Upper Mississippi River Restoration Program Coordinating Committee Quarterly Meeting

February 8, 2017

Highlights and Action Items

Program Management

- On December 12, 2016, Congress enacted a second continuing resolution authority (CRA) for FY 17 that expires on April 28, 2017. The Corps-wide policy is to spend at the lowest amount included for UMRR in the either the FY 17 President's budget or the House's or Senate's energy and water appropriations measures. All three measures include \$20 million for UMRR and thus it is the Corps current operating funding level under the existing FY 17 CRA.
- At the \$20 million planning scenario, UMRR's FY 17 internal allocations are as follows:
 - Regional Administration and Programmatic Efforts \$761,000
 - Regional Science and Monitoring \$6,714,000
 - o Long term resource monitoring \$4,610,000
 - Regional science in support of restoration \$1,000,000
 - Regional science staff support \$129,000
 - Habitat project evaluations \$975,000
 - Habitat Restoration \$12,525,000
 - Regional project sequencing \$150,000
 - o MVP \$4,005,700
 - o MVR \$4,363,600
 - o MVS \$4,005,700
- The FY 18 budget for UMRR has not yet been released. In developing proposals, the Corps provides spending plans at the funding levels of last fiscal year's appropriation as well as two other increments. One increment is always at UMRR's full annual authorized authorization of \$33.52 million.
- MVD submitted the final draft 2016 UMRR Report to Congress (RTC) to Headquarters on December 23, 2016. The Office of Council requested revisions to the issues facing non-federal sponsors in executing cost share agreements. With those changes, Headquarters is scheduled to formally transmit the report to ASA(CW) on February 10, 2017.
- The UMRR *ad hoc* external communications group met via conference call on January 12, 2017 to review objectives for the group and brainstorm initial ideas for the group's effort in expanding UMRR's public outreach and communications efforts. **Please contact Angie Freyermuth** (angela.m.freyermuth@usace.army.mil) to join the external communications group. The Coordinating Committee discussed dedicating resources and staff time to employing outreach strategies more effectively and in more targeted, strategic ways.

UMRR Showcase Presentations

- Kara Mitvalsky and Ron Knopik discussed how the Keithsburg habitat project will restore and
 enhance important aquatic habitats for various waterfowl and overall health and diversity of the
 floodplain forest.
- Yao Yin presented on the development of a model to predict the occurrence of submersed aquatic vegetation at the HREP scale. Ultimately, the purpose is to predict the response of vegetation to the construction of proposed structures e.g., islands.

Long Term Resource Monitoring and Science

- Accomplishments of the first quarter of FY 17 include publication of five manuscripts:
 - 1) Changes in aquatic vegetation and floodplain land cover in the Upper Mississippi and Illinois Rivers
 - 2) Development and assessment of a new method for combining catch-per-unit effort data from different sampling gears: multi-gear mean standardization (MGMS)
 - 3) Fish associations among un-notched, notched, and L-head dikes in the Middle Mississippi River
 - 4) Mesohabitat associations in the Mississippi River Basin: a long term study on the catch rates and physical habitat associations of juvenile silver carp and two native planktivores
 - 5) Population trends and a distributional record of selected fish species from the Illinois River
- The total available funding for FY 17 is \$4.61 million for base monitoring and \$1 million for science research and analysis in support of restoration and management. In response to a recommendation from the A-Team, the UMRR Coordinating Committee endorsed a set of four research proposals to receive UMRR FY 17 funding using carry-in funds. These include:
 - 1) Estimating backwater sedimentation resulting from alluvial fan formation
 - 2) Advancing understanding of habitat requirements of fish assemblages using multi-species models
 - 3) Investigating metabolism, nutrient processing, and fish communities in floodplain water bodies of the Middle Mississippi River
 - 4) Mapping the thermal landscape of the Upper Mississippi River
- The A-Team's January 9, 2017 meeting focused mostly on the four research proposals (as discussed above) as well as a two new fish indicators to evaluate ecological health. **Upon the A-Team's recommendation, the UMRR Coordinating Committee voted to endorse the new indicators of migratory and backwater fish assemblages to replace the suite of individual fish species indicators that were used in the 2008 UMRR Status and Trends Report.**

Habitat Restoration

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

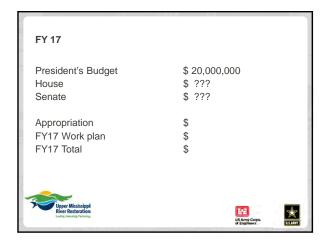
- MVP is accelerating construction of the Conway Lake habitat project with an anticipated close-out anticipated for this fiscal year. The Districts next priorities include McGregor Lake followed by Pool 10 Islands and then Peterson Lake.
- While still in design, MVS is developing the O&M manual for Ted Shanks so that it can be closed
 out more readily following construction. The District will be employing OMRR&R inspections for
 all constructed projects within its respective boundaries this summer, capturing any lessons learned
 regarding how project features are working and how they are being maintained.
- MVR is planning ribbon-cutting ceremonies for Lake Odessa Stage I and Rice Lake this spring.
 The District is also continuing planning work on Beaver Island, Keithsburg, and DeLair habitat projects.
- District staff are considering ways to complete O&M manuals more readily so that maintenance
 information is provided as soon as possible following construction. For example, the Corps is
 considering developing the manuals for each project stage that can be handed over to the sponsor
 independent of progress on subsequent stages.
- Jeff Houser presented on the UMRS ecological resilience's first primary effort of describing the river ecosystem's fundamental characteristics in a simplified way. A draft manuscript detailing the system description is provided in the agenda packet. The next steps include developing metrics for assessing the UMRS ecosystem's general resilience and to assess its specified resilience in the context of conceptual models. Houser anticipates completing a final revision of the system resilience manuscript soon, drafting a manuscript describing the system's specified resilience focusing on a set of selected indicators, and synthesizing management implications.
- A joint meeting of the ecosystem resilience and HNA II teams is being planned for April 2017.
- Tim Eagan described the planned schedule for developing the HNA II. Eagan anticipates the process will be similar to the 2000 HNA, where subject matter experts and resource managers reviewed the quantitative physical and chemical attributes of the ecosystem and floodplain reach objectives to assess the existing conditions. The resulting questions will be: 1) do we want more or less of certain habitats than are seen today (using the 2010 data layer) and 2) how do these wants mesh with the future projections. Major milestones of the anticipated HNA II development schedule are:
 - HNA II steering committee and ecological resilience team discuss the a habitat objectives questionnaire in April 2017
 - Presentation of key pool data and methods and discussion of non-key pool data development at the UMRR Coordinating Committee's May 24, 2017 quarterly meeting
 - Presentation of system-wide data and discussion of the qualitative assessment at the UMRR
 Coordinating Committee's August 9, 2017 quarterly meeting
 - In-person meeting of the HNA steering committee to initiate the qualitative assessment and needs of the ecosystem
 - Development of a system-wide data geo-database, assessment of the UMRS ecosystem habitat needs, and identification of other information needs in November 2017
 - Draft HNA II report in February 2018
 - Final HNA II report in March 208

Other Business

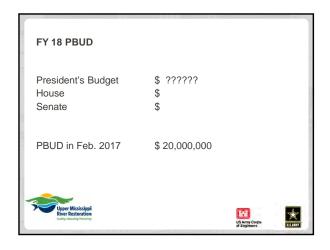
- Upcoming quarterly meetings are as follows:
 - May 2017 St. Louis
 - o UMRBA quarterly meeting May 23
 - UMRR Coordinating Committee quarterly meeting May 24
 - August 2017 Onalaska/UMESC
 - o UMRBA quarterly meeting August 8
 - UMRR Coordinating Committee quarterly meeting August 9
 - November 2017 St. Paul
 - o UMRBA quarterly meeting November 7
 - UMRR Coordinating Committee quarterly meeting November 8

