Attendance:

Matt Vitello
Karen Hagerty
Marv Hubbell
Derek Ingvalson
Kat McCain
Jennie Sauer
Nate De Jager
Dave Bierman
Nick Schlesser
Megan Moore
John Chick
Rob Maher
Jennifer Dieck
Shawn Giblin
KathiJo Jankowski
Jodi Creswell
Jon Hendrickson
Jeff Houser
Kristen Bouska
Dave Herzog
Scott Gritters
Chuck Theiling
Kjetil Henderson

Time and place for next meeting: October 3, 2017 – YMCA Camp Pepin – Joint Meeting with UMRCC Fish Tech.
Proposed having a joint meeting with a UMRCC Tech Group. Fish Tech, Wildlife Tech, and Mussel Tech will be having a combined meeting October 3-5 at YMCA Camp Pepin. Water Quality Tech will have a meeting at Western Illinois University the week of October 23. Nick S. provided details on the Fish Tech Meeting. Team recommended a joint meeting with Fish Tech.

> Due: Matt will send out Doodle to get attendance for Nick.

Approval of April Minutes: Add Rob Maher to attendance list. Approved minutes.

> Q (Megan M.): Standardized Fish Protocol – Is the intention to have the Corps do most of the standardized sampling with HREPs or will Field Stations have a role in some of that standardized sampling?

A (Karen H.): Corps does not usually do the project monitoring, typically project sponsor does monitoring. There is an opportunity for Field Stations to get more involved on a case by case basis. From the PER standpoint Corps will be revisiting how projects are evaluated. Still some issues to be worked through. Corps regs limit Corps cost sharing of monitoring to 10 years (WRDA 2007 Sec. 2039).

UMRR Update (Marv H.): Budget – FY17 began at $20M, through the work plan received plus up by $13.17M to full authorization. For FY18 in the PBUD for full authorization $33.17M, have authority to plan for that amount.

Q (Shawn G.): Will that mean two HREPs moving forward simultaneously?

A (Marv): Yes, for FY17 additional money went into Conway Lake (St. Paul), Clarence Cannon (St. Louis). FY 18 money will concentrate Beaver Island (RI), accelerating construction on Clarence Cannon (St.L). For out-years will need to pick up the pace on planning for projects. St. Louis should be OK with Crains and Harlow, St. Paul will be picking up McGregor.

LTRM Science/Resilience/HNA II (Jeff H.):

LTRM Science:
- DeJager – Reed Canary Grass - published report and set of maps mapping areas invaded by Reed Canary Grass, with funding from Audubon Society. Used 2010 landcover looking at pools 3-10, very few native wet meadows remaining. Also included inventoried forest stands with Reed Canary Grass in the understory.
- WI DNR – Potamogeton crispus – invasive species with typically low biomass midsummer during LTRM sampling, has peak biomass during mid-May (100x greater than mid-July), is underrepresented in LTRM database because of seasonality – report quantified extent

Resilience/HNA May Workshop:
- Detailed meeting summary available in UMRR CC meeting packet
- 3 "Sections" of Workshop –
    o Available data and how it is being used in Resilience Assessment and to develop system-wide inventory/modeling to inform HNA II: Discussed approach to resilience assessment and indicators of general resilience - the role these will serve in the HNA II. Initial look at development and analysis of system-wide data layers that is going into HNA II, what is available, how it is being used, how it can best be used to interact with management decision making.
    o Management objectives in the context of available data and system wide inventory: Review of development of 2009 Reach objectives. Overview of worksheet for HNA II, completed by river teams, derived from 2009 objectives. Linking habitat objectives from various efforts and how all the pieces are connected.
    o How to assess habitat needs based on the information first two parts. Discuss on possible avenues forward to maximize available data and existing objectives. Still some issues to work out

Resilience Assessment Update:

- Final manuscript accepted pending minor final revisions
- Working on additional manuscript built around General Resilience Indicators and feedback received at workshop. Hope to have initial draft before September. Subset of these indicators will be included in HNA II.
- LTRM base monitoring data - Returning to data analyses derived from the conceptual models and LTRM base data to begin looking at specified resilience across the river. Call in mid to late September.

