

A-Team Meeting – 11/3/2021
Scott Gritters- Iowa DNR Chairperson
Webex Webinar
Final Minutes

Attendance:

A-Team Reps:

Scott Gritters (Chair and IA Rep)
Nick Schlessner (MN Rep)
Shawn Giblin (WI Rep)
Matt O'Hara (IL Rep)
Matt Vitello (MO Rep)
Steve Winter (USFWS Rep)

USGS:

Jeff Houser
Jennie Sauer
Jennifer Dieck
Kristen Bouska
Danelle Larson
Molly Van Appledorn
Kathy Jo Jankowski
Brian Ickes

USACE:

Karen Hagerty
Marshall Plumley
Davi Michl
Eric Hanson
Lane Richter

UMRBA:

Andrew Stephenson

MN:

Eric Lund

WI:

IA:

IL:

John Chick
Jim Lamer

MO:

Dave Herzog

USFWS:

Neal Jackson

Scott Gritters- we need to go out of order on the agenda as Dave Herzog has some interviews he will get to this afternoon. Dave will present the Big Rivers and Wetlands Field Station Staff to the group. As done in the previous meetings, we would like to have the staff of the various field stations introduced at each A-team meeting with a different group highlighted each meeting. Today Dave will introduce us to his staff:

Dave Herzog:

The Open river reach field station was stood up in 1991. Since then, there have been several reorganizations and name changes for the field station—slightly suffering an identity crisis. Today the field station identifies as the “Big Rivers Science Unit”. The field station leverages all staff with other projects or funding to get the biggest benefit. For example, most staff are funded at 85% UMRR-LTRM time allowing 15% for agency priority and partner development.

Dave Herzog is the field station supervisor, (funded at 10% UMRR-LTRM), and has been with the field station since its inception. Dave started as a fisheries technician, then promoted along the way up to field station supervisor in 2012: his current role today.

Molly Sobotka is the systems ecologist. Molly began work at the field station as the Water Quality component specialist and promoted to her current role in 2016. Her position seeks to understand the multi-component/multi-agency data string provided by the LTRM. She is currently working on large data projects including classification of the UMR side channels using multiple data sets. She is passionate about the large river landscape, emphasizing floodplain connectivity.

John West is the Fisheries component specialist. John has a strong background in fish taxonomy, zoogeography, population ecology, and life history. His skill set lends itself nicely to complementing the LTRM fish work he completes. He is currently researching the Fish community within the Chevron dike structures. His comparison data with traditional dike structures illustrates his knowledge of fish distribution. Furthermore, he is conducting comparison of a single-rare-backwater habitat in the open river reach to better understand fish distribution and habitat needs. It would be great to one day build more habitats like this backwater using HREP authority—and John’s work will certainly help promote that necessity.

Our Water Quality component specialist is currently vacant. Previously held by Jessica Fulgoni, this position has allowed the incumbent to select research within their specialty and focus on projects development. Jessica focused on the lower trophic levels including plankton—but her love was for macro invertebrates. Having begun development of a proposal, prior to her departure, her efforts will be carried on by minds of similar interest (e.g., Shawn Giblin). Her skill sets will be missed—but we will be filling that position very soon and am excited about the specialties from the next hire.

The field station concept was adopted by MDC in 2003 when it stood up the Resource Science Division. The focus then was on systems, our field station being the Big Rivers and Wetlands Systems. Along with existing UMRR-LTRM staff, the agency funded complimentary positions to fulfill the system approach. Today, after reorganization, there remains a diverse work unit with a cohesive background.

Dave Ostendorf is the longest tenured scientist at the field station. He started as a technician in 1994 and was promoted to his current position in 2019 as a large rivers scientist. He works closely with river managers within the UMR and LMR basins—including large tributaries (e.g., Missouri, Black, St Francis). He transitions from fish to wetland or forest using his varied skills acquired during his career.

Our second vacancy was generated by the departure of Sara Tripp in June—(thank you ILDNR for taking our talented staff). Sara worked for the field station since 2008 as a Fisheries research biologist and was instrumental in projects being completed on shovelnose, lake and pallid sturgeons, paddlefish, and advancing telemetry within the Mississippi River basin. She most recently developed 6 projects to understand control and management of invasive carp on the Missouri and Mississippi Rivers. We hope to recruit for this position coincidental to the LTRM WQ vacancy.

Joe McMullen is the Big Rivers Specialist. Joe started at the field station as a technician and promoted out to the USACE, then the USFWS and returning to the agency as a habitat specialist. Joe's current role includes the commercial fisheries program for the state. In addition, he is the recovery leader for two large river chub species: sturgeon chub and sicklefin chub. Joe has recently presented results from our units 7-year Paddlefish project to implement regulation changes in Missouri waters. He also presented results from the statewide Blue and Flathead catfish project to agency administration. Joe "re-joined" our unit in 2019 and is aiding in filling in where we have vacancies and ongoing project responsibility.

Lastly, our unit could not complete the efforts it does without the dedication from our hourly staff. Josh Abner has been with our unit since 2016 beginning as an LTRM technician. He currently leads the age-0 pallid sturgeon trawling project on the 200 river miles from confluence with the Ohio river to the confluence with the Missouri river. We hope his skills will allow him to compete well for either of the two vacancies given his tenure in completing both tasks. Caleb Pemberton is our Fisheries Biologist assisting LTRM component leaders (WQ and Fish) and will soon be completing a management evaluation project on demographics and techniques for sampling flathead and channel catfish on two mid-sized rivers. Meg Sitzes is the Fisheries technician for LTRM fish and WQ also and recently completed a management evaluation on population demographics of American bullfrog across a wetland management zone gradient. UMRR-LTRM has long served as a launch pad for many biologists and researchers, including generational staffing. Case in point is that Meg Sitzes is the daughter of Mack Sitzes. Mack began his career with LTRM in Alton in 1992 and is currently employed with ILDNR.

I owe my career start to the UMRR-LTRM and my achievements to the many staff who have come and gone. While the science makes the UMRR-LTRM successful: the people make it GREAT!

Thank you A-Team and Scotty for accommodating the Big Rivers Science Unit today.

Scott G: It was always great to get down the Cape area and see how different the river is and the different challenges you face down there. Could you send an email with staff names to make sure we get that right?

Karen Hagerty: Marshall and I are planning to come visit you and John Chick to complete our field station visits.

Dave Herzog: Will prepare.

John Chick: avoid the middle of winter.

Dave Herzog: 30 degrees at a boat ramp – “feels tropical.”

8:22 a.m. Gritters discussed the previous July A-team meeting minutes which were sent out to the group twice for review, asked for the minutes of July A-Team meeting to be approved.

Shawn Giblin: motion to approve. Matt Vitello – second.

Vote: Unanimous

UMRR Program update: Karen Hagerty

Nov 17th is the UMRR Coordinating Committee meeting, 35th Anniversary date. That is kinda a big deal and a testament to this long standing partnership.


The Charter which we have all worked on in now being signed virtually

2022 UMRR Report to Congress is due to Congress in December 2022. Should have a draft pulled together later this year for partner agency review.

Have a continuing resolution through December 3rd? so we can progress at last year’s funding level of 33.17M.

HREP feasibility, planning is ongoing at Reno Bottoms. Lower Pool 10 will be out for public review in fall 2021. Quincy Bay had kick off meeting with sponsor on Oct 25-26. At Yorkinut Slough, the PDT is developing alternatives

West Alton Islands planning continues.



UPPER MISSISSIPPI RIVER RESTORATION PROGRAM

Hot Topics:
UMRR CC 17 Nov 2021
2022 Report to Congress

35th Anniversary
Charter signing underway

Execution:

- FY 21 Program - \$33,169,040.48 / \$33,283,975.52 98.77%
- FY22
 - President's budget \$33,170,000
 - House \$33,170,000
 - Senate \$33,170,000
- Continuing Resolution through 3 December

HREP Design/Construction:


- Harpers Repair (MVP) –repairs underway
- McGregor Lake (MVP) – construction underway (photos)
- Bass Ponds (MVP) – mostly complete
- Conway Lake (MVP) – construction near completion
- Keithsburg Division (MVR) – Stage IIa construction awarded
- Huron Island (MVR) – planted 400 plants on 20-21 July, ERDC to evaluate the plants (photos)
- Crains Island (MVS) – earthwork & pile removal
- Clarence Cannon (MVS) – pump station & berm setback (photos)

HREP Feasibility:

- Reno Bottoms (MVP) – planning continues
- Lower Pool 10 (MVP) – public review (Fall 2021)
- Lower Pool 13 (MVR) –PDT has decided two separate projects are needed to effectively address problems with different spatial scale
- Quincy Bay (MVR) – Kick off meeting with sponsor 25-26 Oct
- Yorkinut Slough (MVS) – PDT developing alternatives
- West Alton Islands, MO (MVS) – planning continues, measures

LTRM:

- FY22 LTRM base monitoring SOW partially funded, Analysis under base SOW in draft
- UMRR LTRM strategic implementation planning – identify highest priority information/science
 - Scoping underway with planning team & facilitators
 - Participation list
 - Problem statement



HREP construction

[See slide above]

LTRM update:





FY22 LTRM base monitoring SOW is now partially funded.

LTRM Implementation planning to ID information gaps. At last UMRR CC meeting, the LTRM IP groups showed initial guidance document and selected facilitators.

Photos:

Huron Island plant enclosures to address herbivory.

Potential construction completed:

| | | | |
|---|--------------|---|--------------|
|  <div>7</div>  <div>7</div> | | | |
| UMRR HREP POTENTIAL CONSTRUCTION COMPLETIONS | | | |
| 2021 | | 2022 | |
| Conway Lake (MVP) | 1,170 | Bass Ponds (MVP) | 2,090 |
| Pool12 Overwintering (MVR) | 1,280 | Harpers Slough (MVP) | 1,680 |
| Ted Shanks (MVS) | 3,140 | Beaver Island (MVR) | 3,510 |
| Total Acres | 5,590 | Huron Island (MVR) | 2,530 |
| | | Total Acres | 9,810 |
|  <div>BUILDING STRONG® and Taking Care of People!</div> | |  <div>Upper Mississippi River Restoration Leading. Innovating. Partnering.</div> | |

Acres restored slide projection is 76,110 potential acres over next 10 years from 2021-2031. That is what will be done under current funding level of \$33.17m.

Scott G: HREPS I visited in MVP and MVR this year looked great. Conway, Sunfish Lake in Pool 12 and Huron all are loaded with fish and wildlife!

LTRM Implementation Planning

UMRR CC put together an *ad hoc* team to aid in implementation planning.



LTRM IMPLEMENTATION PLANNING



Planning Team:

- LTRM management team (Plumley, Hagerty, Gaikowski, Houser, Sauer)
- Jim Fischer (WI, UMRR CC)
- Matt Vitello (MO, UMRR CC, A-Team)
- Nick Schlessler (MN, A-Team)
- UMRBA (Stephenson, Wallace)

Facilitators:

- Dave Smith, Max Post van der Burg (USGS)

Duration:

- About 1 year, once SOW is finalized



BUILDING STRONG®
and Taking Care of People!



Dave Smith and Max Post van der Burg are facilitators – have experience with big systems. Once we figure out the SOW for this effort – in development now – we anticipate about one year to complete the work.

Current tasks:

- Participant list – Goal of about 20
 - Representative of partnership organizations
 - Spanning geographic extent
 - Representing various types of roles and expertise
- Problem statement
- Upcoming tasks:
 - Finalize scope, schedule, meeting format

Looking to assemble a representative group of 20 persons to participate in the process of LTRM implementation Planning.

Karen asked Jeff Houser if was missing anything, he indicated it was a good overview, nothing to add.

KH: Meeting for about 1.5 hours every other week to carry this work on. This work is different than past efforts as here we are looking at information needs, how we could address those, and how to prioritize needs when additional funds are available.

Jennie Sauer –

from Jennie Sauer to everyone: 8:35 AM - Dave Smith is at the USGS Leetown Science Center in Kearneyville, WV

from Jennie Sauer to everyone: 8:38 AM - Max is at Northern Prairie Wildlife Research Center

from Kathi Jo to everyone: 8:38 AM - Did you say when the meetings will start? I think I missed that!

KH: May have schedule and SOW completed before the Science Meeting. Implementation Planning meetings with the full group may not happen until after the Science Meeting.

Jeff Houser: Science Meeting approaching and looking for information that would be useful for me. I think it will need to be virtual and toward that end, would be interested in understanding each agency's perceived ability to participate in an in-person 60-70 person meeting in March.

Scott G: Virtual or in-person has been a popular question at most meetings.

COVID Updates

UMRBA: Meetings are largely driven by state policies. Keeping February open at this time for possible in-person, but will be discussed in November quarterly meetings and after.

Jennie Sauer: We have a 25% occupancy at UMESC and this won't change until COVID numbers go down. WI is red along with most Upper Midwest States. Won't be able to travel until those numbers go down. Some field work possible if mission critical. January-March timeframe is when we're trying to get people back to the Center. Hosting large outside groups is a step beyond that and not in the foreseeable future.

Karen H: USACE is at MVR is at 50% occupancy now. There are restrictions on people in a vehicle traveling together and only vaccinated individuals able to travel. A few people were allowed to attend a national meeting this week. Now, one to two people could attend a meeting in-person potentially. Evaluating based on local conditions. Not expecting a change until after January 1.