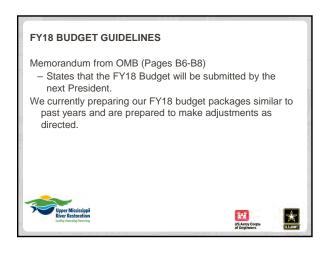


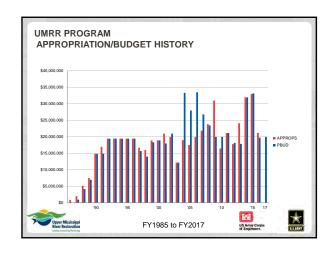




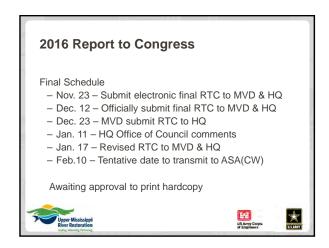












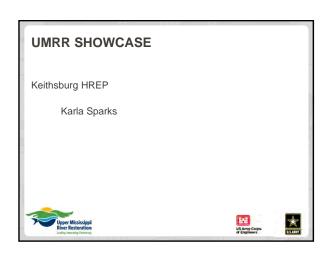


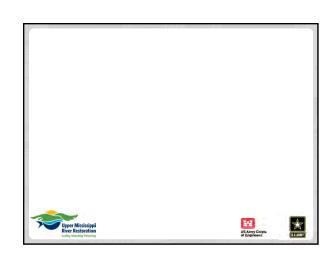


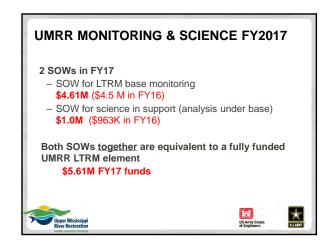


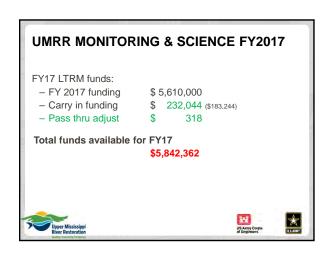


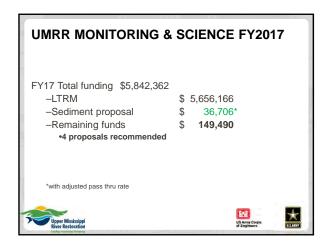


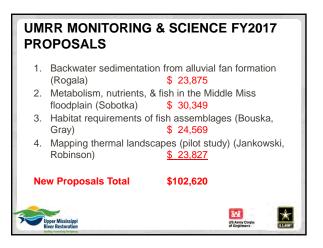


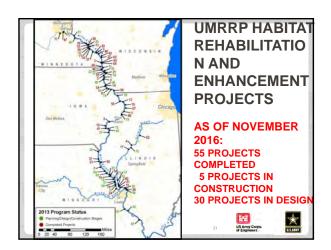


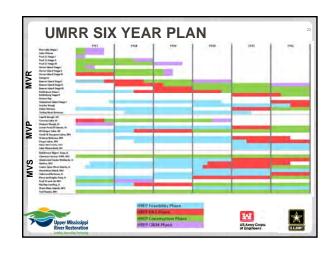




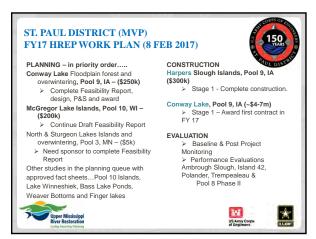








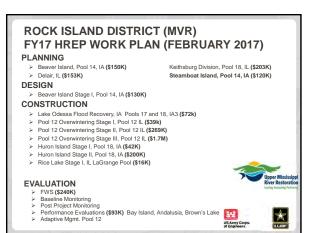
PROJECT PARTNERSHIP AGREEMENTS UMRR Leadership Summit - Indemnification - OMRR&R in perpetuity - Crediting nonprofit organizations for the value of donated goods Statutory requirements for Indemnification and OMRR&R are long standing and reaffirmed in WRDA86) Future Actions - Changes to these requirements would require legislative action because they are statutory. - Offer to "engage in detailed discussions" to find the best way to address concerns without negatively impacting the Civil Works program | Ilper Missispel | River Basteration | Ilper Missispel | River Basteration | Ilper Missispel | Ilper Missisp

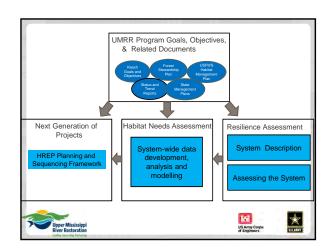




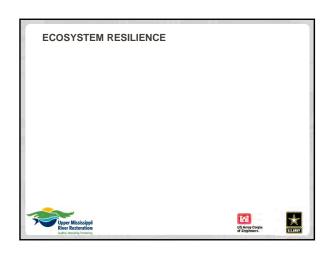






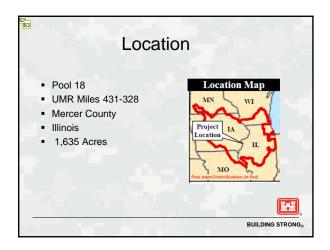


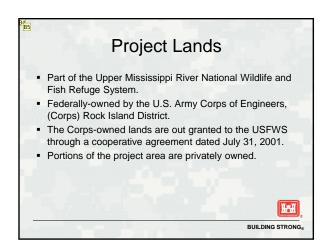




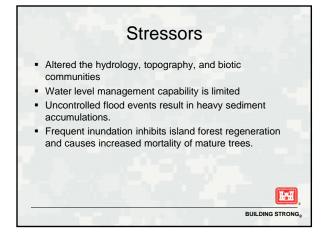












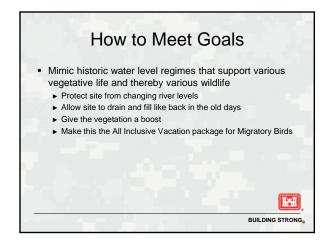






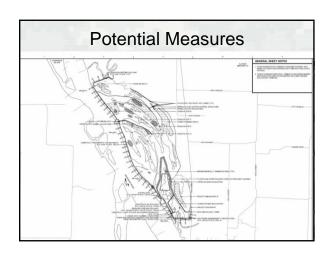






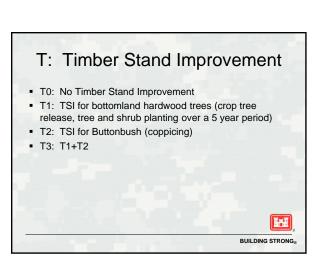


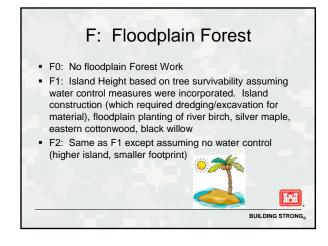
Potential Measures Water Level Management (L) Timber Stand Improvement (T) Spring Slough (S) Floodplain Forest (F)

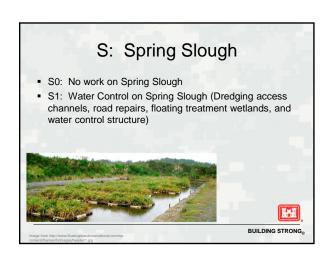


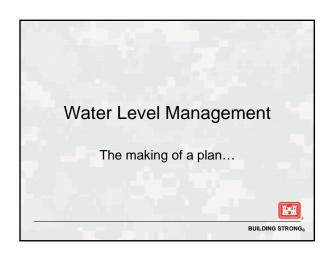
L: Water Level Management Feature L0: No embankment berm repairs or enhancement L1: Embankment berm improvements and gates for water level management Demo of existing structures Embankment berm sloping and top elevation set for appropriate overtoping and floodplain clearance New southern embankment ACM Spillways Upstream Gate with access dredging Downstream Gate with access dredging L2: L1 plus pumping capability

