- Chicago Wilderness
- Northeast Indigenous Climate Resilience Network
- Minnesota Climate Adaptation Partnership

MW CASC Timeline



Climate Issues

- Sedimentation and nutrient influxes
- Vulnerability of protected areas
- Changing fish assembly
- Novel invasives or expanded range
- Restoration of floodplain forests
- …?

Credit: Anthony Souffle, Star Tribune

Opportunities

- Call for proposals (~Spring 2021)
- Connections with climate researchers
- Workshops and trainings
- Technical assistance
- CASC newsletter: https://my.usgs.gov/phplist/lists/?p=subscribe&id=5
- MW CASC list-serve: email to join (jrziege@usgs.gov)

Thank You!

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HABITAT RESTORATION: DISTRICT REPORTS

ST. PAUL DISTRICT (MVP)

PLANNING

- **Reno Bottoms HREP – Pool 9, MN/IA**
  - Continuing Feasibility
- **Lower Pool 10 HREP – Pool 10, IA**
  - Evaluating Alternatives
  - Preparing for TSP Milestone

DESIGN

- **McGregor Lake HREP – Pool 9, WI**
  - Floodplain Forest & Backwater Dredging
  - Advertised (1 July)
  - Bid Opening (11 Aug)

CONSTRUCTION

- **Conway Lake HREP – Pool 9, IA**
  - Construction 45% complete
- **Bass Ponds, Marsh & Wetland HREP**
  - MN River – Water Level Management
  - Contract Awarded (18 June), NTP (1 July)
- **McGregor Lake HREP – Pool 9, WI**
  - "Phase 1" M&R completed 70K placement
  - Contract Award – September 2020

REPAIRS

- **Harpers Slough HREP – Pool 9, IA**
  - Complete P&S, Letter Report
  - Advertise (early Nov)

ST. PAUL DISTRICT PHOTOS

Conway Lake HREP – Construction Progress

Placement at FP21

Removal from Lansing Island

Rock Island District (MVR)

PLANNING

- **Steamboat Island HREP – Pool 14, IA/IL**
  - PDT is routing final package for signatures
  - Send final package to MVD for approval by end of August
- **Lower Pool 13 HREP – Pool 13, IA/IL**
  - PDT is working on features
  - A virtual mini-charette was held June 22-24
- **Green Island HREP – Pool 13, IA**
  - PDT working on virtual open house
  - PDT drafting sections 1-3 of the report
- **Pool 12 Forestry – Pool 12, IA/IL**
  - PDT is being established

DESIGN

- **Keithsburg Division Stage II – Pool 18, IL**
  - 100% review is schedule for early September

CONSTRUCTION

- **Pool 12 Overwintering, Pool 12, IL**
  - ***Stage II*** **–** BPA –tree planting was awarded for $253K
  - ***Stage III*** **-** Closing out the construction contract
- **Keithsburg Division Stage I, Pool 18, IL**
  - No work - waiting on river levels to drop
- **Huron Island, Pool 18, IA**
  - ***Stage II*** **-** Waiting on final survey submittal
  - ***Stage III*** **-** Delayed due to COVID – No travel
- **Beaver Island Stage IB, Pool 14, IL**
  - Contractor is on-site dredging

FACTSHEETS

- Sent Quincy Bay to MVD for approval

ROCK ISLAND DISTRICT PHOTOS

Keithsburg HREP Stage I

Concrete Mats Manufacturing Site

ROCK ISLAND DISTRICT PHOTOS

Beaver Island HREP Stage IB

Dredging at Upper Lake

Rock Placement at Albany Island

ST. LOUIS DISTRICT (MVS)

PLANNING –

Oakwood Bottoms, IL, HREP (Open River)
- Submit Draft Feas Rprt for approval

Yorkinut Slough, IL HREP (IL River)
- Continue Feasibility Planning
- Habitat Evaluation Workshop

West Alton Islands, MO, HREP (Pool 26)
- Initiate Feasibility Report 1st Qtr FY21

DESIGN –

Piasa & Eagles Nest, IL HREP (Pool 26)
- Bid Opening 20 August
- Contract Award Sept.