Lane Richter (MVS): At the end of summer, we went to max telework. Numbers went up so looking at slow transition back. As far as travel to meetings the guidance is deferred to location we're going to and COVID status in that area.

Davi Michl: The MVR & MVP are similar to MVS and not looking to make any changes to after the new year and holidays.

Steve Winter: The USFWS is doing max telework, but can go into the office with scheduling with others to minimize people in the office. We can travel overnight for mission critical work. As far as ability to attend in-person science meeting, guess that we would not be able to attend in-person. There is currently a federal mask mandate for people inside Federally owned or leased buildings and spaces, as well as on outdoor areas if you cannot socially distance. Anytime people on the refuge are congregating less than 6ft apart, they are supposed to have a mask on.

Neal Jackson: Fisheries guidance is consistent with what Steve W said. Additional context for meetings. We have folks traveling for field work, we have been told that the lowest priority for mission critical activities is attending meetings, especially if a virtual option is available. That's what we're hearing now and not sure what that step down from Department level to local level will be.

Matt Vitello: MO DOC is fairly open now. Have been full-time in the office since May. Last week, rolled out policy to allow work from home requests with approvals. As far as travel, have not had any difficulty getting travel approved. Have had out of state and in-state travel approved. We're open for business. I don't see that changing in the near term. We're asking these questions as we plan the UMRCC meeting. After the new year, hope some of these changes allow larger in-person presence for that meeting.

Matt O'Hara – Illinois DNR is back into the office, besides normal COVID. Field work ongoing, travel up to supervise discretion. In-state travel works. Out-of-state goes through more channels for approval. If there is an out-of-state meeting, I might be able to get approval to attend at this point. As far as offices, we're not open to the public at this point unless scheduled, but see that changing.

Jim Lamer: Travel restrictions are lifted for vaccinated folks and out of state is not an issue. Have people attending AFS in Baltimore next week. Non-vaccinated can travel but only one person per vehicle, and stay in hotel room alone. Up to comfort level of staff to attend in-person large meeting in Spring.

John Chick: agree with Jim.

Scott G: Iowa DNR is similar to Missouri as we are open for business. Can work hybrid schedule with some at home if you want. People can come to offices. We can travel in vehicles and out of state with not a lot of restrictions at this time.

Shawn Giblin: WI DNR is similar to last meeting. Can go into office, but masked. Field work is similar to last few months. Have been some restrictions on multiple people riding in vehicles. Seems fairly unlikely that we would be able to attend a large in-person meeting in February, but fairly fluid.

Eric Lund: MN DNR has not much changed from last meeting. The earliest date at which anyone in our agency could return to office full-time or be required to return has been pushed back. Was going to be after Labor Day, but now back to January 1. Most everyone involved in these discussions have had an exemption to go to office to do field work and related activities. Our whole agency is going through work evaluation whereby we submitted plans for after January 1. From Nick it remains to be seen how that affects fisheries staff in co-located office versus some of our other staff, due to amount of field work and may be doing winter report writing from home. LTRM will telework except for direct field work or indirect activities in the office. No restrictions on travel now. Back to process of submitting out-of-state travel requests like pre-COVID. Subject to approval. Probably could get approval for out-of-state travel meetings in late-winter timeframe. Unofficially, LTRM folks at this point, generally favor a virtual meeting for the Science Meeting and others.

Flowering Rush – Danelle Larson

Will provide brief update on status, Steve W will update on control efforts.

In 2020 we received observations that beautiful pink plant was invading the river. It has been in system for a decade but rarely flowers, often hiding unseen, inconspicuous. Don't know history on the river well. Last year it flowered and was much more obvious. In 2020, it was maybe time to hit panic button as Flowering Rush was taking over large areas in upper impounded reach. Not recorded below P13 or Illinois River. Plant is native to Eurasia and first recorded in 1970s. In 2009, there was a program of plant removal.

The attributes of flowing rush are that it has rapid biomass growth and can take over large areas. It is tolerant to range of conditions on the river and thrives in moist soil, shallow water, and water <5M. can be submergent and emergent. It's a triploid genotype as opposed to diploid. Triploid produces sterile seeds but dispersal through rhizomes and bulbils. Herbaceous activity or removal attempts can lead it to move around.

Timeline and evidence of invasion in UMRR

- First documentation in 2009 from pools 5 to 13 (few plants removed)
- One record in Pool 8 was 2015 (Ruth Nissen, WIDNR); plants removed
- In 2020, public and agency reports of the brilliant flowering plant (new records in LTRM & EDDMaps)
- In 2021, sightings proliferated and first LTRM records in Pools 4 and 8. Pool 13 has high prevalence (7%) and cover (>20%), multiple sightings daily

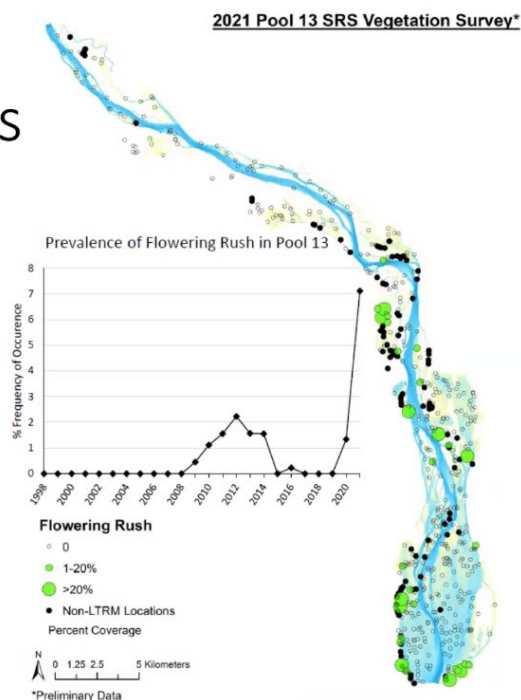
First LTRM records in 2021 came from Pools 4 and 8. P13 has high prevalence and cover with multiple sightings daily.

LTRM Veg Team (Eric, Alicia, Seth and crews) found flowering rush typically in shallow water along with arrowhead and wild rice, wild celery, and sometimes in large monotypic stands. In Pool 4, flowering rush expanding up river. Established infestation in Catfish Slough and up river channel margins.

In Pool 8, Flowering Rush is encountered more frequently but still a low prevalence in LTRM sampling (4/450 sites). High abundance with tens of thousands of plants can typically in lower Pool 8. Range expanding upstream like seen in Pool 4.

In Pool 13, Flower Rush expansion was substantial as prevalence increased to 7% of the sites now. Stands are often several hectares of size. Seth (Fopma) found it every day and documented many sites outside LTRM sampling areas.

LTRM Observations



Data and graphics by
Seth Fopma- 2021
Pool 13 LTRM SRS
Vegetation Survey
Summary



Large green dots – LTRM sites where coverage is vast and dominant.

Early August 2021 – abundant, Early October 2021 – same patch dead – not sure on ability for bulbils to persist until next moist soil.

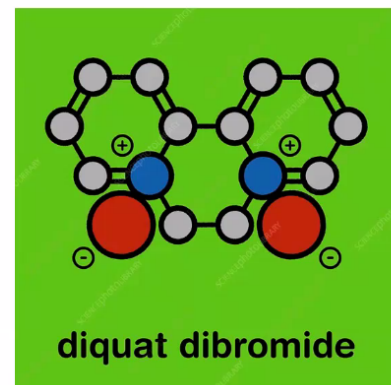
Consequences (lessons learned from other systems)

- Hinders fishing, boating, and swimming
- Ability to create large dominant stands, particularly in the early-invasion cycle (Hudon 2004)
- Impacts on native plant abundance and diversity is unclear (8 studies outside UMR)
- Early detection and control can help reduce impacts (Detroit Lakes MN invasions)



Control efforts (lessons learned from other systems)

- Herbicides can reduce leaf density >99% and belowground biomass >80% with minimal effects on some native species such as river bulrush, but there can be significant effects on some others such as Canadian waterweed (Madsen et al. 2016, Parson et al. 2019, Turnage et al. 2020)
- Control may require repeat applications; tank mixtures of more than one herbicide may be most effective (Poovey et al. 2012)
- Follow-up monitoring and research is needed to determine the most effective strategies.



Karen Hagerty: So with the spreading upstream with bulbils? What mechanism would cause that? as would expect downstream spread with that propagation.

Danella L: Probably people, fish, birds. Have found isolated patches next to boat landings. Doesn't take much to get the plant started,

Eric Lund: The source material has been there for some time. In some locations had overnight explosion. What we're calling upstream movement is possibly a situation where the root fragments were there, and it was the second consecutive low water year that triggered the growth. Not literally spread of material going upstream. Also, some material could be coming down stream. upstream expansion may not be previous source populations spreading upstream, but latent material there.

Jennifer Dieck: This is consistent with LCU imagery for Pools 4, 8, and 13 and have added a modifier to the imagery to track that. Seeing explosion of flowering rush on imagery. It has signature that is easy to see. Have mapped the pools mentioned. Something we have not seen with imagery before has been explosion of flowering rush in past couple years.

Danelle Larson: This will certainly aid in the tracking of Flowering Rush.

Andrew S: The flowering rush modifier, can you explain some more as have seen expansion of wild celery as well.

Jennifer Dieck: Wild celery is submersed, so can't see that. Shallow marsh or deep marsh perennial polygon, if we see that there we are adding modifier to the code.

KH: If Flowering Rush has been in the system for decades why the explosion this year? Is it low water?

Danelle Larson: This is typical of invasive biology, lingering for years and then an environmental change triggers it. Water levels may be helpful. Having data Jennifer described may help ID where it is thriving.

KH: Pool-scale drawdown in P13 is maybe a way to do some hypothesis testing.

Danelle Larson: It could be. Drawdowns could dry plant out or stimulate bud production. Natives may have been struggling this year.

Eric Lund: I am just speculating but the fact that we had multiple successive years of high water followed by low to record low water. Some literature that indicates lower water stimulates bud growth and hydrograph data over last 4 years seems to fit that theory.

Steve W: In high water it can exist as submersed aquatic but the problem can be that it looks a lot like wild celery. May be that it was spreading throughout the system, but almost expressed as submersed aquatic. Except in P13, Then, in 2020 year of low water and that's when it becomes emergent and all of a sudden all those plants expressed as an emergent.

Danelle L: LCU will be fascinating to look at as we have many decades of data and can possibly detect where and how patches have changed over time. Lots of learning opportunities there.

Eric Lund: if it was emergent in those years.

Steve W: In 2020 it was detected and LTRM staff did a great job letting others know. Refuge managers monitored the Refuge lands from Lower P 4 to P14 from the refuge. Refuge was interested in doing early detection, rapid response. When species first shows up, hit it quickly. Wanted to do that but realities of getting that done are different with each district: Winona District (Pools 4-6), La Crosse (Pools 7-9), McGregor (Pools 10-11) and Savanna (Pools 12-14). Winona and LaCrosse thought they could address it but the McGregor District could not. Savanna District thought the situation was too far gone to address in that way.

First step in Winona and LaCrosse that was needed to obtain a federal permit to use new herbicide Diquat. Then needed Section 7 inter-agency consultation with USFWS Ecological Services to determine potential to harm T&E species. Then needed state pesticide application process. The state of Minnesota was easier to get permits and Wisconsin was much more difficult. A number of things about Wisconsin process doesn't fit with doing work on a broad scale on the Mississippi River. No fault of people from WI working on the river but the legislative process for pesticide use was thought to be used on the River.

It also was a difficulty to find a contractor for applying Diquat using methods and equipment. In Wisconsin, didn't have permit, didn't have contractor. So the 2021 work was limited to Minnesota. USACE ERDC folks working in the Pacific Northwest have been helpful to provide consultation and advice as needed.

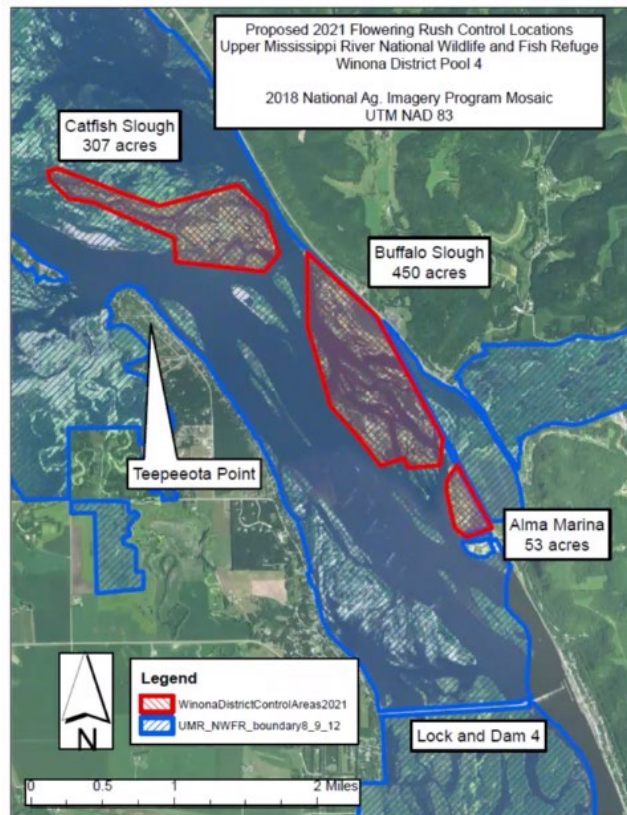
Applying Diquat in the water column surprisingly doesn't have unintended consequences or collateral on non-target species. If your foliar spray plant parts above the water, that's when you see more collateral damage on non-target species. If water is not still, we may be able to use bubble curtains to confine herbicide to reduce transport laterally. Techniques that people use in unique situation. Went into

AquaTechnex brochure example...