BUILDING STRONG

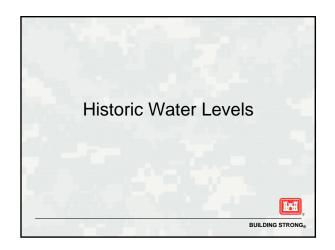


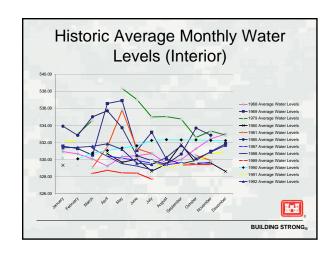


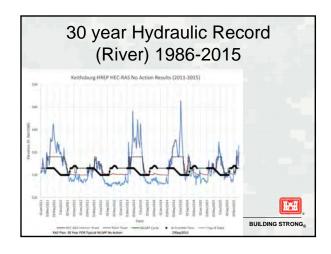


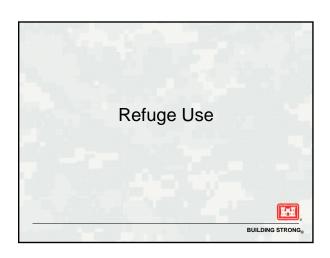










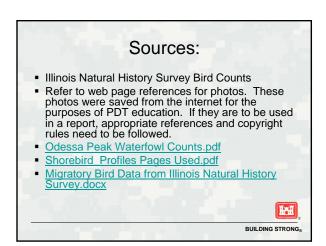


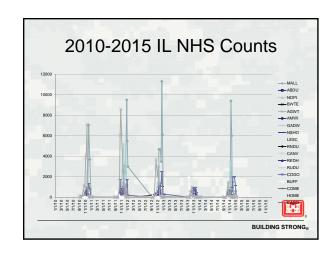


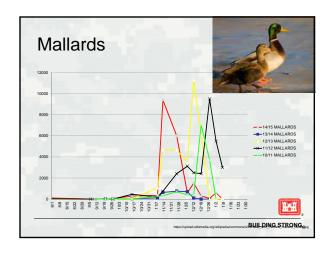
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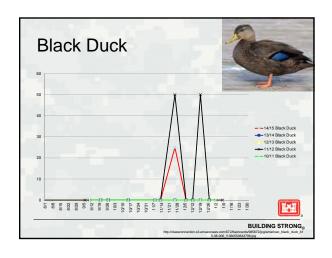
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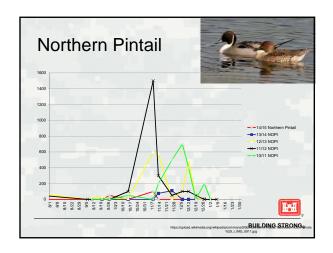
Shorebird Data Skagen, S.K., P.B. Sharpe,R.G. Waltermire, and M.B. Dillon. 1999. Biogeographical Profiles of Shorebird Migration in Midcontinental North America. Biological Science Report USGS/BRD/BSR-2000-0003. (USGS/DOI)