Harlow Island, IL HREP (Open River)
- Finalize P&S for future award

CONSTRUCTION –

Crains Island, IL HREP (Open River)
- Awarded Contract 20 Feb 20 (A)
- Earthwork & Pile Removal

Clarence Cannon Refuge, MO (Pool 25)
- Pump Station
- Exterior Berm Setback

Ted Shanks, MO HREP (Pool 24)
- Reforestation
- Warranty Work

New Fact Sheets
- Finalize new facts sheets
- Sponsor Review
- 4th Qtr. FY20 & 1st Qtr. FY21
- Submit to MVD for Approval

ST. LOUIS DISTRICT

Crains Island HREP Earthwork

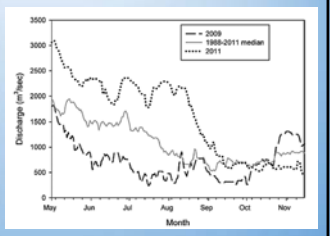
Clarence Cannon HREP Pump Station

DISCUSSION

Environmental factors controlling phytoplankton dynamics in a large floodplain river with emphasis on cyanobacteria

Shawn M. Giblin & Gretchen A. Gerrish

- Assessed potential drivers of abundance of phytoplankton and of specific toxin-producing cyanobacteria in the UMRS.
- Comparison of 2009 (low discharge) and 2011 (high discharge)
- LTRM Fixed Site and Stratified Random Sampling WQ data

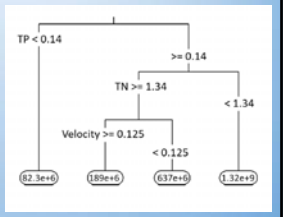


Giblin SM, Gerrish GA. Environmental factors controlling phytoplankton dynamics in a large floodplain river with emphasis on cyanobacteria. River Res Applic. 2020;1–14.
https://doi.org/10.1002/rra.3658

Environmental factors controlling phytoplankton dynamics in a large floodplain river with emphasis on cyanobacteria

Shawn M. Giblin & Gretchen A. Gerrish

- Most important factor associated with abundance of cyanobacteria was high phosphorus / low nitrogen concentrations
- Other factors associated various abundance of cyanobacteria
  - low velocity
  - low flushing / long water residence time
  - adequate light
  - warm temperatures



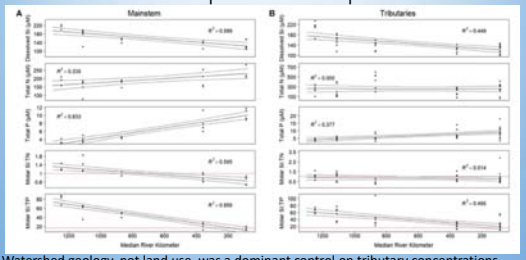
- Cyanobacteria (*Dolichospermum*, *Aphanizomenon* and *Microcystis)* were abundant in 2009 – a year of low discharge and low flushing rates.
- Results suggest isolated backwaters with high phosphorus, low nitrogen, warm water temperatures and low flushing rates are more susceptible to abundant cyanobacteria

Exploring Silica Stoichiometry on a Large Floodplain Riverscape

Joanna C. Carey*, KathiJo Jankowski*, Paul Julian II*, Lienne R. Sethna*, Patrick K. Thomas*, and Jason Rohweder
*Joint first authorship; equal contributions and listed alphabetically

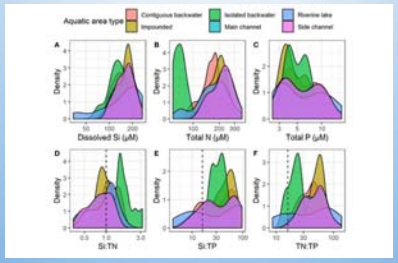
- Silicon (Si) is an important nutrient for phytoplankton production (diatoms) in freshwater and marine ecosystems
- Rivers provide 80% of marine Si supply to the oceans; diatoms in ocean ~50% of global NPP
- What is the role of watershed lithology and land use in controlling the inputs of Si to the UMRS?
  - Investigated the role of land use, lithology, and *in-situ* ecological controls in altering external inputs of Si:TN:TP from 23 tributaries to the UMRS.
- How does the hydrogeomorphology of the UMRS impact Si and its ratio with other nutrients? (i.e., is Si limiting to phytoplankton production?)
  - Examined how mainstem river hydrogeomorphology altered internal patterns and coupling of Si:TN:TP along the 1,900 km of the mainstem UMRS.