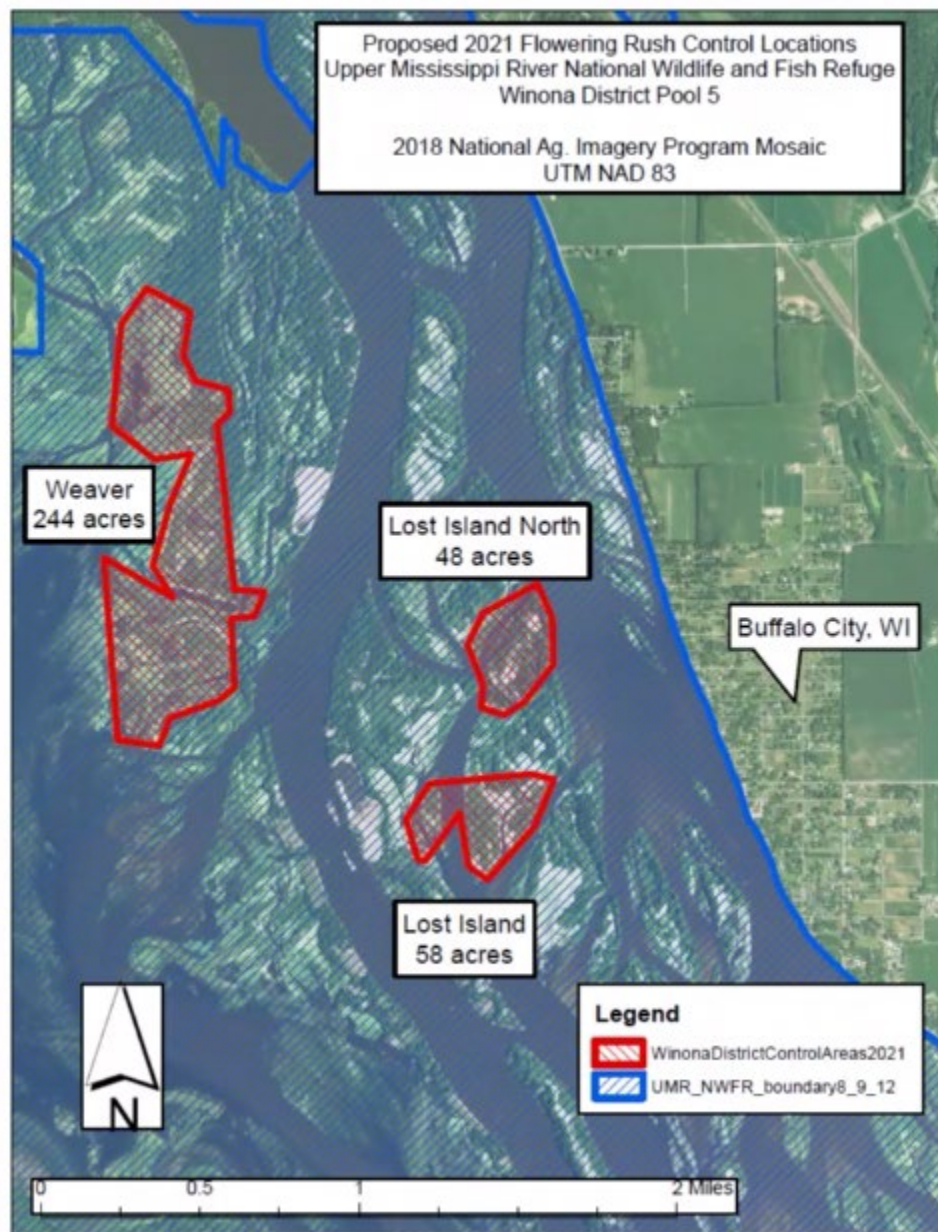
Submersed Diquat Application – Driftyard: 2107 Diquat and Rhodamine WT Dye Applied to the Plot

Rhodamine WT Dye used to measure contact exposure time. The dye can be measured with a fluorometer at stations inside and outside the plot to determine a half life and show where herbicide may go

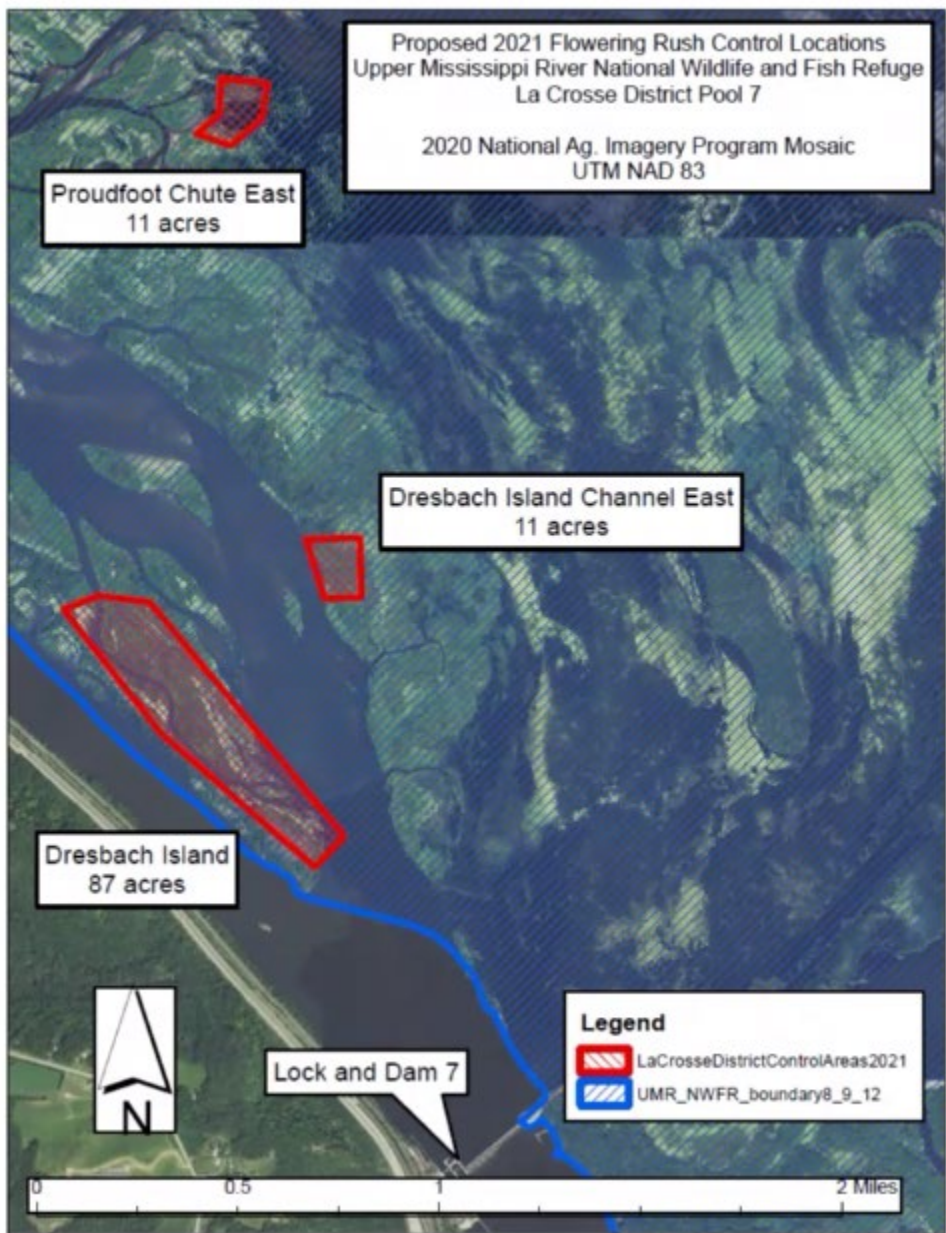




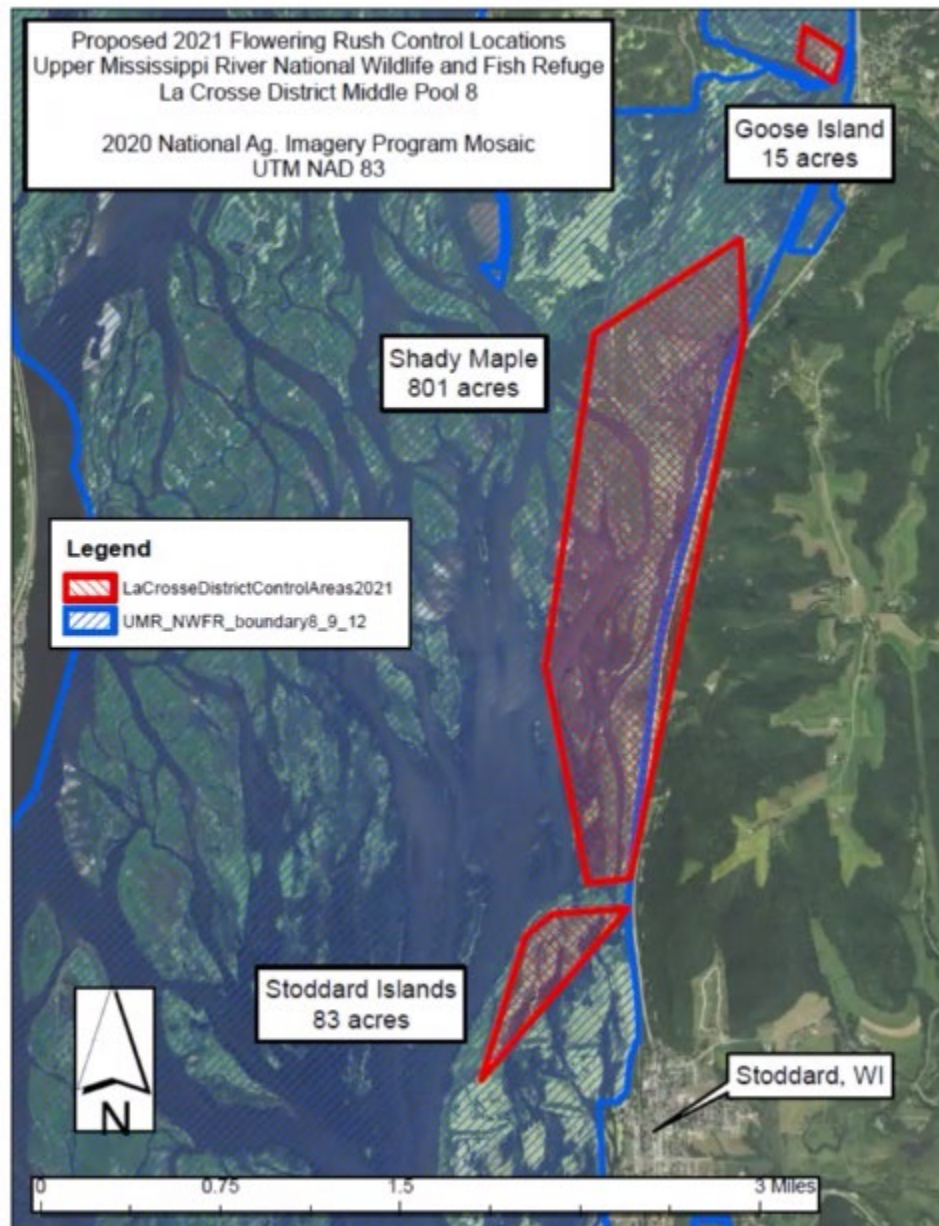
Populations in Catfish Slough – 307 acres of broad treatment area identified.