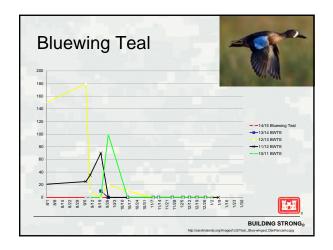


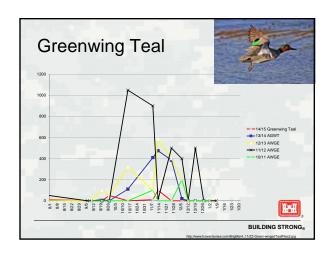


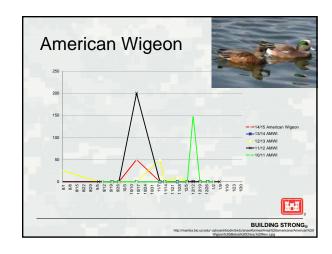


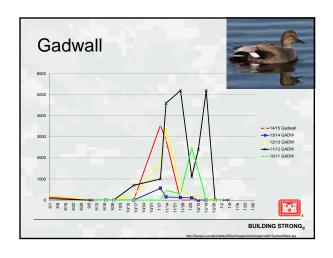


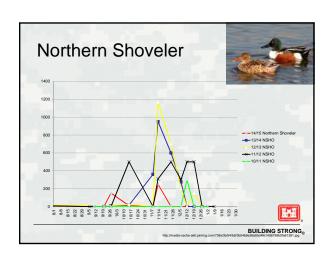


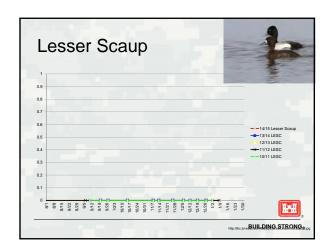


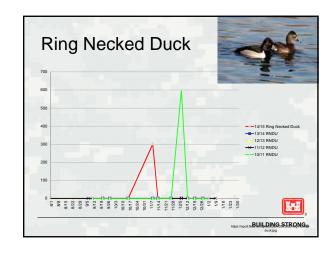


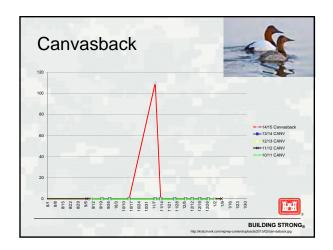


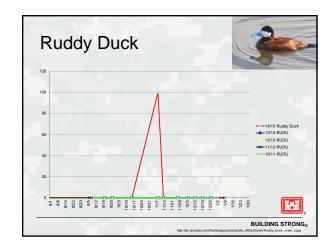


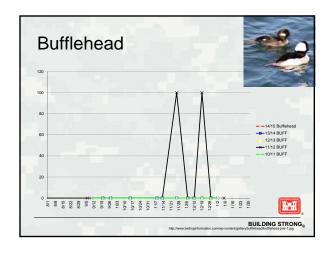


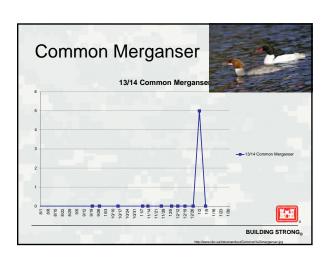


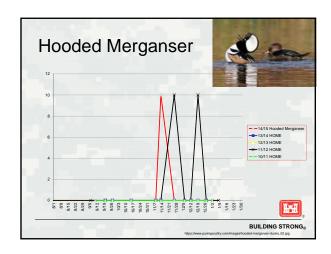


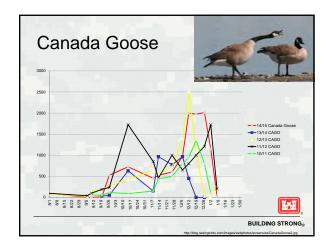


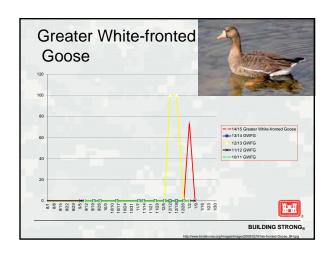


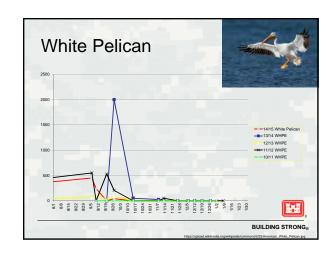


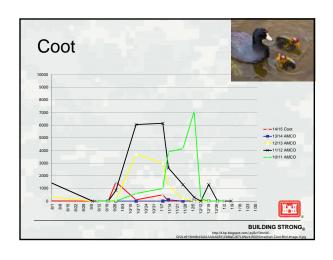


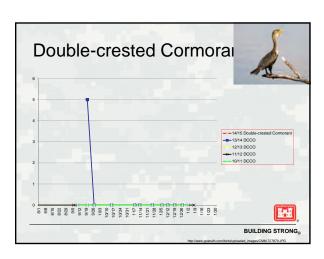


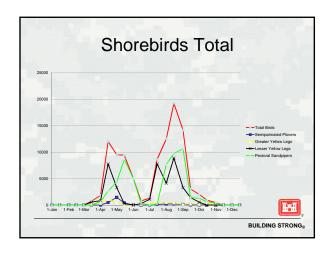


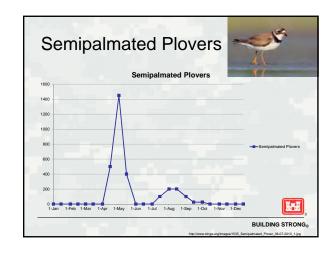


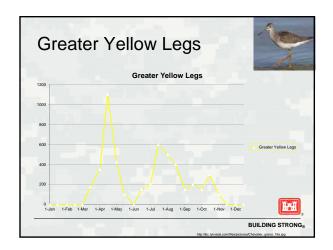




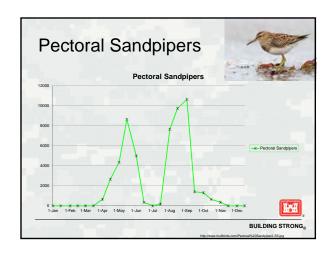


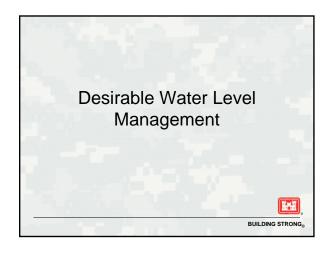


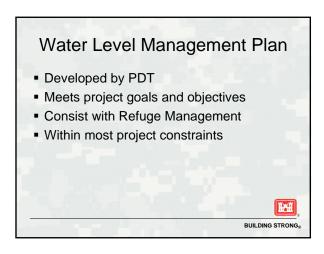


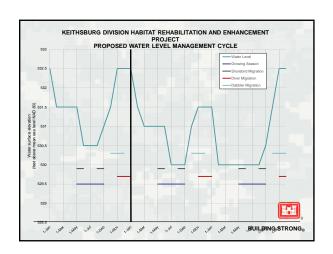


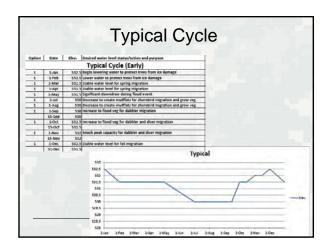


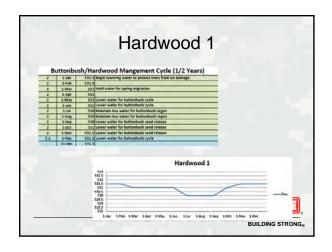


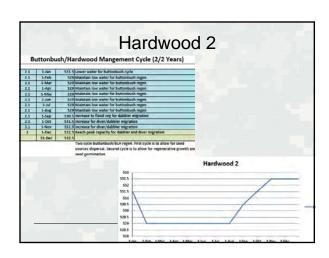


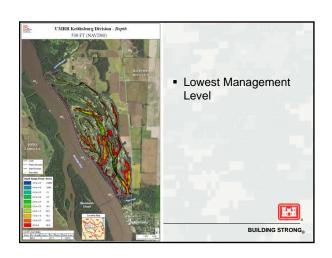


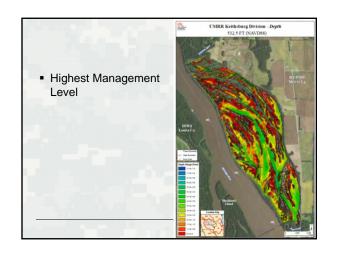


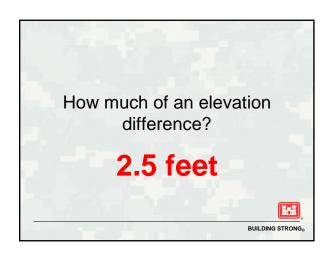


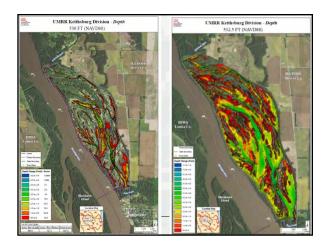


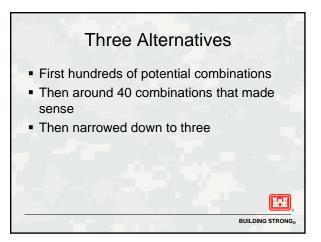


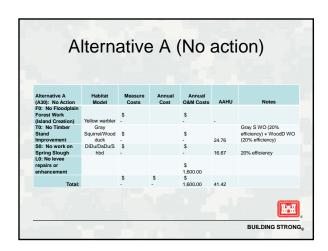


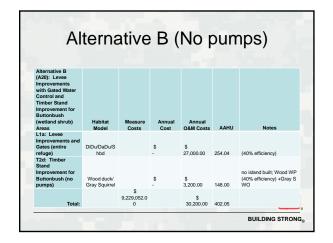


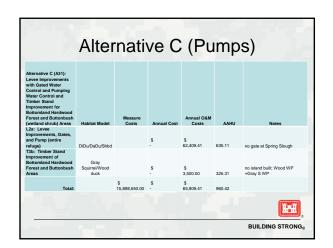


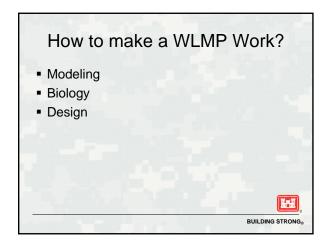


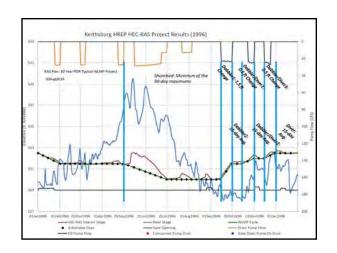


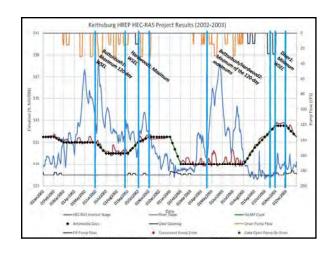




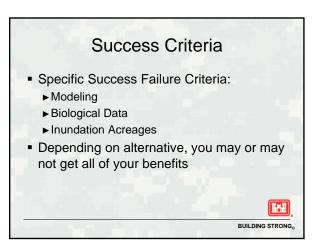


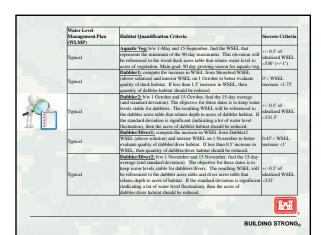












Water Level Management Plan (WLMP)	Habitat Quantification Criteria	Success Criteria
Typical	Dabbler/Diver3: compute the increase in WSEL from Dabbler/Diver2 WSEL (above solution) and interior WSEL on 1 December to better evaluate quality of dabbler/diver habitat. If less than 0.5' increase in WSEL, then quantity of dabbler/diver habitat should be reduced.	0.25'< WSEL increase <1'
Typical	Diver, bw 1 December and 15 December, find the 15-day average (and standard deviation). The objective for these dates is to keep water fewed stable for drivers. The resulting WSEL will be referenced to the diversers table for drivers. The resulting WSEL will be referenced to the driver screen shabe that relates depth to ences of habitat. If the standard deviation is significant (indicating a lot of water level fluctuation), then the acres of driver habitat should be reduced.	+/- 0.5' of idealized WSEL =532.5'
HW/BB1		+/- 0.5' of idealized WSEL =531'
HW/BBI	Hardwood1: b/w 25-August and 1-November during Hardwood WLMP1. find the maximum WSEL that is not exceeded during the entire period. The resulting WSEL will be referenced to the number of acres of hardwood habitat.	+/- 0.5' of idealized WSEL =531.5'
HW/BB2	Buttonbush/Hardwood2: bw 15-April and 15-October during Hardwood WLMP2, find the 120-day maximum and return the minimum of the maximums. The resulting WSEL will be referenced to the acres of diver habitat.	+/- 0.5' of idealized WSEL =529.75'
HW/BB2	Diver1: b/w 1-November and 1-December during Hardwood WLMP2, find the minimum elevation during the entire period. The resulting WSEL will be referenced to the acres of diver habitat.	+/- 0.5' of idealized WSEL =532.5'

Be Keithsburg Evaluation of Br		1986-2015 with		atior		re in place to	
	No Action Alternative Success				Gates & Pumps Alternative Success		
	%	# years in the past 30 years that success would have been met	%	# years in the past 30 years that success would have been met	%	# years in the past 30 years that success would have been met	
Typical WLMP							
Aquatic Veg	7%	2	3%	1	50%	15	
Dabbler1	0%	(10%	3	73%	22	
Dabbler2	10%	3	37%	- 11	97%	29	
Dabbler/Diver1	10%	3	17%		80%	24	
Dabbler/Diver2	7%	2	33%	10	100%	30	
Dabbler/Diver3	7%	2	13%		93%	28	
Diver	7%	2	23%	7	100%	30	
OVERALL	7%	2	20%	6	85%	26	
HW/BB1		(0		0	
Buttonbush I	0%	(27%		87%	26	
Hardwood1	7%	2	47%	14	100%	30	
OVERALL	3%	1	37%	11	93%	28	
HW/BB2		(0		0	WwW
Buttonbush/Hardwood2	0%	(27%		73%	22	10.00
Diver1	0%	(27%		100%	30	
OVERALL	0%	(27%	. 8	87%	26	STRONG

Example: Divers

Success Criteria: b/w 1 December and 15 December, find the 15-day average (and standard deviation). The objective for these dates is to keep water levels stable for divers. The resulting WSEL will be referenced to the diver acres table that relates depth to acres of habitat. If the standard deviation is significant (indicating a lot of water level fluctuation), then the acres of diver habitat should be reduced.

- Alternative A: If you keep the system you have now, you would have only had diver benefits 2 out of the last 30 years.
- Alternative B: If you would have had the gate system installed, you
 would have only had diver benefits 7 out of the last 30 years.
- Alternative C: If you would have had the pump system installed, you would have had diver benefits all 30 of the last 30 years!