Exploring Silica Stoichiometry on a Large Floodplain Riverscape



- Watershed geology, not land use, was a dominant control on tributary concentrations
- Longitudinal decline in mainstem Si; Si:TN and Si:TP in southern reaches indicate limitation
- Dominant role of tributary inputs in controlling Si and stoichiometry
- But, evidence for some influence of CHL, temperature and SS indicating role of in-river processing

Exploring Silica Stoichiometry on a Large Floodplain Riverscape



- River hydrogeomorphology (residence time) affects Si and its ratio with N and P

Carey, J., Jankowski, K., Julian, P., Sethna, L., Thomas, P. and Rohweder, J.J. 2019. Exploring silica stoichiometry on a large floodplain riverscape. *Frontiers in Ecology and Evolution* 7:346. https://doi.org/10.3389/fevo.2019.00346

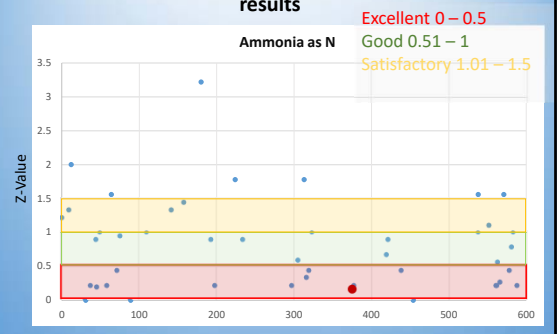
2020 Summer REU program at UWL

- NSF Research Experience for Undergraduates: Ecological Modeling of the Mississippi Basin (Mathematical and Theoretical Ecology)
- Objectives:
  - Train undergraduates in interdisciplinary mathematics via projects in ecological modeling
  - Motivate students to attend graduate school, especially underrepresented or first-generation students
  - Provide students with quantitative and ecological skills to address management-related and applied questions
- Summer 2020 focused on UMRS water quality, phytoplankton, and floodplain forest data
- Collaboration among institutions
  - UWL: Douglas Baumann and Barbara Bennie
  - UMESC: KathiJo Jankowski, Molly Van Appledorn, Jeff Houser
  - MDC: Jessica Fulgoni

2020 Summer REU program at UWL

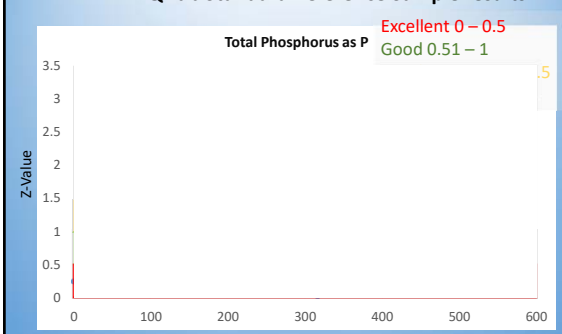
- Four projects
  - Classification of Upper Mississippi River Floodplain Forests
    - USACE Phase II Forest Inventory Data (3 districts, 19 pools, > 250,000 trees)
    - Salvador Balkus (UMass Dartmouth), Noah Dean (Michigan State), and Makayla McDevitt (Colorado College)
  - Characterizing Water Quality Responses to High Discharge Events using High-frequency Sensor Data
    - GREON buoy data from Pool 8 (main channel and Stoddard Island; 2015-2019)
    - Taryn Waite (Colby College)
  - Spatial and Temporal Patterns in River Phytoplankton and Cyanobacteria Communities
    - LTRM phytoplankton samples; Phytoplankton sample review dataset (1996-2012; IDs from BSA Environmental in 2020)
    - Lamia Benyamine (Univ. of Central Florida), James Pack (Centre College)
  - Using Time-series Analysis of Water Quality Sensor Data to Understand Shared Seasonality.
    - GREON buoy in Pool 8
    - Megan Johnston (Emory University)
  - Recording of the final 15 min presentations are available here: https://uwlax.webex.com/uwlax/ldr.php?RCID=eb8d7f34e0f04e53bec2ca877d239872