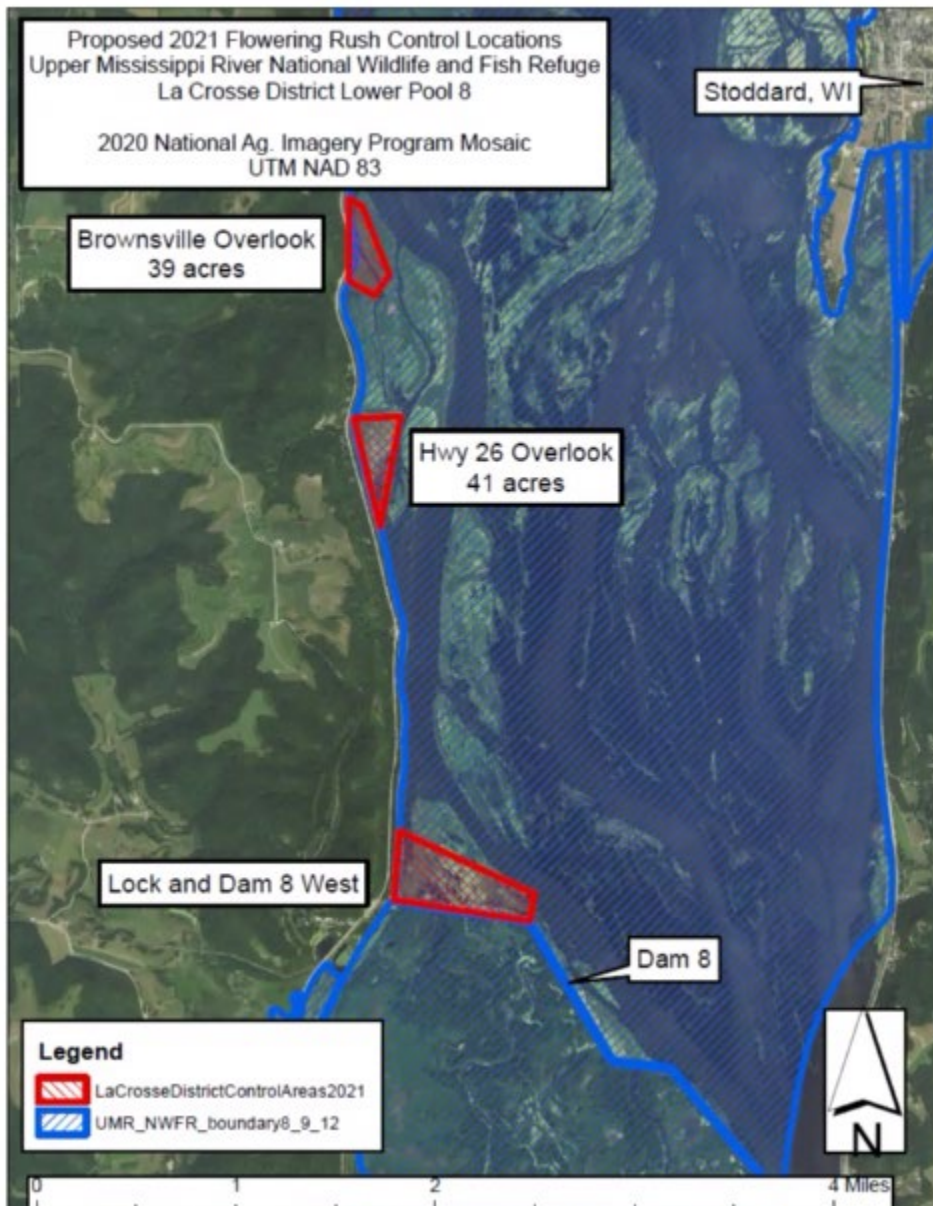
P5 – Weaver Bottoms.



Lake Onalaska P7.



P8 - Stoddard



Lower Pool 9

In 2021 we were not able to do work due to Wisconsin permitting and contracting issues.

Jim Fischer was discussing issue with statewide pesticide people. Couldn't get it through on this. It's legislative process that spells out how to administer that program. We are not able to get contract lined up in time, in-part because specialized equipment meant only one contractor. Then we had to do sole-source contract and that also requires additional steps.

SW: Lining up for next year. The USFWS early detection rapid response funding award application is in. We asked for \$464,000 to do control work which will pay contractor and purchase herbicide. Refuge committed to cost-share in addition to that. We didn't get funded for full amount, but a little less than half. Were awarded \$188,000. Have those funds to help do this work. LaCrosse District has not identified

new maps. The Winona District will confirm the target populations in the near future. May need to adjust maps depending on refuge staff response.

Scott G: So we have not put chemical in the river, has to be frustrating but probably protections to places like the Refuge hinder rapid action.

Steve W: McGregor did have permit to apply glyphosate in terrestrial situations but found the area that had dried up.

Neal Jackson: The Mississippi River Basin panel on AFS which is coordinated through MICRA. May be a good place to work with on ANS issues.

Jim Fischer suggested instead of refuge needing state permit and going through permitting process, what about idea of state entering into MOA or cooperative agreement with refuge to get the work done. Similar result with potentially easier process. May be too late for flowering rush but could be done in the future. Those might be good alternatives to establish for when the next new arrival appears.

Eric Lund: What are plans for future control and do those include not treating some areas as a control?

Steve W: We have some areas identified on maps and will address only areas districts feel they could tackle. If contract was in place in 2021 we would've moved forward on Minnesota side.

Eric L: Thinking side-by-side areas that are sprayed/not-sprayed would be a good approach.

Steve W: Monitoring in adaptive management context is our approach now. Need multiple treatments.

Contractor said treating multiple times per year for 3-5 years post-treatment monitoring would be big help to determine the locations we need to return to. If we have 10 acres to treat but capacity to treat only 5, then maybe go back to those sites and see if it's above 10% may wait and treat other areas. If population was treated and seemed effective, we may try to address another area. Post-treatment adaptive management framework may be helpful there. Experimental/quasi-experimental approach would be helpful to understand, but with limited data collection potential -post-treatment monitoring may be most important.

Eric Lund: What about manually removing plants from some outlying areas where it is just getting started?

Steve W: Good idea for a number of reasons. But, have heard that manual remove needs to be done carefully as it can either be non-productive or counterproductive. If plants break off and seed.

Steve W: UMRCC folks could devote a summer event to post-treatment monitoring and may not need to do it with rakes? maybe some other way to do it?

Eric L: Would need to proceed with caution. First ones that I saw we got immediate response from WIDNR AIS staff for approval to remove plant if I could get it all. I was able to remove it and felt confident that I could get it all. I imagine that careful removal of low number of plants in areas where expansion seems to be happening is better than leaving the source material.

KH: Flowering rush is easy to see in emergent state but how easy to detect in submerged state?

Eric L: Lots of reports that submerged state it can resemble wild celery but I'm not sure I've seen submerged only plant and could've been missing it for a couple years. Such as conspicuous plant. In upper pool where I observed plants for the first time... Catherine's pass backwater there were lots of

emergent flowering rush plants in that area however just five days prior there was no flowering rush in that area.

Steve W: EDD maps, red is where detected. Staff is making attempts to document on the refuge.

Danelle Larson: LTRM has entered 600 records over last two years to the EDD dataset as well.

Steve W: will records be added to the map in the future? Does it have to go through QAQC?

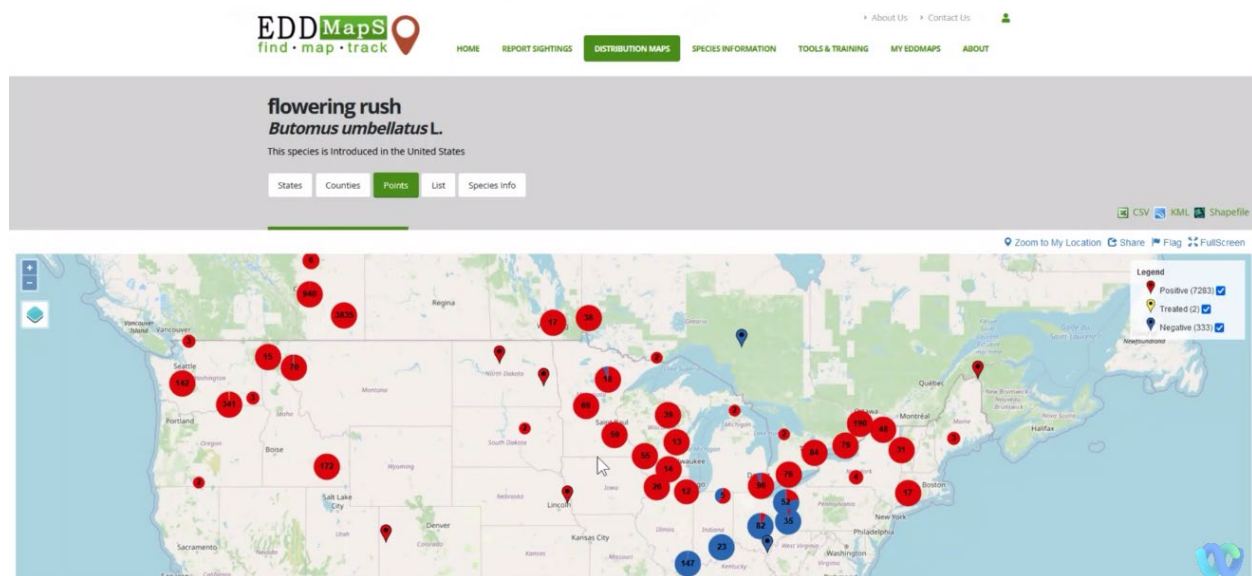
Danelle Larson: Yes, may not be in there.

Neal Jackson: Do you report to USGS NIS?

Danelle Larson: EDD Maps is where we report as multiple platforms pull from EDD Maps.

Neal Jackson: recommend sharing this information with UMRCC in Marchand how to do monitoring. Seems like that timeline may be appropriate for any field work that may

Steve W: EDD Maps and USFWS Region 3 management actions database with invasives layer in it which is accessible to all USFWS. Not sure about those outside the agency. Does require account. Use that to track populations.



Shawn Giblin: Brought that idea to Jim Fischer about entering into cooperate agreement. Have been examples with Water Hyacinth... that have been addressed with early detection. Need a mechanism to hit these things hard and early.

Steve W: took that approach with Section 7 consultation. Have to do that every year. Knew that we only had intentions to treat in Winona and La Crosse Districts so we wrote our proposals to cover Diquat applications across refuge for treatment of any aquatic invasive we might come across – Water lettuce, reed canary, etc. Wanted that option for that whole suite of species able to be addressed with this herbicide to allow rapid response.

Neal Jackson: Service sets money aside for actions that might take place. Hard to set money aside for rapid response actions that may not be necessary in a given year. Requires action. MRBP or others that focus on aquatic vegetation may have other information. Surely this has come up before.

Steve W: Parrot feather was hand collected plants and bagged up and disposed outside river floodplain. On another occasion contracted for foliar application of herbicide. Had instance in Pool 7 of another.

Water hyacinth from shoreline homeowners pond that was overflowing. Conservation partners around Lake Onalaska did hand collecting and found out which home site had it. Working wherever they found it found a spot where there was a pond and plants laying between the pond and river.

Shawn G: Water lettuce and hyacinth. Manual reactions have been very successful, we can mobilize to have 40 boats on the river in a matter of days. Car Street marsh had early detection, collected bagged didn't reoccur in locations. Manual efforts with volunteers can be effective. These chemical treatments are different.

Steve W: lettuce and hyacinth do not have all the characteristics of flowering rush. If you pull the visible plants of flowering rush but leave behind rhizomes and bulbils. Don't want rhizomes persisting.

Jeff Houser –

LTRM Science Highlights -

Publication – Floodplain forest structure and the recent decline of *Carya illinoensis*

Publication: Floodplain forest structure and the recent decline of *Carya illinoensis* (Wangenh.) K. Koch (northern pecan) at its northern latitudinal range margin, Upper Mississippi River System, USA. Forest Ecology and Management.

Daniel J. King, Grant L. Harley, Justin T. Maxwell, Karen J. Heeter, Benjamin J. Vandermyde, Robert J. Cosgriff

- Result of UMRR Science in Support of Restoration funded proposal:
 - "Using dendrochronology to understand historical forest growth, stand development, and gap dynamics."
- Forested floodplains are ecologically important
- Used dendrochronology to:
 - Characterize the floodplain forest composition, structure and dynamics
 - Examine annual- to decadal-scale growth responses of northern pecan trees to disturbance events



Image reproduced from Maricopa.edu.

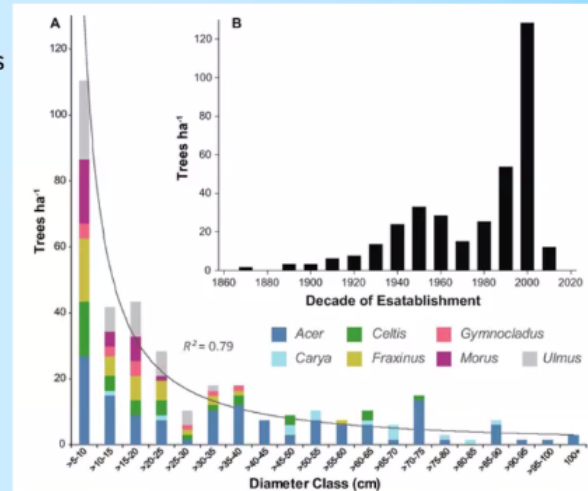


Used dendrochronology to take core samples and count rings and assess width to infer environmental conditions during tree growths. Consistent establishment pattern of N. pecan. Over last 50 years,

Publication: Floodplain forest structure and the recent decline of *Carya illinoensis* (Wangenh.) K. Koch (northern pecan) at its northern latitudinal range margin, Upper Mississippi River System, USA. Forest Ecology and Management.

Daniel J. King, Grant L. Harley, Justin T. Maxwell, Karen J. Heeter, Benjamin J. Vandermyde, Robert J. Cosgriff

- Northern pecan:
 - Consistent establishment pattern 1860s – 1950s.
 - Regeneration failure over last ~50 yrs.
- Contributors to the observed decline in Northern pecan and increase in maple, hackberry and elm likely include:
 - altered flooding regimes
 - drought frequency
 - masting phenology
 - fire suppression
 - increased warming during the 20th century
- Conclude that the continued persistence of pecan trees in much of the UMR floodplain will require direct forest restoration



Attributed to changes in floodplain, flooding regime, drought occurrences and fire suppression. For this species to persist, will require some direct forest restoration interventions.