BUILDING STRONG

Overall Success

Overall, for the typical water level management plan (combining all success factors):

- Alternative A: If you keep the system you have now, "success" 2 out of the last 30 years.
- Alternative B: If you would have had the gate system installed, "success" 6 out of the last 30 years.
- Alternative C: If you would have had the pump system installed, "success" 26 out of the last 30 years.



 ${\bf BUILDING\ STRONG}_{\otimes}$

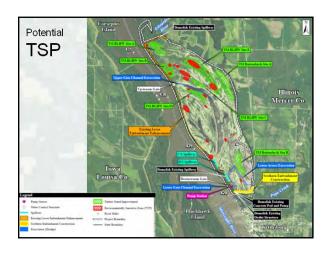
Success to Habitat Units to ICA

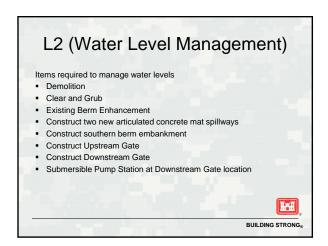
- Success calculations fed into the development of habitat units.
- Costs were developed for various features.
- Planning software ran (and re-ran...)
- Potential Tentatively Selected Plan rose to the top

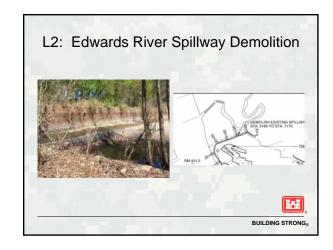


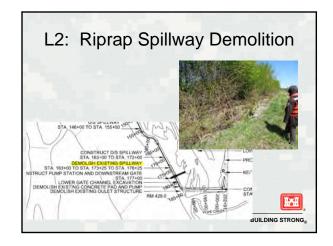
BUILDING STRONG

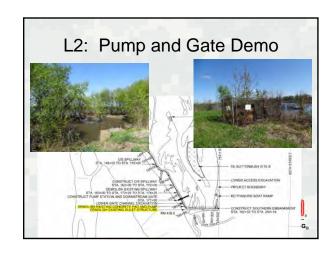


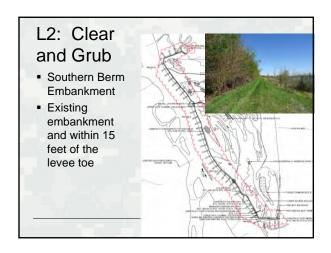


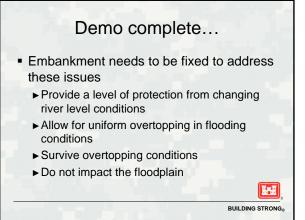


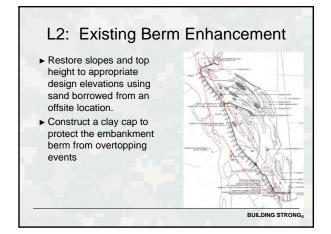


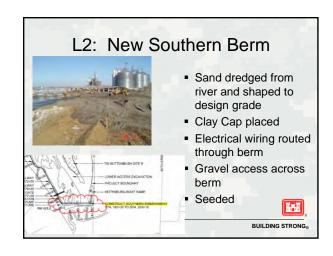


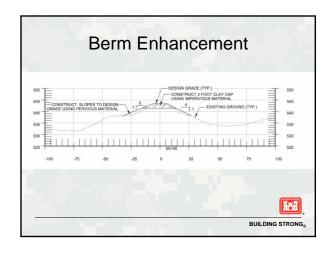


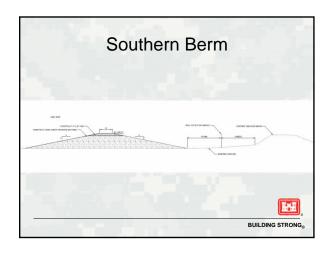


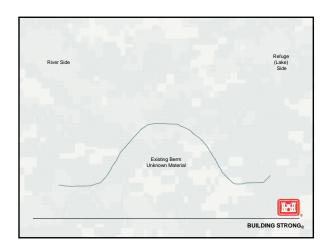


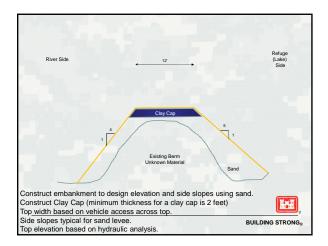


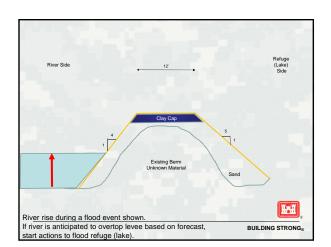


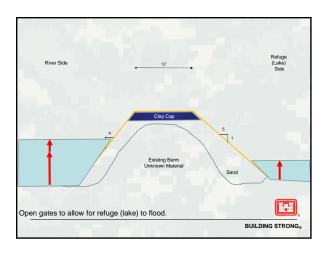


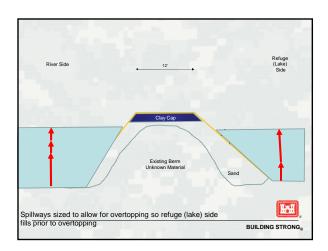


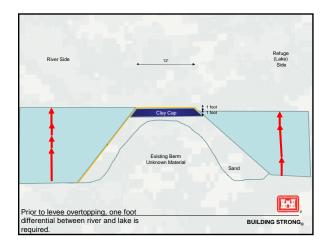


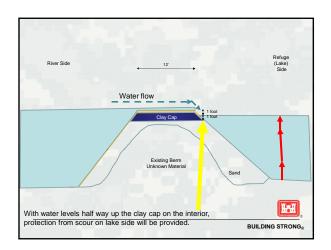












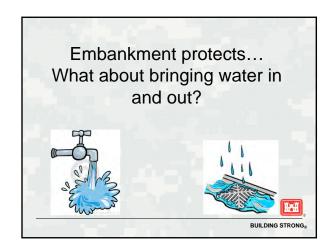


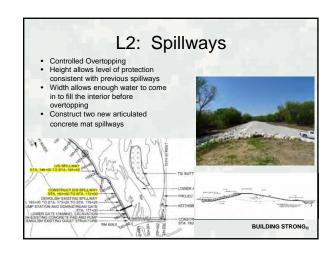


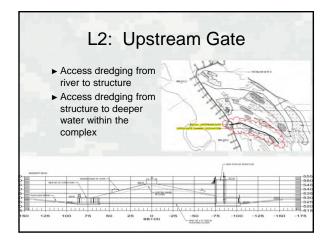


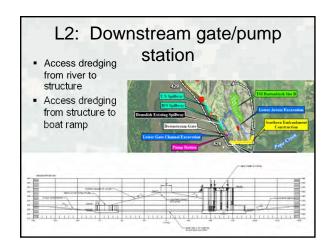






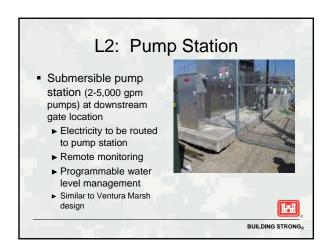


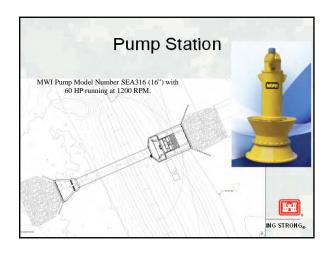


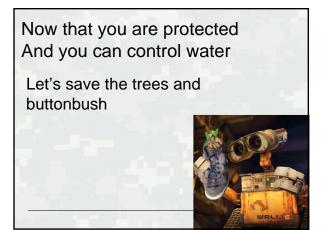


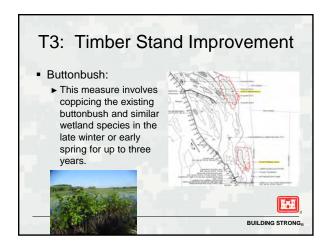


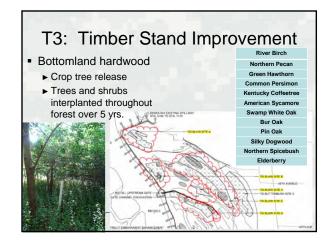
What type of pump? Remote location, infrequent access so temporary or diesel pumping eliminated early in the process Electric Pumps with Remote monitoring and sensing of pump and water levels (so you can see what is happening back at the office) Bubbler system (so the system does not ice up) Float System (so the pump doesn't burn up) System that allows to fill or drain with the plan