HNA II (Nate D.):

- UMESC has been trying to create datasets that will be useful to inform HNA II. Following the workshop and feedback received, changed direction from data development to begin thinking about the structure of a final report, what should be included and what shouldn't (but would be useful in another phase of restoration planning) – still ongoing. Developing read a-head "proposal" on what from an information standpoint would be important to know from HNA II viewpoint for Steering Committee and River Teams.
- HNA II Report Structure: Introductory Material – context, need for ecosystem restoration, look back at HNA I, look at emerging concepts; Approach and Rationale for HNA II – level of comparability with HNA I, incorporation of new data and technology to improve habitat classifications, understanding UMRS goals and objectives.
- Picking up on where 2009 Reach objectives left off. Reach objectives based on idea of developing an ecosystem health report card (Hartwell et al. 1999) – goals and objectives are driven by society then drilled down to essential ecosystem characteristics to capture a broad range of ecosystem attributes, i.e. taking very broad goals and objectives and expressing them as things that can be measured and quantified. That is done through use of indicators and data used to generate indicators. This effort will allow us to have quantifiable measures to evaluate the UMRR goals and objectives and be aware of where the system is.
- Current Proposed Indicators
    o Connectivity – longitudinal aquatic connectivity, longitudinal terrestrial connectivity, lateral connectivity
    o Diversity – Aquatic area diversity, aquatic vegetation diversity, floodplain vegetation diversity
    o Slow variables and feedbacks – water surface elevation fluctuations, TSS concentrations, sedimentation in off-channel areas, floodplain forest succession
    o Hydrogeomorphic – Lentic functional classes (depth, connectivity, vegetation differences among backwater/impounded areas), Lotic functional classes (structure, depth, connectivity within channel), Floodplain functional classes (outputs from inundation model, duration, frequency, depth)
- Next steps: Finish read-ahead, get feedback from steering committee and river teams, finalize data and information going into HNA II report. Lots of work left to be done.

    Q (Shawn G): Will you be providing read-ahead to full A Team?
    A (Kat M): Steering committee will provide feedback, with their concurrence then will include river teams and the A Team with broader engagement

Q (Karen H): Water level fluctuations, are you looking at seasonal, daily, both?
A (Kristen B): Currently calculated in reference to pre-lock and dam conditions. Have a seasonal and an annual fluctuation over a 7-day period. Have not been able to access pre-lock and dam data on the Illinois – Chuck T suggested Henry, Illinois gage goes back to 1878 and will send to Kristen.

Q (Karen H): Floodplain vegetation diversity – does it include non-forested vegetation?
A (Nate D): Yes, it hasn't been calculated completely yet. Example at workshop was limited. Has all landcover classes available. Did not originally include agricultural areas, but likely will.

Q (Matt V): What is the timeframe for completion of the HNA II?
A (Kat M): Don't have an exact date but as of now planning on Draft report in February 2018. Still need to get direction and approval from Steering committee.

Field Station Science Proposals (Jeff H and Marv H): Had been planning FY17 as $20M program, with plus up to full authority $33.17M program and associated planning changes, by late June there was an understanding of the additional money available for science in FY17. Began looking at options to obligate funds. These proposals we are reviewing came from a specific request sent to field stations to look at what does integration between science and restoration look like, understanding the system more effectively. There are some other things with the additional funding – equipment refresh, ecosystem resilience and health. About $2.5M additional science dollars in FY17. This is outside of our normal process but needed to take advantage of great opportunity with increased funding and to strive to maintain our rate of obligation.

Following request for proposals, held a conference call with Field Station team leaders to discuss proposals. Received a lot of good comments and suggestions during that call, as well as an overall understanding of what is occurring where. Out of that call and understanding was reached that the first four proposals (in read ahead) were developed to a point where they could be funded in FY17, the other three needed some additional work. Proposals are being revised based on that call and finalized proposals will be shared with the UMRR CC.

Q (Rob M.): What are you looking for from A Team?
A (Karen, Jennie): The first four proposals are ready to go pending UMRR CC endorsement. Of the next three – two (YOY and systemic fishes) – we want to move forward, the HREP proposal may move out of research arena into more HREP led arena.
We will be getting revised proposals on the top four. We would like A Team to review for technical aspects – methods, outstanding questions. Need to make technical aspect as strong as possible rather than focusing on ranking.

Q (Shawn G): Is the full $2.5M going into these proposals?

A (Marv): No, there are some other proposals that relate to HNA, to apply those techniques to smaller scales. There are proposals related to Resilience. Discussion about UMESC WQ lab upgrade. And equipment refresh. All the budgets are still in flux, as we start getting more refinement in scopes we will get more refinement in costs.