Ongoing and upcoming work

Status and Trends 3rd edition

18 UMRR Science in support of restoration funded projects are in-progress

Planning for the 2022 Science Meeting

2022 UMRR Report to Congress – Chapter 3

LTRM Implementation Planning

Resilience Assessment

Status and Trends Report -

Things are moving slowly but we are wanting to provide more context.

For each of 60 odd figures, we provide to publishing group, they take that into file structure used for publication. Reformats various things to report standards but in doing so, a fair number of errors or things we didn't like were introduced. This requires various back and forth review with authors. SPN making reviews and edits.

Status and Trends Report update

- Figures for all chapters
 - Have been imported by SPN (USGS publishing group) to the required format
 - Have gone through multiple iterations of author review and SPN revision
 - Except for one figure for Chapter 8, are complete
- Detailed editorial review by SPN has been completed for chapters 1 through 5
- Chapters 6 through 10 are still undergoing editorial review.
- Completion date has not been specified by SPN
- Center Director Review (Mark Gaikowski)
- USGS BAO Review



Chapters 1-5 have made it through SPN editorial review. Chapters 6-10 are undergoing editorial review. Don't have a completion date at this point. Have been pushing for November 17 date for 35th anniversary which is fair to say we won't have it at this point. After all the above steps the report has to go through Center Director Review and BAO review. Meeting every other week with SPN folks to address comments, inquiries.

Shawn G: We provided comments to the report. Was decided there would be reconciliation to those comments, when will that occur?

Jeff H: That process is nearly done. Each author, when revising chapters, looked at comments, addressed comments, or indicated why they weren't addressed. I have to finish some things up before doing that. Will distribute those in the next few weeks. Plans to provide comments to each agency that provided comments. Otherwise, could compile all comments if everyone is comfortable with that.

Karen H: I would be interested in seeing all the comments.

Jeff H: I would like to hear from state agency reps if they are comfortable with that.

Shawn G: WI would like to see compiled comments.

Jennie S: if we get approval from each agency – in an email –

from Matt Vitello to everyone: 10:27 AM - I'd be interested in compiled comments as well

from Karen H Hagerty to everyone: 10:27 AM - The Corps is fine with everyone seeing our comments

Jeff H: Anyone we hear from will go into compiled version, anyone we don't hear from won't be included in compiled version.

from Steve Winter to everyone: 10:28 AM - The USFWS is fine with our comments being shared.

Scott G: Iowa will look through all comments.

Jennie S: is your agency comfortable with comments being shared with the group

[NOTE: IA, WI, MO, USACE, USFWS have indicated they are willing to share their comments.]

KH: What is the date for publication?

Jennie S: Beginning of calendar year. Once we get back editorial review the authors need to look at editorial reviews and clean up documents. Has been taking two weeks per chapter to get it back from SPN. After that the authors have to look at it. In the new year is safest at the moment. Will push a bit on Thursday to get a better idea of when we'll see chapters 6-10.

JH: Until 2-3 weeks ago, still clinging to Nov 17 deadline. Only in last couple weeks that they said they couldn't do that. No one more frustrated than I am.

KH: Appreciate it. Know it's out of your control.

2022 Science Meeting

Timeline for UMRR 2020 Science Meeting

- September / October 2021: Initial LTRM PI discussions
- November 2021: Initial A team discussion
- December 2021: Webinars providing update on ongoing projects
- January 2022: Working group pre-meetings
- February 2022: UMRR 2022 Science Meeting (concurrent w/ winter A team meeting?)
- Feb/Mar 2022: Working groups complete proposals for submission
- End of March 2022: Proposals due
- Early April: Proposals distributed to A team, USACE, USGS for review, ranking, and selection.
- May 2022: Request to UMRR CC for endorsement of selected proposals.
- Funding and work to begin FY23



In December, we will have two webinars. Will have 18 proposals currently underway briefly presented across two webinars. Thinking the formula will be 3-5 minutes (3 slides) to remind everyone scope of what is going on and who to get in touch with. After input from this group, we will distribute information to attendee list for meeting. Would like to have a pre-meeting for each working group in January.

KH: Budgets will need a review with Jennie, me, and Marissa.

JH: Yes, will need to be part of proposal submission.

2020 Focal Areas being revised for 2022.

Main changes are:

- Addition of macroinvertebrate Focal Area (draft provided as read ahead for this meeting) – Sent to Jim Lamer and Shawn Giblin for review
 - **JH: request comments from others in next two weeks.**
- Possible addition of “learning from the Lower Pool 13 HREP” focal area.

2022 Initial Draft List of Working Groups (pending partner feedback)

(note: several of the groups will likely have additional co-leaders)

1. Bathymetry working group (Nate De Jager, Jayme Strange)
2. Hydrology working group (Molly Van Appledorn, Lucie Sawyer)
3. Fisheries working group (Brian Ickes)
4. Water quality working group (Kathi Jo Jankowski)
5. Aquatic vegetation working group (Danelle Larson)
6. Macroinvertebrate working group (Jim Lamer)
7. Learning from the Lower Pool 13 HREP (Jeff Houser, additional co-leads TBD)



Bathymetry working group

- Focal area 1.1 Recent and ongoing geomorphological changes and their implications for future conditions.
- Elevation data is critical for monitoring, researching, and restoring the river system. Includes
 - Lidar (terrestrial elevation),
 - Bathymetry (aquatic elevation)
 - seamless topobathy (combined aquatic-terrestrial elevation)
- Used in applications from small scale habitat restoration projects to systemic assessments.
- increasing interest in understanding elevation change within the UMRS and its possible causes and consequences.
- This working group will contribute to creating a framework for acquiring new elevation data and how it can be used to better understand, and manage ecosystem change in the UMRS.



Lidar, bathymetry, and seamless topobathy. Most of bathymetry data is pretty old, but collecting it is expensive and time consuming. Need to think critically about what aspects of systemic datasets are most useful. How can those be met? Discussing those questions to formalize how we think about care and feeding of this dataset going forward.

Rebecca Seal-Soileau, USACE, is facilitator.

Future Hydrology of the UMRS

- There is an ongoing workshop series funded by a 2020 UMRR science proposal
- The goal of these workshops is to develop an approach for modelling climate-changed hydrology for the UMRS
 - Meeting #1 (9/21 & 9/23): How will the resulting information be used?
 - Meeting #2 (11/1&11/2): What data sets are needed to support those uses?
 - Meeting #3(TBD): Small group discuss the details of a modelling approach that would produce the information needed based on Meetings #1 and #2.



Forum to report outcomes of three meetings. Discuss what current trajectory is for quantitative modeling, how that will be used by UMRR partners, and discuss overall strategy and sequencing of proposed work to clarify potential.

Fisheries

- Focal area 2.4 What are main drivers of fish abundance, distribution, and community composition?
- Work will be based of LTRM fisheries research framework (Ickes 2018).
- Prioritize and edit an initial draft list of questions selected from those frameworks.
- The goal of this group is to produce a proposal identifying specific work, based on the above assessment of priority questions, to be done by one or more post-docs that would be hired to lead and conduct the work.
- These projects will complement ongoing activities within the fisheries component which include:
 - expanding LTRM compliant sampling (designs and protocols) to all Illinois River nav pools and all UMR nav pools bordering Illinois;
 - continuing work on the 2020 project "fish community patterns in the face of a changing river",
 - year 4-5 of the vital rates project;
 - the IWW nav closure study;
 - other local projects being conducted/assisted by local field station staff.



Fisheries

- General topics to be addressed:
 - Longitudinal fish passage
 - Effects of Locks and dams on systemic distribution of fishes
 - Effects of large floods and droughts on dam passage
 - Management-relevant patterns in large river fish populations and communities
 - Do environmental determinants of a single species biological responses vary as a function of life stage, and in what ways?
 - Further develop and refine habitat occupancy models (e.g. AHAG) as needed to assist habitat managers.
 - Estimate functional extinction probabilities for a variety of species across the UMRS to better inform management priorities and biological targets.
 - What cause observed differences in prevailing growth rates across the UMRS, especially changes in growth rate responses associated with habitat rehabilitation efforts.
 - Use earlier results to inform biological indicator selection for habitat rehabilitation efforts.
 - What are underlying mechanisms giving rise to observed changes in demographics of several species (e.g. recruitment failures in northern white bass populations; increases in weed shiner abundance and range expansion, bigheaded carp and native fish assemblages in the south).



Water plants and water birds

- Focal area 2.3 Why is aquatic vegetation where it is and not where it isn't?
- Generate new research questions, priorities, and proposals within an ecological community context (e.g., aquatic plant diversity and specified community types).
- Guided by a new conceptual model of aquatic vegetation that was created during an ongoing series of partnership workshops
- Develop questions that can be addressed using a newly integrated 'mega-dataset' that includes hundreds of variables at various spatiotemporal scales related to aquatic vegetation communities, water quality, hydrology, geomorphology, and climate.
- Capitalize on the variety of existing data to inform restoration and management of water bird habitats across the river system, including the Upper and Lower Impounded Reaches and Illinois River.

Water quality

- Focal area 2.5 Consequences of river eutrophication for critical biogeochemical processing rates and habitat conditions.
- The UMRS continues to experience high rates of nutrient input from its catchment and remains eutrophic in most reaches
- Likely consequences of eutrophication for rivers include
 - excessive growth of planktonic, benthic and filamentous algae, and aquatic macrophytes;
 - reductions in number of species of macrophytes;
 - increased occurrence of low dissolved oxygen conditions (especially at night);
 - blue-green algal blooms
- Recent occurrences of harmful algal blooms (HABs) in other large rivers in the region and in some areas of the UMRS (e.g., Illinois River, Trempleau National Wildlife Refuge).
- Phytoplankton communities are fundamental members of river food webs yet are substantially understudied relative to other ecological communities in the UMRS and other large rivers.
- Therefore, some potential focal areas for this working group will include the following questions relevant to phytoplankton communities in the river:
 - What is the current frequency of occurrence / risk of occurrence of harmful algal blooms (HABs)? What factors are linked to risks for toxin production and how are they distributed across the river?
 - How have phytoplankton communities responded to potential regime shifts in the UMRS, such as the invasion of bighead carp or the resurgence of submersed aquatic vegetation?
 - What factors have affected long-term dynamics in phytoplankton communities in the UMRS and will they be sensitive to shifts in climate?



Macroinvertebrates

- New Focal Area: What are the main drivers of macroinvertebrate distribution and abundance? What are the implications for the ecosystem and its management and restoration?
- Jim Lamer and colleagues are developing a draft proposal to resume macroinvertebrate work within UMRR
- Draft Macroinvertebrate focal area text provided to A-team as read-ahead
- Working group will refine draft proposal and consider developing proposals for ancillary studies



Learning from Lower Pool 13 HREP

- New topic
- HREP for Lower Pool 13 currently being planned.
- Extensive long-term data, expertise and infrastructure for Pool 13
- Unusual opportunity to learn about the diverse ecological effects of an HREP on the river.
- Science meeting is a good forum for initiating that discussion.

Don't always have forum for folks involved in LTRM and HREP together. One focused on Islands, one focused on Water level drawdowns but could include both into this discussion. From PDT discussions looking out 5 years to construction. Starting this conversation sooner than later would be good. Need to talk more in detail with PDT about their interest in participating in this conversation at the science meeting.

from Karen H Hagerty to everyone: 10:52 AM - Pool 13 HREP will be split into 2 HREPs: one focusing on the SW corner of the pool, the other focusing on pool scale drawdown

from Karen H Hagerty to everyone: 10:53 AM - we can get a better idea of the construction start from Marshall

from Karen H Hagerty to everyone: 11:10 AM - Pool 13 should go to construction in FY24/25

JH: Previous discussion on travel possibility but sounds like we should plan for a virtual meeting. Had some thoughts on how to stagger working groups so people could attend multiple working groups. Now, currently think about having the meeting be its usual structure with at least one or two exceptions. Pool 13 discussion the plenary group that doesn't conflict with other meeting times because we'd like to draw from all the others. Bathymetry may be similar. Might have other groups meet concurrently.

Scott G : Thanks Jeff, a lot going on. Thanks for your leadership on this.

AS: UMRCC format worked well with breakout groups and reconvening. May be good to bring people back together for those P13 or bathymetry discussions.

JH: Opening, large group part then breakdown to small groups, then bump back up to large group. I think flow could be similar. Time back together could be more focused on additional topics rather than reporting out. Platform was Zoom?

Scott G: Yes. We tested some. Zoom breakout seemed to work best for us for that meeting. Could run through state of Iowa Zoom if needed. Could have that available for free for you and reserve that time just let me know.

JH: Next is to sort out platform and who will help with that platform.

Shawn G: suggest staggering the Macroinvertebrate group as well. New group will draw from other groups as well.

from Eric Lund to everyone: 10:59 AM - Jeff, did you or someone else say you are thinking February for this meeting?

JH: yes, February.

from Kathi Jo to everyone: 10:59 AM - Just FYI - the water quality group is open to other themes or thoughts, so please be in touch if you have ideas or would like to work on a topic in the general theme!

KH: Comments back on Macroinvertebrate group by November 17?

JH: Yes.

Scott G: Appreciate your leadership on all these efforts.