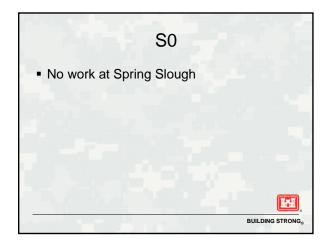


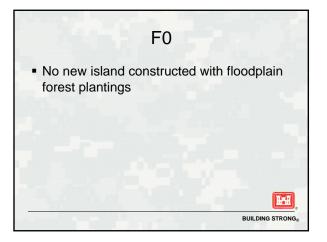


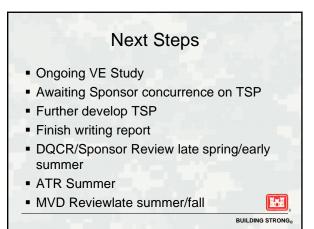


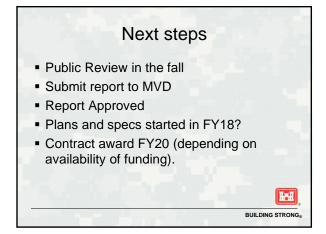




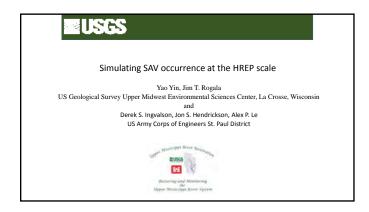


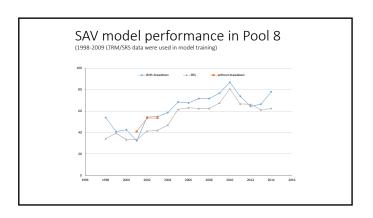


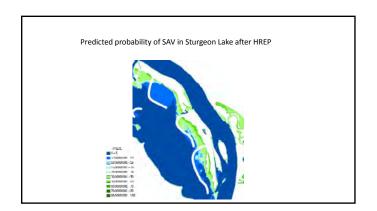


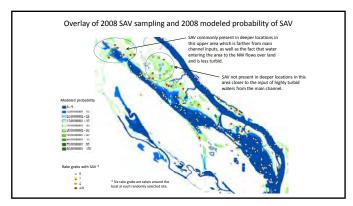


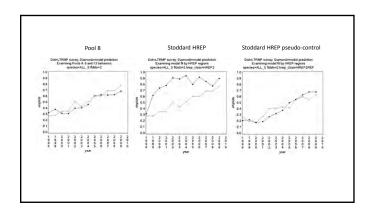






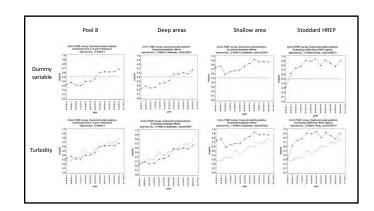


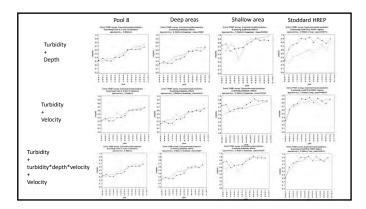


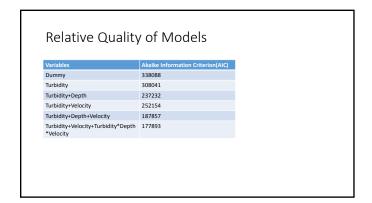


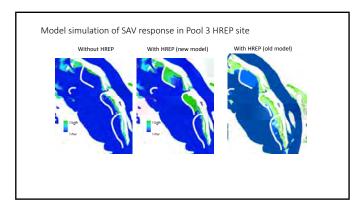
New modeling approach

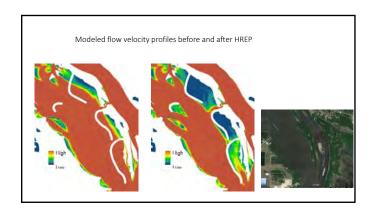
- Parameterization is based on data collected in the Stoddard Bay HREP site and an adjacent pseudo-control area, as compared to the entire Pool 8 in the old approach.
- Local turbidity is modified by flow velocity. A trial modeling with a connectivity indicator that factors in both velocity and travel distance showed some promising potentials but didn't work out eventually.

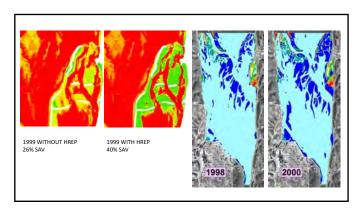




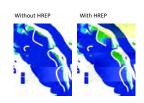








Summary



- 1. The Model predicts significant enhancement of SAV in 2 out of the 4 sites protected by proposed artificial islands;
 2. The smallest island is not creating a significant response.
 3. The lowest (southern) island is predicted to have less significant initial response due to residual (non-zero) flow velocity, However, based on observations at Pool 8. Stoddard Bay HREP, this island still has the potential to create large SAV beds eventually, assuming the initial, limited, SAV response would further reduces local turbidity. But it will take a longer time to develop. Alternatively, the residual flow velocity may not be a factor because at summer low discharges the natural island to the northeast cut off the flow from the main channel.
- island to the northeast cut off the flow from the main channel.

 If faster response and/or higher degree of confidence are desired, then we recommend modify the design to further reduce the flow velocity behind the southern island.





De Jager, N.R. & J.J. Rohweder. 2017. Changes in aquatic vegetation and floodplain land cover in the Upper Mississippi and Illinois rivers (1989–2000–2010). Environ Monit Assess 189:77

Net changes in 13 aquatic and land cover classes quantified using photo interpreted maps of the UMRS from 1989 to 2000 and from 2000 to 2010.

Net decreases in vegetated aquatic area in nearly all river reaches from 1989 to 2000.

Subsequent recovery of vegetated aquatic area in the Illinois River.

Changes in aquatic vegetation occupied between 5 and 20% of the total aquatic area and were likely associated with previously reported regional improvements in water clarity

Upper Minassippi River Restaution

De Jager, N.R. & J.J. Rohweder. 2017. Changes in aquatic vegetation and floodplain land cover in the Upper Mississippi and Illinois rivers (1989-2000-2010). Environ Monit Assess 189:77 Changes on the floodplain dominated by urban development, which increased in nearly every river reach studied from 1989 to 2000. Agricultural lands declined in most river reaches from 2000 to 2010. In the upper UMR, loss of agricultural land cover was accompanied by increases in forest cover In the lower UMR, and Illinois River, declines in agriculture were accompanied by increases in forest and shallow marsh Floodplain changes were relatively minor (1–15% of the total floodplain area) and likely driven by broad-scale socio-Shallow Mersh
Forest
Grass/Forbe
Wet Shrub
Shrub/Scrub
Sand/Mud economic conditions. Upper Minassippi River Restoration

Gibson-Reinemer, Daniel K., Brian S. Ickes, & John H. Chick. 2016. Development and assessment of a new method for combining catch per unit effort data from different fish sampling gears: multigear mean standardization (MGMS). Canadian Journal of Fisheries and Aquatic Sciences 74:8-14

• Fish communities often assessed using multiple gear types in order to adequately sample all species and life stages of fishes.

• Combining data from different sampling gears presents challenges.

• Evaluated 4 methods of combining catch per unit effort (CPUE) from multiple gears.

• MGMs worked best

• Standardized CPUE and Species Max did reasonably well

• Relative abundance not recommended for combining CPUE data across gears

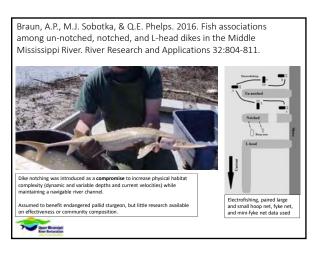
among un-notched, notched, and L-head dikes in the Middle Mississippi River. River Research and Applications 32:804-811.

How do fish communities compare between different dike types?

Notched dike

Notched dike

Braun, A.P., M.J. Sobotka, & Q.E. Phelps. 2016. Fish associations



Braun, A.P., M.J. Sobotka, & Q.E. Phelps. 2016. Fish associations among un-notched, notched, and L-head dikes in the Middle Mississippi River. River Research and Applications 32:804-811.