Proposal 1 – Plankton community dynamics
- Last piece of long term work looking at plankton community in Lake Pepin. Previous samples have looked at phytoplankton and rotifers. This is the last piece to look at crustaceans. This will give us a complete look at plankton community which serves as the base of the food chain. How can this inform Asian Carp data, pre and post invasion? Will be able to use in-kind data collection, software and microscopes.
- Understanding the collective plankton community dynamics particularly as they respond to ecosystem drivers, can help to understand pathways that restoration projects can affect.
- Opportunity to build expertise with the plankton community that could be lost with staff turnover.

Proposal 2 – Water Clarity in Pool 9
- Builds on TSS thresholds and the critical role TSS plays in the pools
- Given long term changes we've seen, looking at available data to understand how much changes to external inputs are driving change versus changes in internal processes. How changes in tributary and upstream inputs have changed relative to what's changing in the pool; changes in pool beyond upstream changes reflect internal biological processes, most likely the effect of vegetation.
- Work can expand beyond Pool 8 to 13, and upper and low 4 to understand contrasts.

Proposal 3 – Estimating submersed aquatic vegetation
- Looking at ways to better estimate vegetation biomass. A method to apply to a relatively large area
- Collected wet mass data and understanding how much additional time and effort is associated with that and understand how that relates to biomass.

Proposal 4 – Smallmouth Buffalo population demographics
- Important part of commercial fish indicator. Also has some overlap with Asian carp and the resources they use.
- Understanding age, recruitment, growth, and mortality by looking at otoliths in order to better understand the various biological rates to understand the various spatial and temporal patterns that are seen in the LTRM data. Refine techniques of processing otoliths to further develop proposal 7.
- Growing interest in doing this type of work for a broader suite of species (Proposal 7)
  Q (Rob M): Curious as to why the focus on smallmouth instead of bigmouth buffalo? Especially with the interaction of Asian Carp, there is a lot more overlap in dietary requirements between bigmouth and Asian carp.
  A (Jennie): Have previous data on smallmouth that is available. Revised proposal explains in more detail the reason for focusing on smallmouth.
  A (Dave B): Upper pools collect more smallmouth buffalo than bigmouth buffalo, so have a better sample size.

(Nick S): Work we've previously done has found that it is incredibly difficult to age smallmouth buffalo. Also we know they have a large amount of movement between pools, so will be difficult to assess effect an HREP has on the species.

Proposal 5: Illinois River HREPs long-term performance

- This proposal will be substantially revised, because of larger effort to look at all HREP management practices.
- There are several managed older HREPs on IL River, all with the objective to establish SAV, all have essentially failed to achieve that and have since changed their management strategies. Take a comprehensive look across those HREPs to understand the management practices and what is working and not.

Proposal 6: Young of Year Fish Indicator

- Outgrowth of review of indicators (Ickes and Hagerty) and broad review of fish indicators. There were substantial concerns on YOY cutoffs that were developed. This proposal will revisit what those lengths could and should be to develop a better YOY Indicator

  Q (Nick S): Is there an intention to do back calculating off of non-YOY fish, or will YOY be targeted at end of growth?

  A (Jeff): Would need to discuss with Andy. Proposal is undergoing revisions, did not have detail on methods.

  Q(Nick S): What kind of methods/standardized protocol do we have for aging in LTRM? There is an opportunity for data-mining from the state agencies to provide expertise.

  A (Jeff): For Proposal 7- That is still being discussed.

Status and Trends Report (Karen H)

2008 S&T Report started in 2004. This was the first time to really focus in on the LTRM data and the first time to pick indicators from the large amount of data we had. After publication the A Team launched an initiative to look at the indicators with the goal of improving them for the next S&T Report. Indicator Report was prepared in 2013 with a series of recommendations (on A Team corner and UMRR Key Documents). The high priority recommendations from the Indicator Report have been completed. This S&T report will include those improved indicators but will also look at Resilience indicators. Those indicators that haven't changed very much over time will be looked at closely. We need to answer exactly what we want this report to look like and what it can do. Current thinking is that this will be a relatively technical report, from which we can develop outreach materials. S&T Report is opportunity to align with UMRR Strategic Plan Vision and demonstrate our understanding of ecosystem health and resilience.