Jennifer Dieck: I've had two almost full-time mappers mapping 2020 LCU images. Given notice on Oct 15 that one mapper was taking early retirement on Oct 29 and we got 2-weeks' notice. I'm down a mapper right now. Looking at FY22 mapping and trying to figure out what we can tackle. Working with Mark Gaikowski and Andrew Strassman about moving forward on recruiting a second mapper. Have several years left on these products. Takes 8+ months to get a mapper in. In FY21 were were mapping P4, 8, 13, 26, open-river south and half of La Grange South.

La Grange is only $\frac{3}{4}$ mapped, Andrew Strassman will finish that pool so all FY21 work is complete. Fy22 is completing second half of Open River South. Image processor just finished P9 converts raw to TIF, makes mosaics, etc. P9 is in the docket next. Also had on list for FY22 – 10, 11, 12, Alton so if anyone has feedback on priority of remaining pools and knowing we won't get to all in FY22, we are open to hearing that.

Conversations we've had – seems like P9, 10, and 12 – lots of interest in those areas – was going to focus efforts there. Would need to focus within those group of pools – field work completed late-summer – don't have fieldwork on schedule for... Will also present at UMRCC meeting, to see if anyone has a priority list out of that group of pools.

Scott G – is there a way to formally ask me and I can get to partners on this forum for that discussion? That way we can have an internal discussion quick

KH: including USACE and USFWS in that?

Scott G: send through A-Team as a whole?

KH: there is some need on the HREP side of things as P12 forestry HREP kicked off this year.

from Davi Michl to everyone: 11:05 AM - Pool 12 would be nice for the pool wide forestry HREP

AS: Suggest raising this topic at the UMRR CC meeting as well.

Jennie S: Jennifer Dieck will provide a similar update at that meeting.

AS: Great.

UMRR Future Hydrology Meeting Series - Molly Van Appledorn

Lucie Sawyer and I have been organizing for the last year and it is exciting to see it come together. Rebecca Seal-Soileau is our facilitator. Many of those attending have been part of the meetings so will hit highpoints from meetings.

UMRR Future Hydrology Meeting Series

Problem Statement:

How do we enhance habitat and advance knowledge for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem in uncertain future hydrologic conditions?

GOAL 1: to facilitate discussion among the partnership around specific needs, methodological approaches, and desired outcomes for understanding climate-changed hydrology.

GOAL 2: develop a blueprint for modeling climate changed hydrology for the UMRS

Talk about needs, methodology, desired outcomes for understanding hydrology.

UMRR Future Hydrology Meeting Series

Problem Statement:

How do we enhance habitat and advance knowledge for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem in uncertain future hydrologic conditions?

| Event | Dates | Format | Attendees | Purpose | Outcomes |
|------------|------------------------------------|--------------------------------|--|--|--|
| Meeting #1 | Sept 21 & 23 (2 half-day sessions) | Virtual Webinar and Discussion | UMRR Partnership (~26 people) | Identify UMRR priorities for understanding climate changed hydrology | Prioritized list of program needs (Geomorphology, HREP/Management, Ecology themes) |
| Meeting #2 | Nov. 1 & 2 (2 half-day sessions) | Virtual Webinar and Discussion | UMRR Partnership and Technical experts (~24 people) | Identify potential datasets and approaches to addressing UMRR priorities; Identify ideal outcomes of modeling effort | Description of ideal quantitative future hydrology dataset; ID Meeting #3 participants |
| Meeting #3 | FY22 – TBD (16 hours) | Virtual Workshop | UMRR Partnership representatives and Technical experts | Develop a proposal for achieving priority needs | Proposal |

Had great representation from the partnership. Shows lots of interest and willingness to invest limited time in thinking about these issues and working through tough conversations. Heartened by that.

First meeting was brainstorm session to generate list of needs for future Hydrologic dataset. Everyone brought own perspectives and we mixed up HREP managers, tech experts, etc. Had fun conversations there. People were asked to prioritize the big, long, needs list. Rebecca helped ensure we used a fair process and that we had information about how the final ranking was developed. Happy to share that process. Valuable process for the partnership to engage in and don't want to lose that conversation.

On November 1 and 2 we reconvened and we joined by experts about what dataset characteristics we might want to see. How we could generate or acquire that dataset. Needs themselves follow along three big themes, geomorphology, HREP management, and ecology. Groups talked more about those needs this week.

Meeting #1 Outcomes

Geomorphic Needs

There is a need to...

- "...understand how future hydrology may affect geomorphic responses (e.g., island loss, natural levees) in channels, shorelines, backwaters & floodplains"
- "...understand how natural geomorphic features and navigation infrastructure influence the conveyance of water across the river-floodplain"
- "...assess how changing hydrology may affect backwater sedimentation in the Mississippi and Illinois Rivers"

First need was broad – working group on Nov 1 focused on this and what datasets would be needed.

Meeting #1 Outcomes

HREP / Management Needs

There is a need to...

- "...understand changes in hydrology and hydraulics (e.g., WSE, velocity) at varying spatial scales to guide river restoration designs"
- "...understand how future hydrology can drive our vision of future desired conditions and other planning guidance"
- "...understand whether future hydrology provides opportunities for different/new restoration (HREP) features that are more self-sustaining (e.g., rip-rap vs seed islands)"

Focused primarily on need 1.

Meeting #1 Outcomes

Ecology Needs

There is a need to...

- “...understand how future hydrology may affect biologic responses, ecological structure, and ecological function in channels, shorelines, backwaters & floodplains”
- “...understand how future hydrology, including WSE changes and seasonal shifts in hydrology, may affect floodplain forests, aquatic vegetation, and the distribution of their suitable habitats. For example, whether they may cross tipping points that could reduce their resilience”
- “...develop a better understanding of which hydrologic metrics are most influential on aquatic and floodplain vegetation responses”

Meeting #2 Outcomes

- Ideal dataset description:
 - Quantitative
 - Daily discharge
 - 50-year minimum horizon
 - All gages in UMRS
- Focus of Meeting #3:
 - Proposal to assess applicability of existing hydrologic outputs for UMRS use through a comparative analysis
 - Strategize future proposals/work
 - If existing data are not suitable, then scope custom modeling scenario
 - If existing data are suitable, then discuss how to assess, interpret, disseminate, etc. so appropriate uses are ensured

There are existing datasets and need to determine if they can fit in this ideal dataset.

Existing hydrologic outputs from existing datasets but have assumptions that need to be evaluated for our river system. Existing data are not from calibrated models. We have issues with directly using off the shelf for our purposes. Processes used to generate hydrologic output might not be fully representative of what is happening in the Upper Mississippi River Basin. First step could be to determine if those data could be used for our purposes. IF deemed NOT appropriate, would scope custom modeling effort. If they ARE deemed appropriate and would discuss how that data could be shared in different ways within the partnership and incorporated into existing work processes.

Upcoming Activities & Related Resources

- Meeting #3 – dates TBD (early 2022)
 - Goal: draft a proposal for generating broadly useful hydrologic dataset for meeting UMRR priority needs
 - Attendees: Small group of invested participants
 - ****Please contact Lucie or Molly with suggestions for participants****
- Final Report – draft by end of FY22
 - Document UMRR needs and priorities, key decision points, and the resources and tools identified during the meeting series
 - Appendices may include materials generated during meeting series (e.g., full needs list, edited needs list, ranked priority needs; compiled tables from Meeting #2; etc.)

Still seeking suggestions for participants. Dig into agencies and field station teams. If you think someone has expertise, interest, and ability to join this effort - let us know. **Would like to know by November 12. Send to Molly Van Appledorn or Lucie Sawyer.**

Also coming up is the drafting report on process. Those who did not participate can see the discussion and materials generated through that process.

Other opportunities to build off this effort:

- UMRR Science Projects Updates – brownbag webinars, dates TBD
- UMRR 2022 Science Meeting – dates TBD



Molly Van Appledorn
Lucie Sawyer

mvanappledorn@usgs.gov
lucie.m.sawyer@usace.army.mil

Scott G – appreciate your work on this. Know it was a challenge to get some of our staff there because of field seasons.

UMRR Invertebrate Subgroup Monitoring Recommendations and Proposal Development update

Jim Lamer – Appreciate Shawn G leading this effort.

Invertebrate Subgroup Participants: Steve DeLain (MN DNR), Scott Gritters (IA DNR), Shawn Giblin (WI DNR), Jim Lamer (IL NHS), Molly Sobotka (MDC), Jessica Fulgoni (MDC), Brian Gray (USGS), Ross Vander Vorste (UW- La Crosse)

Group convened two meetings:

- Monday Dec 14, 2020. Two-hour meeting to scope the issue.
- Friday Dec 18, 2020. Two-hour meeting to come to consensus on 1-3 recommendations regarding UMRR invertebrate monitoring.
 - No action necessary was considered a potential recommendation.
 - Each agency came to this meeting with 2-3 recommendations for the group to consider.



Formal Recommendations to UMRR Analysis Team:

1. Reinstate LTRM macroinvertebrate monitoring for **five** years beginning in 2022 using the same methods employed prior to 2004. Modifications to the prior methods would include:
 - Open River protocols related to site selection will be modified to account for large number of sites that can't be successfully sampled.
 - Mayfly samples will be retained in case further taxonomic and tissue analysis is desired.
 - Possibly add faucet snails (dead vs. alive determination)
2. Develop a new research focal area (3.4): Understanding factors affecting the distribution and abundance of benthic invertebrates. Potential factors to explore could include:
 - neonicotinoids
 - pyrethroids (bifenthrin)
 - other current-use pesticides
 - climate change (physical/geomorphic/hydrologic)
 - cyanotoxins
 - increasing hypoxia
 - improving water quality
 - substrates changes
 - wind speed and direction during major hatches



A-Team recommendations/concerns

- Proposal development
- Concerns to address:
 - Power to detect % change/sample size required and variability between strata
 - Comparison of historic data to new data
 - Project coordination
 - Database and SRS waypoint generation
 - Lack of systematism

Strata variability, some pools are very sandy and do not have benthic organisms targeted by this methodology.

Project coordination: USGS doesn't have flexibility to absorb these duties – it's an additional component that requires additional work. Having someone lead this charge would be important.

Database and SRS waypoint generation would be in place and usable – what was used before to now. Having someone able to generate SRS waypoints for monitoring. Especially by MDC based on sampling in 2000. Just because they weren't getting high enough abundance of mayflies does not make statistically defensible inferences from year to year. Because of that, they were excluded from this group and benthic sampling.

Lack of systematism – how to address that going forward?

Power to detect % change/sample size required and variability between strata

- Historic samples used to determine sample size needed to determine detection of change from year to year (Ickes)
- Some strata on some reaches are not able to be used to detect adequate changes in abundance
- Most field station crews comfortable sampling at similar level of effort that occurred during historic sampling

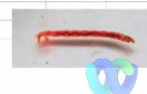
Brian Ickes conducted power analyses based on historic sampling to establish necessary strata in each pool. Some strata in each reach are not abundant enough to be used to make statistically valid inferences. Need to consider what current infrastructure at field stations are able to absorb and conduct. Thinking about sample sizes we need to determine what field stations are capable or able to do with existing crews or what, if any, additional staff would be needed.

Most comfortable giving historical level of sampling.

Pool 4

- May need to address backwater habitat substrate changes due to vegetation expansion in backwaters.
- Existing personnel and equipment can cover sampling

| Mayfly | BW | IMP | SC | MC | | Fingernail | BW | IMP | SC | MC | | Midge | BW | IMP | SC | MC | |
|----------|---------|---------|----------|-----------|--------|------------|----------|---------|----------|-----------|--------|-------|----------|----------|----------|----------|--------|
| Historic | 57.00 | 44 | 10 | 10 | 121.00 | | 57.00 | 44 | 10 | 10 | 121.00 | | 57.00 | 44 | 10 | 10 | 121.00 |
| 1% | 4306.79 | 9185.75 | 41511.37 | 160398.98 | | 1% | 27187.86 | 9185.75 | 41511.37 | 160398.98 | | 1% | 12190.56 | 19010.76 | 23595.56 | 38561.16 | |
| 3% | 478.53 | 1020.64 | 4612.37 | 17822.11 | | 3% | 3020.87 | 1020.64 | 4612.37 | 17822.11 | | 3% | 1354.51 | 2112.31 | 2621.73 | 4284.57 | |
| 5% | 172.27 | 367.43 | 1660.45 | 6415.96 | | 5% | 1087.51 | 367.43 | 1660.45 | 6415.96 | | 5% | 487.62 | 760.43 | 943.82 | 1542.45 | |
| 10% | 43.07 | 91.86 | 415.11 | 1603.99 | | 10% | 271.88 | 91.86 | 415.11 | 1603.99 | | 10% | 121.91 | 190.11 | 235.96 | 385.61 | |
| 15% | 19.14 | 40.83 | 184.49 | 712.88 | | 15% | 120.83 | 40.83 | 184.49 | 712.88 | | 15% | 54.18 | 84.49 | 104.87 | 171.38 | |
| 20% | 10.77 | 22.96 | 103.78 | 401.00 | | 20% | 67.97 | 22.96 | 103.78 | 401.00 | | 20% | 30.48 | 47.53 | 58.99 | 96.40 | |
| 25% | 6.89 | 14.70 | 66.42 | 256.64 | | 25% | 43.50 | 14.70 | 66.42 | 256.64 | | 25% | 19.50 | 30.42 | 37.75 | 61.70 | |
| 30% | 4.79 | 10.21 | 46.12 | 178.22 | | 30% | 30.21 | 10.21 | 46.12 | 178.22 | | 30% | 13.55 | 21.12 | 26.22 | 42.85 | |
| 35% | 3.52 | 7.50 | 33.89 | 130.94 | | 35% | 22.19 | 7.50 | 33.89 | 130.94 | | 35% | 9.95 | 15.52 | 19.26 | 31.48 | |
| 40% | 2.69 | 5.74 | 25.94 | 100.25 | | 40% | 16.99 | 5.74 | 25.94 | 100.25 | | 40% | 7.62 | 11.88 | 14.75 | 24.10 | |
| 45% | 2.13 | 4.54 | 20.50 | 79.21 | | 45% | 13.43 | 4.54 | 20.50 | 79.21 | | 45% | 6.02 | 9.39 | 11.65 | 19.04 | |
| 50% | 1.72 | 3.67 | 16.60 | 64.16 | | 50% | 10.88 | 3.67 | 16.60 | 64.16 | | 50% | 4.88 | 7.60 | 9.44 | 15.42 | |
| | 57.00 | 64.00 | | | | | 57.00 | 64.00 | | | | | 57.00 | 64.00 | | | |



Mayflies, fingernail clams, midges.