Conclusions:

*Different fish species respond to dike types in different ways

*L-head dikes appear to support a higher abundance of species adapted to lotic habitats, may approximate natural backwater habitats

*Mapping of physical habitat near dikes needed to better understand effects of dike construction types

Notching a dike



Habitat associations of juvenile silver carp, gizzard shad and emerald shiner

Kevin J. Haupt and Quinton E. Phelps. 2016. Mesohabitat associations in the Mississippi River Basin: a long-term study on the catch rates and physical habitat associations of juvenile silver carp and two native planktivores. Aquatic Invasions 11: 93–99

- Habitat utilization is similar for all three species
 - Occurring over a large spatial scale (UMR, MMR, and Illinois River)
 - This spatial overlap increases potential for interactions to occur (e.g. competition for food)
 - Silver carp are much more efficient at obtaining plankton resources – meaning they can outcompete our native fish for food





Management implications

- Native fishes might experience slower growth rates, lower survival rates and reduced fitness due to habitat overlap and resulting competition with silver carp
- Restoring floodplain connectivity may lead to greater growth rates of natives species while providing little additional benefit to silver carp (Phelps et al. 2014) thus partially counteracting the detrimental competitive effects of silver carp.



Academy of Science 109:57-61.

Levi E. Solomon, Richard M. Pendleton, Robert A. Hrabik, and Andrew F. Casper. 2016. Population Trends and a Distributional Record of Selected Fish Species from the Illinois River Transactions of the Illinois State Academy of Science 109:57-61.

- LTRM has sampled consistently for 23 years using a multi-gear approach in all major strata of the La Grange Reach of the IL. River
- From 1993-2009, zero Shoal Chub, Channel Shiner, or Banded Darter were collected
- Shoal Chub (first collected in 2010) are now common in trawling at the TWZ, peaking in 2014 (n=151; 45.8% of total trawling catch)
- Channel Shiner (first collected in 2012) have now been collected throughout the La Grange Reach, including all strata.



Subsequent collection in 2015 (n=1) at RM 157
 Recent appearance of new species to the LTRM dataset provides additional evidence to support previously presented/published data that describes a changing fish community of the IL River.

Levi E. Solomon, Richard M. Pendleton, Robert A. Hrabik, and Andrew F.

Casper. 2016. Population Trends and a Distributional Record of Selected

Fish Species from the Illinois River Transactions of the Illinois State

 Banded Darter collections in 2013 at RM 92 (n=2) represent distributional records of the species into the Illinois River



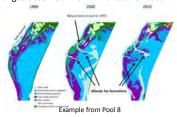


Estimating backwater sedimentation resulting from alluvial fan formation

- PI: Jim Rogala (USGS)
- Why it matters: Backwater sedimentation has long been a major concern in the management and restoration of the UMRS.
- Objective: develop automated methods to determine the frequency and rate of alluvial fan formation in backwaters over a 20-yr period based on changes observed in UMRR landcover data

Expected results:

- GIS land cover data sets identifying areas of potential alluvial fan formation in Pools 4, 8, and 13.
- Partial quantification of rates of such formation where it is occurring.
- Proof of concept/methods developed that can be applied across impounded reaches.



Advancing our understanding of habitat requirements of fish assemblages using multi-species models

- Pls: Kristen Bouska & Brian Gray (USGS)
- Why it matters: Will improve our understanding of how the fish community changes along gradients of environmental variables commonly manipulated by HREPs (e.g., depth, velocity, temperature)

Objectives:

- Develop multi-species models from existing LTRM fisheries data to:
 - 1) identify the dominant responses of the fish community to environmental gradients within each study reach;
 - 2) infer habitat preferences based on environmental responses and life history strategies;

Expected results:

- Measurement of the association between fish species and environmental conditions using LTRM fisheries data
- Better understanding of habitat associations of fish community of the UMRS.



Investigation of metabolism, nutrient processing, and fish community in floodplain water bodies of the Middle Mississippi River

- PI: Molly Sobotka (MDOC—Big Rivers and Wetlands Field Station)
- Why it matters: Structure and function of floodplain water bodies of the MMR are poorly understood.
- Objective: Investigate the effect of hydrologic connectivity of off-channel aquatic areas in the LTRM OR reach on:
 - fish and aquatic invertebrate community structure.
 - · rates of nutrient depletion,
- ecosystem metabolism.

• Expected results:

Better understanding of the differences between floodplain water bodies and the main channel as well as differences among floodplain water bodies that vary in their connectivity to the channel (e.g. time since connection).

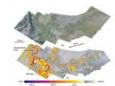
Mapping the thermal landscape of the Upper Mississippi River: A Pilot Study

- PIs: KathiJo Jankowski & Larry Robinson (USGS)
- Why it matters: Water temperature is a master variable that controls physical, chemical and biological processes in rivers.

Questions:

- 1. How does temperature vary spatially across the diverse habitat types of Pool 8?
- the diverse habitat types of Hood 2. How do temporal patterns differ across habitats (e.g., rate of warming in the spring, cooling in the faill? What controls these differences among and within habitat types?

 3. How does connectivity among habitats (e.g., backwater & main channel) influence spatial and temporal patterns in temperature?

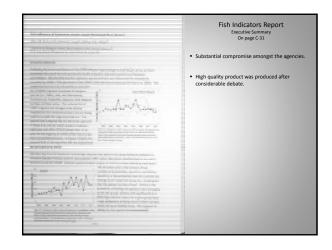


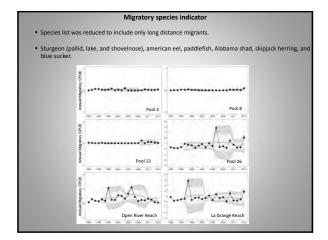
(Image of Upper Middle Fork John Day

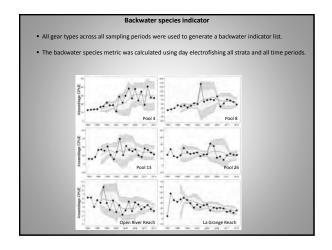
Expected results:

- Better understanding of the link between spatial temperature patterns and other existing spatial data including depth, flow, land cover and vegetation as well as spatially-referenced water quality data.
- High resolution temperature data distributed across the pool will provide information on how and why temperature may vary differently among habitats and help to identify important drivers of these differences

UMRR Analysis Team Agenda January 9, 2017 UMESC Root River Room, Upper Segment D, La Crosse, WI Date: Monday, January 99**, 2017 Time: 12 PM- 430 PM Chair: Shawn Giblin, Wisconsin Department of Natural Resources 1200-1210 PM- Introductions and Roll Call, Shawn Giblin 1210-1215 PM- Time and Place for next meeting- La Crosse, WI (MRRC) April 26**-Chair Change begins July 2017. 1215-1220 PM- Approval of minutes from October meeting (Group) 1220-1235 PM- UMRR update, Mary Hubbell, USACE 1225-1305 PM- HITM Science Update, Jeff House, USGS 1305-1530 PM- Research proposal discussion and vote (Research proposals were ranked and four were selected for funding) 1330-1630 PM- Fish indicators discussion and vote Adjourn







Other Notes

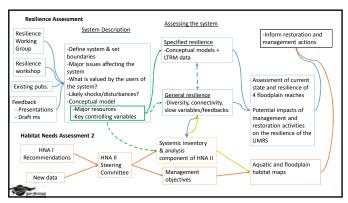
- Five year moving average was used for both migratory and backwater fish indicator metrics.
- The YoY fish metric was tabled for the time being due to issues discovered relating to cutoff size for certain fish species- this can be taken up again at a future date- if desired.

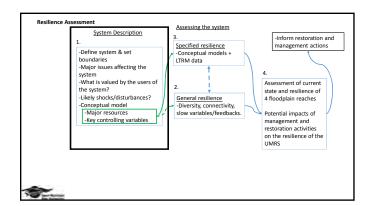
Moving Forward

- Alison Anderson, Andy Casper, Kat McCain and the Analysis Team accomplished the task of revising fish indicators.
- We are asking the UMRR- Coordinating Committee for endorsement of the migratory and backwater fish indicators.
- If endorsed, both indicators will be included in the next Status and Trends report.

Questions?