Technical Presentation: Is the Mississippi River Basin: A River Divided or Can We Manage Our Big Rivers as a Migratory Swimway? – Sara Tripp, Missouri Department of Conservation

Historic sampling and tracking on migratory birds helped to define migratory flyways or corridors. The definition of a "flyway" can be expanded to other species with the removal of the word "birds". Fish are known to be migratory and the extent and pathways for that migration is well documented in some species. However, tracking the migrations of fish in our Big Rivers is a significant challenge because of the inability to directly view them and the difficult nature of sampling.The Mississippi River Basin is

often divided into its subbasins, Upper Mississippi, Missouri, Ohio, Lower Mississippi, but should we be viewing it as a holistic migratory swimway for the migratory fish species which inhabitat the system.

To effectively implement management strategies it is necessary to understand spatial and temporal movement patterns. Prior studies have gained information on movement and habitat use using mark recapture techniques. Traditional techniques have included: Fin clips, PIT tags, Coded Wire Tags, and Floy Tags. Tagging techniques have provided some insight but have several potential drawbacks. There is a need for a more broad-scale technique that allows for continuous monitoring.

Emerging techniques that can be used are microchemistry and telemetry. Microchemistry can determine environmental life history of fish using the relationship between water chemistry and the otolith chemistry. Telemetry provides a timeline of fish movement throughout the lifetime of a transmitter. Microchemistry uses naturally occurring chemical markers. Different water bodies carry distinct chemical signatures which imprint on the hard parts (otolith) of a fish as a fish moves through the environment. The environmental life history of a fish can then be reconstructed based on the otolith chemistry with respect to the annuli location. Telemetry uses receivers to track transmitters placed in fish. Current stationary receiver array is deployed from Lock and Dam 19 to Caruthersville, MO – covering 365 miles of the UMR, 150 miles of the LMR, 160 miles of the IL River, and 200 miles of the MO River, as well as some smaller tributaries to those larger rivers. Stationary recievers are attached to Lock structures, bridge piers, navigation buoys. Mobile tracking also occurs. A partnership with the towboat industry has allowed placement of receivers on tow depth finders, so they are continuously tracking on their day-to-day movements throughout the inland waterway system. With the industry partnership and other partnerships with state and federal agencies, universities, etc. the telemetry system covers most of the Mississippi River Basin.

Blue catfish movement – found to be seasonal, majority of movement in fall and spring, downriver in fall, upriver in spring. Individual fish tracked moved up to 400 miles. Over 50% of fish tagged near L&D 26 moved among the subbasins.
Hybrid Striped Bass – majority of movement in spring and fall, predominantly into tributaries. 25% of fish tagged moved among sub basins. Some fish moved over 300 miles from original tagging location.
Sturgeon and Paddlefish – all four species moved among sub basins. Movement is seasonal and appears to be dictated by water level. Some fish moved over 1000 miles.
Using microchemistry technique – able to distinguish among MO River, Middle MS, and Upper MS and track fish life history among these basins.
Asian Carp – no seasonal pattern in movement. Over 1/3 of tagged fish moved among river basins. Were tracked moving over 700 miles

Data from both methods supports migratory swimway and suggests that movement patterns are highly variable among fish, across many political boundaries. To effectively manage/restore populations interjurisdictional management will be necessary. Can we model the migratory bird flyway concept to develop a migratory fish swimway based on observed movement patterns to ensure population ability to maintain itself. For example, paddlefish fisheries regulations vary widely across the basin from no

harvest to commercial harvest with no interjurisdictional management. With paddlefish migratory habits the lack of continuity in regulations makes the more stringent regulations less effective. Also need to consider other stressors – climate change, development, invasive species, etc.

Q (Jennie): Who would lead an effort to begin interjurisdictional management?
A (Sara): Some kind of Federal oversight would need to be part of it, but each state would need to participate. There are models on the coasts which enhance visibility and create opportunities for increased funding.
Nick: Aren't the coastal areas pretty limited, only a few states are participating? This effort would include so many states it would have to be Federally led.
Sara: Yes it would need to be Federally led, but the states would need to agree upon a range of limits, seasons, etc. within which to set own regulations to meet the needs of their constituencies.

Q (Jennie): Has this been done on other species?
A: On the Ohio River there have been efforts for paddlefish and are trying to start with catfish. Arkansas, Tennessee and Mississippi are working on paddlefish. It can be done.

Adjourn