During last year of program – historical sampling per strata -

| Mayfly | BW | IMP | SC | MC | |
|----------|-------|-----|----|----|--------|
| Historic | 57.00 | 44 | 10 | 10 | 121.00 |

Some strata like BW and Impounded we can detect 10% change roughly with similar level of effort historically. Side channels and main channels a need a much higher level of sampling.

| Mayfly | BW | IMP | SC | MC | |
|----------|---------|---------|----------|-----------|--------|
| Historic | 57.00 | 44 | 10 | 10 | 121.00 |
| 1% | 4306.79 | 9185.75 | 41511.37 | 160398.98 | |
| 3% | 478.53 | 1020.64 | 4612.37 | 17822.11 | |
| 5% | 172.27 | 367.43 | 1660.45 | 6415.96 | |
| 10% | 43.07 | 91.86 | 415.11 | 1603.99 | |
| 15% | 19.14 | 40.83 | 184.49 | 712.88 | |
| 20% | 10.77 | 22.96 | 103.78 | 401.00 | |
| 25% | 6.89 | 14.70 | 66.42 | 256.64 | |
| 30% | 4.79 | 10.21 | 46.12 | 178.22 | |
| 35% | 3.52 | 7.50 | 33.89 | 130.94 | |
| 40% | 2.69 | 5.74 | 25.94 | 100.25 | |
| 45% | 2.13 | 4.54 | 20.50 | 79.21 | |
| 50% | 1.72 | 3.67 | 16.60 | 64.16 | |
| | 57.00 | 64.00 | | | |

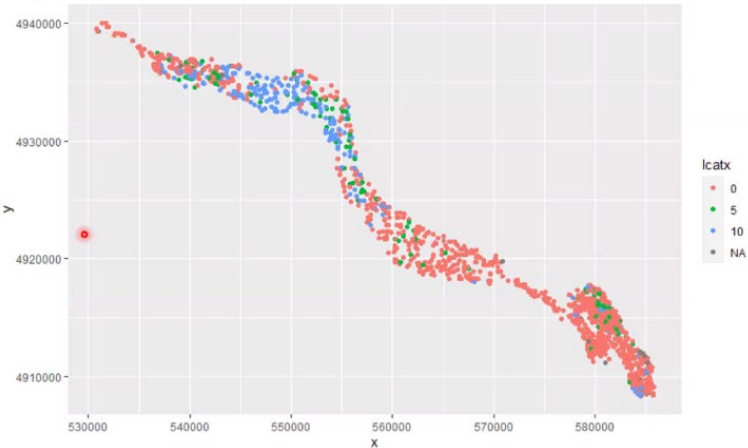


from Jennie Sauer to everyone: 11:34 AM - Makes sense since you usually don't find Benthic inverts in those strata

Jim L: Can focus on adding precision to strata where we can detect change and eliminating strata where sampling is too burdensome to detect change.

Pool 4

| Mayfly | BW | IMP | SC | MC | | |
|----------|---------|---------|----------|-----------|--------|--|
| Historic | 57.00 | 44 | 10 | 10 | 121.00 | |
| 1% | 4306.79 | 9185.75 | 41511.37 | 160398.98 | | |
| 3% | 478.53 | 1020.64 | 4612.37 | 17822.11 | | |
| 5% | 172.27 | 367.43 | 1660.45 | 6415.96 | | |
| 10% | 43.07 | 91.86 | 415.11 | 1603.99 | | |
| 15% | 19.14 | 40.83 | 184.49 | 712.88 | | |
| 20% | 10.77 | 22.96 | 103.78 | 401.00 | | |
| 25% | 6.89 | 14.70 | 66.42 | 256.64 | | |
| 30% | 4.79 | 10.21 | 46.12 | 178.22 | | |
| 35% | 3.52 | 7.50 | 33.89 | 130.94 | | |
| 40% | 2.69 | 5.74 | 25.94 | 100.25 | | |
| 45% | 2.13 | 4.54 | 20.50 | 79.21 | | |
| 50% | 1.72 | 3.67 | 16.60 | 64.16 | | |
| | 57.00 | 64.00 | | | | |



Blue – 10+ mayflies per site. Keeping those main channel and side channel sites would inflate Os.

Pool 8

- Need to determine equipment and personnel needs

| Mayfly | BW | IMP | SC | MC | | | Fingernail | BW | IMP | SC | MC | | | | Midge | BW | IMP | SC | MC |
|----------|---------|----------|----------|----------|--------|--|------------|---------|----------|----------|----------|-----|--|--|-------|----------|-----------|----------|----------|
| Historic | 31.00 | 49 | 19 | 10 | 109.00 | | | 31.00 | 49 | 19 | 10 | 109 | | | | 31.00 | 49 | 19 | 10 |
| 1% | 4331.79 | 17420.73 | 46283.01 | 81085.97 | | | | 6007.39 | 17420.73 | 46283.01 | 81085.97 | | | | | 12166.74 | 151053.53 | 45303.01 | 58759.09 |
| 3% | 481.31 | 1935.64 | 5142.56 | 9009.55 | | | | 667.49 | 1935.64 | 5142.56 | 9009.55 | | | | | 1351.86 | 16783.73 | 5033.67 | 6528.79 |
| 5% | 173.27 | 696.83 | 1851.32 | 3243.44 | | | | 240.30 | 696.83 | 1851.32 | 3243.44 | | | | | 486.67 | 6042.14 | 1812.12 | 2350.36 |
| 10% | 43.32 | 174.21 | 462.83 | 810.86 | | | | 60.07 | 174.21 | 462.83 | 810.86 | | | | | 121.67 | 1510.54 | 453.03 | 587.59 |
| 15% | 19.25 | 77.43 | 205.70 | 360.38 | | | | 26.70 | 77.43 | 205.70 | 360.38 | | | | | 54.07 | 671.35 | 201.35 | 261.15 |
| 20% | 10.83 | 43.55 | 115.71 | 202.71 | | | | 15.02 | 43.55 | 115.71 | 202.71 | | | | | 30.42 | 377.63 | 113.26 | 146.90 |
| 25% | 6.93 | 27.87 | 74.05 | 129.74 | | | | 9.61 | 27.87 | 74.05 | 129.74 | | | | | 19.47 | 241.69 | 72.48 | 94.01 |
| 30% | 4.81 | 19.36 | 51.43 | 90.10 | | | | 6.67 | 19.36 | 51.43 | 90.10 | | | | | 13.52 | 167.84 | 50.34 | 65.29 |
| 35% | 3.54 | 14.22 | 37.78 | 66.19 | | | | 4.90 | 14.22 | 37.78 | 66.19 | | | | | 9.93 | 123.31 | 36.98 | 47.97 |
| 40% | 2.71 | 10.89 | 28.93 | 50.68 | | | | 3.75 | 10.89 | 28.93 | 50.68 | | | | | 7.60 | 94.41 | 28.31 | 36.72 |
| 45% | 2.14 | 8.60 | 22.86 | 40.04 | | | | 2.97 | 8.60 | 22.86 | 40.04 | | | | | 6.01 | 74.59 | 22.37 | 29.02 |
| 50% | 1.73 | 6.97 | 18.51 | 32.43 | | | | 2.40 | 6.97 | 18.51 | 32.43 | | | | | 4.87 | 60.42 | 18.12 | 23.50 |
| | 43.00 | 66.00 | | | | | | 43.00 | 66.00 | | | | | | | 43.00 | 66.00 | | |



Sampling design wants power to detect 10-15% change per year.

BW and IMP strata are good at covering main taxa but midges are more difficult.

Will reach out to Alicia next week to discuss staffing needs.

Pool 13

- May need to address backwater habitat substrate changes due to vegetation expansion in backwaters.
- Existing personnel and equipment can cover sampling

| Mayfly | BW | IMP | SC | MC | | | Fingernail | BW | IMP | SC | MC | | | Midge | BW | IMP | SC | MC | | |
|----------|----------|---------|----------|----------|--------|--|------------|---------|---------|----------|----------|--------|--|-------|----------|-----------|----------|----------|--|--|
| Historic | 43.00 | 46 | 14 | 15 | 118.00 | | | 43.00 | 46 | 14 | 15 | 118.00 | | | 43.00 | 46 | 14 | 15 | | |
| 1% | 16493.69 | 4449.58 | 33199.53 | 28006.97 | | | 1% | 3914.43 | 4449.58 | 33199.53 | 28006.97 | | | 1% | 47607.21 | 211938.66 | 40914.98 | 178067.8 | | |
| 3% | 1832.63 | 494.40 | 3688.84 | 3111.89 | | | 3% | 434.94 | 494.40 | 3688.84 | 3111.89 | | | 3% | 5289.69 | 23548.74 | 4546.11 | 19785.3 | | |
| 5% | 659.75 | 177.98 | 1327.98 | 1120.28 | | | 5% | 156.58 | 177.98 | 1327.98 | 1120.28 | | | 5% | 1904.29 | 8477.55 | 1636.60 | 7122.7 | | |
| 10% | 164.94 | 44.50 | 332.00 | 280.07 | | | 10% | 39.14 | 44.50 | 332.00 | 280.07 | | | 10% | 476.07 | 2119.39 | 409.15 | 1780.68 | | |
| 15% | 73.31 | 19.78 | 147.55 | 124.48 | | | 15% | 17.40 | 19.78 | 147.55 | 124.48 | | | 15% | 211.59 | 941.95 | 181.84 | 791.4 | | |
| 20% | 41.23 | 11.12 | 83.00 | 70.02 | | | 20% | 9.79 | 11.12 | 83.00 | 70.02 | | | 20% | 119.02 | 529.85 | 102.29 | 445.1 | | |
| 25% | 26.39 | 7.12 | 53.12 | 44.81 | | | 25% | 6.26 | 7.12 | 53.12 | 44.81 | | | 25% | 76.17 | 339.10 | 65.46 | 284.9 | | |
| 30% | 18.33 | 4.94 | 36.89 | 31.12 | | | 30% | 4.35 | 4.94 | 36.89 | 31.12 | | | 30% | 52.90 | 235.49 | 45.46 | 197.8 | | |
| 35% | 13.46 | 3.63 | 27.10 | 22.86 | | | 35% | 3.20 | 3.63 | 27.10 | 22.86 | | | 35% | 38.86 | 173.01 | 33.40 | 145.3 | | |
| 40% | 10.31 | 2.78 | 20.75 | 17.50 | | | 40% | 2.45 | 2.78 | 20.75 | 17.50 | | | 40% | 29.75 | 132.46 | 25.57 | 111.2 | | |
| 45% | 8.15 | 2.20 | 16.39 | 13.83 | | | 45% | 1.93 | 2.20 | 16.39 | 13.83 | | | 45% | 23.51 | 104.66 | 20.20 | 87.9 | | |
| 50% | 6.60 | 1.78 | 13.28 | 11.20 | | | 50% | 1.57 | 1.78 | 13.28 | 11.20 | | | 50% | 19.04 | 84.78 | 16.37 | 71.2 | | |
| | 72.00 | 46.00 | | | | | | 72.00 | 46.00 | | | | | <50% | | | | | | |

Fingernail clams and mayflies will benefit from sampling – will be more variability in midge data.