LTRM WQ Lab Standard Reference Sample results



Red Dot UMRR LTRM WQ Lab Results

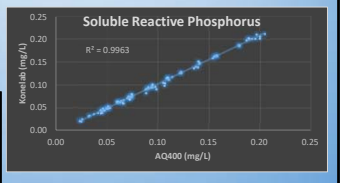
LTRM WQ Lab Standard Reference Sample results



Red Dot UMRR LTRM WQ Lab Results

Behind the Curtain, LTRM WQ Lab

A Comparison Study of Soluble Reactive Phosphorus and Silicate Samples Analyzed on a Konelab Aqua20 and Seal Analytical AQ400



Shirley Yuan, John Manier, and Derek Craig

UMRR Status and Trends 3rd edition

- Internal rough draft complete
- Draft for A team review early to mid-September

Covid-19 Update
LTRM WQ sampling

June Fixed Site Sampling

- Week of June 1:
  - Able to sample: IA (Pool 13), MO (Open River), and IL (La Grange Pool)
  - Not able to sample: MN (Pool 4), WI (Pool 8), IL (Pool 26)
- Week of June 15:
  - Able to sample: MN, IA, MO, IL
  - Not able to sample: WI
- Week of June 29, July, and August sampling:
  - All study reaches sampled

Stratified Random Sampling

- All study reaches were sampled
- Iowa suspended sampling 30 July. Tentative plan is to resume sampling 13 August.
  - Not all 150 SRS WQ sites will be sampled, but reasonable coverage of all strata is expected.

Covid-19 Update
LTRM Vegetation sampling

- Minnesota (Pool 4)
  - Began sampling with no delay in start date
  - Unable to hire interns, other staff are assisting
- Wisconsin (Pool 8) and Iowa (Pool 13) began sampling with a 1 week delay in start date
- Iowa suspended sampling on 30 July. Most sites had been sampled.
  - Tentatively plan to resume sampling 13 Aug.

Covid-19 Update
LTRM Fish sampling

Period 1 (June 15 – July 31)

- Minnesota and Wisconsin
  - Only net sampling.
  - No LTRM electrofishing b/c > 2 people not permitted in boat.
  - Single dipnet electrofishing done to collect samples for the vital rates project
- Iowa : All but 3 wing dike sites were sampled (Netting and Electroshocking) before sampling was suspended 30 July
- Illinois (Pool 26 and La Grange Pool) and Missouri (Open River Reach) have been conducting full sampling—Netting and Electroshocking

- Period 2 (August 1 – September 14)
  - Expect similar to above
  - Iowa will resume fish sampling the week of 17 August. This is a late start, but staff expect to complete period 2 sampling

Period 3 (September 15 – October 31)

- Plans will be finalized as that period nears

Covid-19 Update
Illinois River 2020 lock closure sampling

- No vegetation rake sampling on the Illinois River will occur because of Covid-related travel restrictions
  - Aerial photos will be collected as part of 2020 LCU flights
- Fish sampling is ongoing
  - Full LTRM SRS design has been adopted
- Water quality
  - Fisheries teams will collect chlorophyll and turbidity at sites in Alton, Peoria, Starved Rock and Marseilles pools during periods 2 and 3 fish sampling
  - Rock Island USACE water quality staff are deploying two sondes at sites in Starved Rock pool for the duration of the closures to measure several parameters (e.g., turbidity and chl.)

Covid-19 Update
LCU sampling is underway!

Flight tracking for Pool 13 LCU mapping flight as of 8/11/20, 10:37 am.

Questions?

Upper Mississippi River Restoration
Leading·Innovating·Partnering

UMRR MONITORING AND SCIENCE UPDATE

Karen Hagerty
Rock Island District
12 August 2020

US Army Corps of Engineers

UMRR MONITORING & SCIENCE FY20

2 SOWs in FY20

SOW for LTRM base monitoring
$5.0M

SOW for science in support (analysis under base)
$1.3M

Both SOWs <u>together</u> are equivalent to a fully funded UMRR LTRM element $6.3M

Additional funding for Science
$2.5M

TOTAL: $8.8M

UMRR MONITORING & SCIENCE FY21

2 SOWs in FY21

SOW for LTRM base monitoring
$5.0M

SOW for science in support (analysis under base)
$1.3M

Both SOWs <u>together</u> are equivalent to a fully funded UMRR LTRM element $6.3M

Additional funding for Science
$2.5M

TOTAL: $8.8M