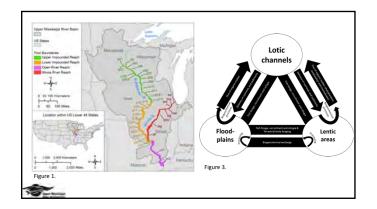


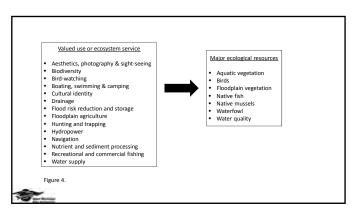


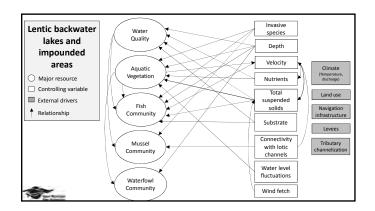
System Description Manuscript

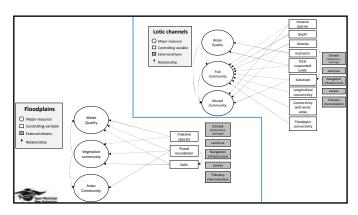
- Purpose
 - Present an agreed upon simplification of the UMRS that clearly identifies the fundamental characteristics of the system.
 - Briefly describe the history of how the UMRS came to be what it is today.
 - Simplify a complex system to its most fundamental controlling variables.
 - Valued uses & ecosystem services
 - Major ecological resources needed to support those uses & services
 - Major controlling variables that affect those major resources
- Bouska, K.L., J.N. Houser, N. R. De Jager. Developing a shared understanding of the Upper Mississippi River: the foundation of a resilience assessment. DRAFT provided as read-ahead.











Next steps: Assessing the resilience of the system

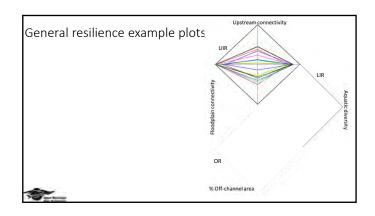
- 1) Develop metrics needed for assessing general resilience of the UMRS.
- 2) Assess specified resilience in the context of conceptual models.

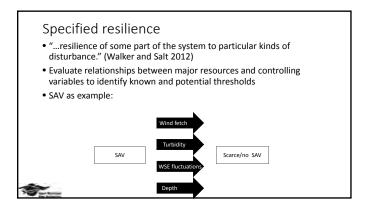
General resilience

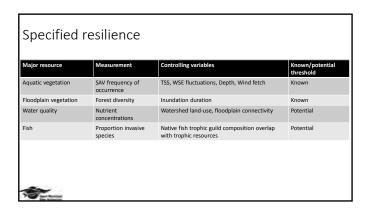
- "—the capacity of a system that allows it to absorb disturbances of all kinds, including novel, unforeseen ones, so that all parts of the system keep functioning as they were" (Walker and Salt 2012)
- To enhance general resilience (Biggs et al. 2015):
 - Maintain diversity and redundancy
 - Manage connectivity
 - Manage and account for slow variables and feedbacks
 - Slow variable: "a variable whose rate of change is slow in relation to the timescales of ecosystem services provision and management, and is therefore often considered constant"
 - Examples: sedimentation, catchment land use, cumulative sediment and nutrient inputs,



General resilience	Example metric	Data	Project (Lead)
Diversity and	Aquatic area diversity	Aquatic areas coverage	HNA II
redundancy	Floodplain vegetation diversity	Land cover	HNA II (De Jager & Rohweder)
	Depth diversity & distribution	Bathymetry	Resilience (Bouska)
	Fish diversity & functional redundancy	Species distribution or abundance data	Resilience (Bouska)
	Aquat. veg diversity	Species distribution or abundance data	Resilience (TBD)
Connectivity	Longitudinal connectivity	% time LD gates open	Resilience (Bouska)
	Lateral connectivity	Levee coverage, 100 yr floodplain	HNA II (Rohweder) or Resilience (Bouska)
	Core forest area	Land cover	HNA II (Rohweder & De Jager)
Slow variables and feedbacks	Water surface elevation fluctuations	USACE gages; USGS gages	Resilience (Bouska)
	Nutrient loads	LTRM	Kreiling and Houser 2016
	BW sediment accumulation rates	J. Rogala 2017 study	Rogala
	TSS concentration	LTRM; LD transparency	Resilience (Bouska)
	TSS load	LTRM	Kreiling and Houser 2016
	Watershed land use	Land cover	Resilience (Bouska)
	Invasive species	LTRM; distribution maps	Resilience (Bouska)







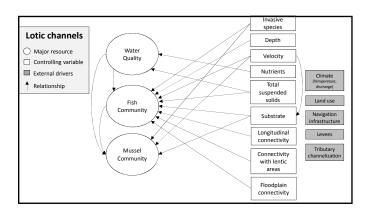
Summary of expected outcomes FY 17 and 18

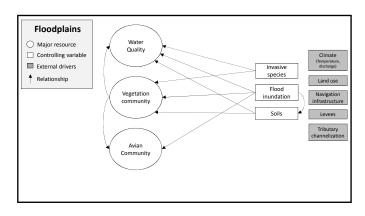
- System description manuscript
 - · Final revision is underway
 - Previous draft provided as a read ahead.
- General resilience manuscript describing what existing data indicate regarding the general ecological resilience of the four floodplain reaches of the UMRS.
- Specified resilience manuscript focused on selected indicators of specified resilience
- Synthesis and management implications -- how to best summarize and present this needs further discussion



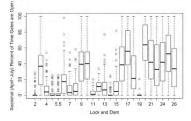
Next meeting

- April 2017 Face to face meeting. Joint meeting with HNA II steering committee.
 - Present initial results of General Resilience Metrics for comment and discussion by the group
 - Include system-wide GIS layers (HNA II) and application to quantifying the general resilience of the UMRS
 - Discussion of related system or reach-wide restoration objectives (HNA II)
 - Additional discussion of candidate Specified Resilience Metrics.



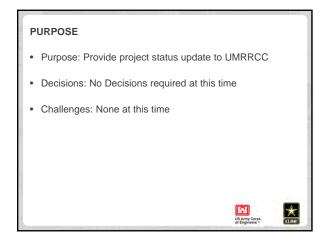


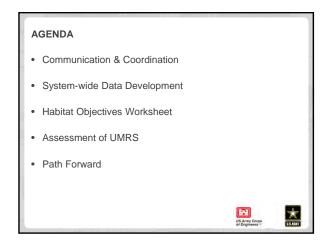
Example: Longitudinal connectivity

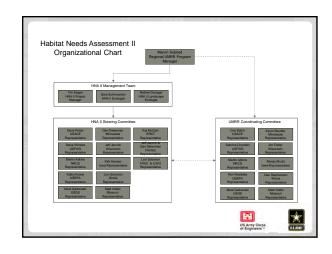


Percent of time the gates at each lock and dam are open between April and July (1959-2015). A few lock and dams are likely barriers to fish movement (LD 19, LD 14, LD 2, possibly others).

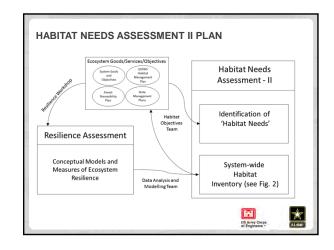




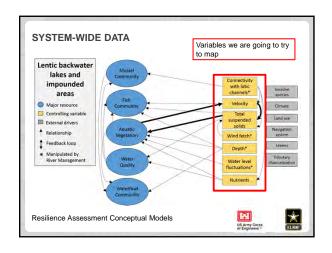


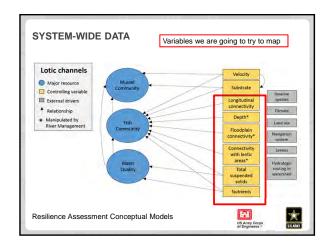


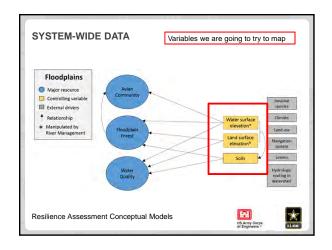












HABITAT OBJECTIVES WORKSHEET

- UMRS objectives foundation for conducting assessment
 - Identifies stressors, goals, and provides direction to initiate an assessment of the data
 - Identifies individuals/workgroups for conducting assessment
- Step 1 (working on this now)
 - Review of 2009 Reach Planning Objectives
 - Confirm, Modify, or Add Objectives/Stressors/Drivers
 - Define scale for HNA II
 - floodplain reach, geomorphic reach, pool, sub-pool





HABITAT OBJECTIVES WORKSHEET

- Step 2 (Spring Meeting -- While reviewing key pool data)
 - Further discussion of objectives and how they can be used to assess the system-wide data
 - Development of Workgroups
 - Workgroups to group and organize objectives