Pool 26




- Existing personnel can cover sampling and there will be some equipment needs

| Mayfly | BW | IMP | SC | MC | | | Fingernail | BW | IMP | SC | MC | | | Midge | BW | IMP | SC | MC | | |
|----------|----------|----------|----------|----------|--------|--|------------|----------|----------|----------|----------|-----|--|-------|----------|----------|----------|----------|--|--|
| Historic | 33.00 | 27 | 34 | 17 | 111.00 | | | 33.00 | 27 | 34 | 17 | 111 | | | 33.00 | 27 | 34 | 17 | | |
| 1% | 74260.06 | 19164.61 | 15875.72 | 57366.00 | | | 1% | 51079.45 | 19164.61 | 15875.72 | 57366.00 | | | 1% | 18168.43 | 47435.97 | 37534.15 | 42089.16 | | |
| 3% | 8251.12 | 2129.40 | 1763.97 | 6374.00 | | | 3% | 5675.49 | 2129.40 | 1763.97 | 6374.00 | | | 3% | 2018.71 | 5270.66 | 4170.46 | 4676.57 | | |
| 5% | 2970.40 | 766.58 | 635.03 | 2294.64 | | | 5% | 2043.18 | 766.58 | 635.03 | 2294.64 | | | 5% | 726.74 | 1897.44 | 1501.37 | 1683.57 | | |
| 10% | 742.60 | 191.65 | 158.76 | 573.66 | | | 10% | 510.79 | 191.65 | 158.76 | 573.66 | | | 10% | 181.68 | 474.36 | 375.34 | 420.89 | | |
| 15% | 330.04 | 85.18 | 70.56 | 254.96 | | | 15% | 227.02 | 85.18 | 70.56 | 254.96 | | | 15% | 80.75 | 210.83 | 166.82 | 187.06 | | |
| 20% | 185.65 | 46.91 | 39.69 | 143.41 | | | 20% | 127.70 | 47.91 | 39.69 | 143.41 | | | 20% | 45.42 | 118.59 | 93.84 | 105.22 | | |
| 25% | 118.82 | 30.66 | 25.40 | 91.79 | | | 25% | 81.73 | 30.66 | 25.40 | 91.79 | | | 25% | 29.07 | 75.90 | 60.05 | 67.34 | | |
| 30% | 82.51 | 21.29 | 17.64 | 63.74 | | | 30% | 56.75 | 21.29 | 17.64 | 63.74 | | | 30% | 20.19 | 52.71 | 41.70 | 46.77 | | |
| 35% | 60.62 | 15.64 | 12.96 | 46.83 | | | 35% | 41.70 | 15.64 | 12.96 | 46.83 | | | 35% | 14.83 | 38.72 | 30.64 | 34.36 | | |
| 40% | 46.41 | 11.98 | 9.92 | 35.85 | | | 40% | 31.92 | 11.98 | 9.92 | 35.85 | | | 40% | 11.36 | 29.65 | 23.46 | 26.31 | | |
| 45% | 36.67 | 9.46 | 7.84 | 28.33 | | | 45% | 25.22 | 9.46 | 7.84 | 28.33 | | | 45% | 8.97 | 23.43 | 18.54 | 20.78 | | |
| 50% | 29.70 | 7.67 | 6.35 | 22.95 | | | 50% | 20.43 | 7.67 | 6.35 | 22.95 | | | 50% | 7.27 | 18.97 | 15.01 | 16.84 | | |
| | | 60.00 | 51.00 | | | | | | 60.00 | 51.00 | | | | | | 60.00 | 51.00 | | | |

Backwaters are not abundant in P26 and this is an issue so may need to shift efforts to Impounded and Side channels as main strata.

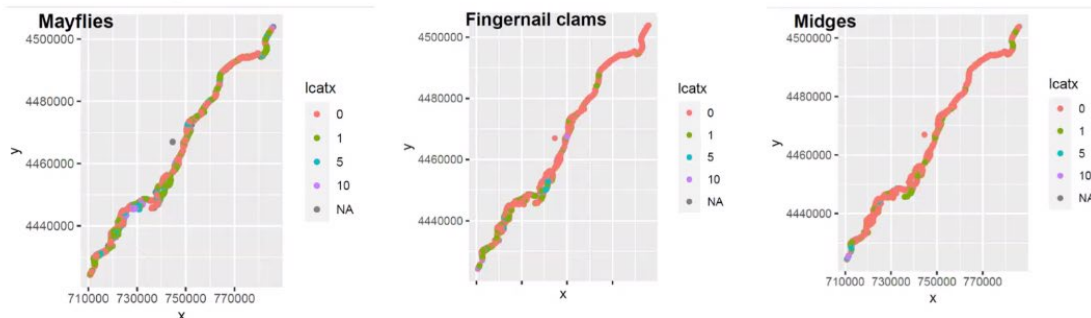
May be some equipment needs there – screens and wash tables. Current personnel should be able to handle sampling.

- Existing personnel can cover sampling and there will be some equipment needs

| Mayfly | BW | IMP | SC | MC | | | Fingernail | BW | IMP | SC | MC | | | Midge | BW | IMP | SC | MC |
|----------|----------|---|----------|----------|-------|-----|------------|----------|-----|----------|----------|---|-------|-------|---------|-----|---|----------|
| Historic | 24.00 | | 35 | 40 | 99.00 | 119 | 24.00 | | 35 | 40 | 99 | 119 | 24.00 | | 35 | 40 | | |
| 1% | 28283.78 | | 37020.08 | 12906.04 | | | 1% | 17359.07 | | 37020.08 | 12906.04 | | | 1% | 9301.79 | | 16664.07 | 46783.28 |
| 3% | 3142.64 | | 4113.34 | 1434.00 | | | 3% | 1928.79 | | 4113.34 | 1434.00 | | | 3% | 1033.53 | | 1851.56 | 5198.14 |
| 5% | 1131.35 | | 1480.80 | 516.24 | | | 5% | 694.36 | | 1480.80 | 516.24 | | | 5% | 372.07 | | 666.56 | 1871.33 |
| 10% | 282.84 | | 370.20 | 129.06 | | | 10% | 173.59 | | 370.20 | 129.06 | | | 10% | 93.02 | | 166.64 | 467.83 |
| 15% | 125.71 | | 164.53 | 57.36 | | | 15% | 77.15 | | 164.53 | 57.36 | | | 15% | 41.34 | | 74.06 | 207.93 |
| 20% | 70.71 | | 92.55 | 32.27 | | | 20% | 43.40 | | 92.55 | 32.27 | | | 20% | 23.25 | | 41.66 | 116.96 |
| 25% | 45.25 | | 59.23 | 20.65 | | | 25% | 27.77 | | 59.23 | 20.65 | | | 25% | 14.88 | | 26.66 | 74.85 |
| 30% | 31.43 | | 41.13 | 14.34 | | | 30% | 19.29 | | 41.13 | 14.34 | | | 30% | 10.34 | | 18.52 | 51.98 |
| 35% | 23.09 | | 30.22 | 10.54 | | | 35% | 14.17 | | 30.22 | 10.54 | | | 35% | 7.59 | | 13.60 | 38.19 |
| 40% | 17.68 | | 23.14 | 8.07 | | | 40% | 10.85 | | 23.14 | 8.07 | | | 40% | 5.81 | | 10.42 | 29.24 |
| 45% | 13.97 | | 18.28 | 6.37 | | | 45% | 8.57 | | 18.28 | 6.37 | | | 45% | 4.59 | | 8.23 | 23.10 |
| 50% | 11.31 | | 14.81 | 5.16 | | | 50% | 6.94 | | 14.81 | 5.16 | | | 50% | 3.72 | | 6.67 | 18.71 |
| | 69.00 | | | 50.00 | | | 69.00 | | | | 50.00 | | | | 69.00 | | | 50.00 |
| | |  | | | | | | | | | |  | | | | |  | |

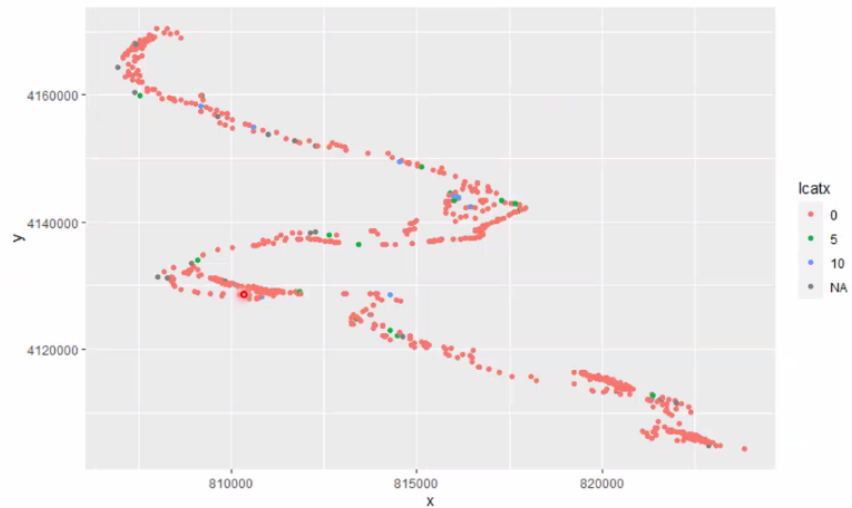
Another shift on strata is where we could possibly do 20 more samples than historical effort. Looking at backwaters and main channel as main strata. Good ability to detect change in mayflies and fingernail clams.

LaGrange



Open River

- Program isolated to SCB and MCB historically – only goes up until year 2000.
- Zero-inflated data and inability to detect annual change due to lack of soft substrates
- Sampling on limited amounts of soft substrates could be an option, but its value will need to be evaluated



Open-river Macro sampling was discontinued in 2000. Was isolated at that time to side channel and main channels at that time. Some blue hotspots where a number of individuals could be found, mostly red.

Comparison of historic data to new data

- SRS design allows comparison of new data to historic data
- Strata specific comparisons
- Increased sample size adds precision but does not prohibit comparison with historic data
- Comparison of historic data achieved!

Using same SRS design between strata selected allows comparison to historic data. More sampling sites just increases precision in data – doesn't affect ability to compare to historic data.

Project coordination

- Coordination, maintenance, analysis of data needed
- 5 year post-doc could serve multiple roles
 - Coordinate data collection
 - Coordinate data curation
 - Coordinate future science in support and identify additional program needs
 - Analyze historic data/current data
 - Generate scholarly projects
 - Sample processing when finer taxonomic resolution is needed, contaminant samples, etc.
 - 2 technicians could assist with field work and lab processing.

Seems valuable to have someone with ability to analyze current and historic data and look for ways to adaptively improve the data if trial gets off the ground. Suggest having a dedicated person – possibly a post-doc who has ability to synthesize data and literature.

Jason Rohweder is helping look through past information. Looks like there is information on database and SRS support.

Lack of systematism

- The lack of soft-substrates in the Open River Reach (MDC) makes benthic sampling comparisons impractical
- Opportunity to add another sampling method and capture other important invertebrate communities to allow systemic comparisons.
- Would focus on trichopterans, amphipods, plecopterans, ephemeropterans
- Require rock bag or plate sampler deployment (2-4 weeks), 12-20 samplers.
 - Anticipated a day to deploy and a day or 2 to retrieve
 - Techs hired for the program could assist



Talking with Dave and macro-sub group there may be opportunity to provide sampling method in a limited capacity to establish a way to make some macro comparisons system-wide. Could focus on different macroinvertebrate community which is still important functional driver for the system. Kat

McCain report on rock bag samplers that could be used systemically to make comparisons throughout the system. Some field stations willing to assist in this. May have technicians recommended to assist if these are deployed. Could be retrieved 2-4 weeks later. If this component is reinvigorated, we may want to add this for macroinvertebrate sampling method for system-wide assessment. The Rocks are rinsed in the sluice tables.

Focus on trichopterans, amphipods...

Changes from historic sampling

- Redistribute effort from non-soft substrate strata to soft-substrate strata to make comparisons meaningful and more robust
- Possible family level resolution on any EPT taxa.
- Retention of faucet snails – included as target taxa
- Component leader likely outside USGS – technician support for lab and field processing
- Proposed as 5 year trial, but design will be evaluated and adjusted annually as needed.
- Established infrastructure for targeted research (neonics, other contaminants).

Some interest in going down to family-level resolution on EPT taxa.

Component leader likely outside USGS. Would be proposed as 5-year trial instead of full component. Design could be evaluated and adjusted as needed. Would allow infrastructure to build on targeted research opportunities.

We have an opportunity to fill in gaps with historical data and learn more as we move forward.

Potential funding needed

- Component lead (Post-doc): 75K per year with benefits
- Technician (2-3): 60K per year
- Field station personnel needs: (10K)? Currently none requested
- Field station equipment needs: 15K
- Other (pubs, lab needs, travel): 15K
- Tentative estimate annually: first year - 165K-175K
 - Subsequent years: 130K-145K
- Future funding request would likely decrease once equipment refresh is complete and startup needs addressed.

Main costs are from personal, in this case component leads and technicians.

from Karen H Hagerty to everyone: 11:55 AM - what about costs for Ben Schlifer and Jason Rohweder?

Next steps

- Continue to work with field stations to refine methods and understand needs
- Refine design and strategy with macroinvertebrate monitoring subgroup
- Finalize proposal – 2-3 weeks.
- Science in support – build off of proposal and program infrastructure

from Davi Michl to everyone: 11:58 AM - Great effort, Jim!

from Shawn Giblin to everyone: 11:59 AM - Nice work Jim!

from Matt Vitello to everyone: 11:59 AM - Thanks Scott!

from Brian I to everyone: 11:59 AM - Very clear and useful info for wider program considerations and deliberations re macro inverts. Nice job Jim

Email agency updates to Scott G – will include in minutes.

from Davi Michl to everyone: 12:00 PM - Thanks, Scotty!

from Molly Van Appledorn to everyone: 12:00 PM - Thanks Scotty

from Steve Winter to everyone: 12:00 PM - Thanks!

from Neal Jackson to everyone: 12:00 PM - Great meeting!

from Lane Richter to everyone: 12:00 PM - Thanks all!

from Jim Lamer to everyone: 12:00 PM - Thanks Scotty!