TO: MRRIC SPA Task Group

FROM: Independent Science Advisory Panel (ISAP)

RE: ISAP Thoughts on Lessons Learned from Adaptive Management Programs Review

DATE: 2 December 2013

Based on participation in the Adaptive Management Lessons Learned Webinar and the MRRIC November meeting in Omaha, the ISAP offers the following suggestions to facilitate continued progress in the development of an adaptive management plan. The Panel seeks no formal immediate response to the following discussion. There should be opportunity for further discussion at several points in anticipated engagements.

On the structure and governance of adaptive management

The design and implementation of a governance structure and process for implementing adaptive management should be completed early. A clear governance structure for the MRRMP is not yet evident to us. Because of the compressed 3-year timeline and complexity of the MRRMP, it is important for the decision process leading to its completion be clarified and a description of how components of that process will be produced to transition into an ongoing AM process.

We anticipate that the current Effects Analysis will inform and guide the ACT steps of PrOACT and contribute to a recommended suite of management actions. In the follow-on AM process, a monitoring and assessment program will inform and drive a modified ACT process on a periodic (likely annual) basis, allowing for management actions to be adapted as necessary.

Stakeholder trust in the legitimacy of the MRRMP will be improved if its near- and long-term governance structure and decision rules are articulated early on. An operations plan is required that explicitly describes the governance of the PrOACT process and the transition to the AM process that follows. Such a plan should follow the established steps of AM, i.e., include a clear description of how objective setting, effects analysis, evaluation and implementation of alternative management actions, identifying performance metrics, monitoring, data analysis and archiving, and information transfer relate to each other, how they will be accomplished, and by whom. Equally important is defining trigger points for decisions and articulating the framework on how learning will be used to adjust the program if indicated. Drafts of the Effects Analysis scope, MRRMP implementation plan, MRRIC and ISAP engagement points, and timeline need better harmonizing (and updating). A hard copy organizational chart was handed out near the end of the August MRRIC meeting, but apparently has not been captured in planning documents.

During discussion at the November 2013 SPA/ISAP meeting, the ISAP urged that an adaptive management governance structure be developed concurrently with ongoing technical efforts, including the Effects Analysis. Such concurrent development will better indicate how results of the Effects Analysis can inform needs of the AM process, such as the kinds of data and

information that will be required of the AM monitoring programs for decision making. Establishing the relationships and feedback mechanisms at the outset between data, models, and the decision-making process (i.e., governance) will contribute to eventual success of adaptive management within the MRRMP. It will help stakeholders see logic and transparency in the process.

The Corps has pointed to lessons learned in governance from several AM programs, mostly flow-related AM programs. The Corps should use these, and other AM programs (not necessarily flow-related programs), as sources of ideas, information, structures, and even text as they develop their own AM plans. Quite simply, they should copy and adapt from these where appropriate to achieve MRRMP needs.

Identify research, monitoring, and evaluation needs and define roles as the MRRMP/AM plans are implemented

Current Missouri River Recovery Program research, monitoring, and evaluation efforts will likely undergo substantial revision as a result of the effects analysis and PrOACT processes to meet the needs of the eventual AM plan. Those involved in existing research and monitoring efforts presumably will be engaged by the effects analysis team in collating existing models and data. Many were involved in defining the species objectives and developing the corresponding conceptual ecological models. As new models, decision rules, and data needs are developed, these groups should be actively engaged in the development and implementation of new programmatic data collection and analysis efforts to specifically support the new AM program. These groups can potentially contribute to adapting research, monitoring, and evaluation through workshops, existing sub-basin working groups, and the annual Missouri River Natural Resources Conference and BiOp Forum.

Address data management, analysis, and communication – identify responsible entities

Data accumulated during the Effects Analysis and throughout the AM program will need to be managed, analyzed, and communicated. What group or agency will be responsible for managing those data? What group or agency will be responsible for data analysis and conclusions that will ultimately be used to make future decisions with respect to ongoing management actions? The Corps and FWS can, and should, draw guidance from existing AM Plans – how have other programs dealt with data management? Periodic reports will be needed for summarizing data, model results, analysis, and synthesis relevant first to the EA-PrOACT process, then to the AM process. Additional documentation will be needed to summarize recommendations and/or records of decision, first for the MRRMP NEPA requirements, and later concerning how monitoring results compare to the pre-identified trigger points with regard to management actions, future data collection, and research. Data management and analysis plans should be developed concurrently with the design of an AM governance structure.

A further quest for lessons learned

As the panel conveyed during the most recent Webinar and in informal exchanges at the November MRRIC meeting in Omaha, there is a rich slate of ongoing adaptive management

efforts and past experiences from which the MRRMP can draw guidance. The geographic scale of the MRRP and the diverse uses of the river make the program unique in its ambitions, but there are now several large-scale efforts, some entering or well into a second decade of implementation. A number of those programs have been reviewed, in scientific journals and by the National Research Council (see examples annotated in list below). We urge all involved to continue learning from these experiences as an integral part of ongoing activities, and to adapt that learning (i.e., plagiarize and adapt it as appropriate) into the evolving MRRMP process.

There may also be a local learning opportunity to further exploit. Identifying trigger points for the existing ESH AM program could serve as a learning experience for eventual future MRRMP adaptive management. A functional, although not formally defined trigger point recently occurred following the flood of 2011, and the 2012 Annual Report on ESH recognized the need to switch from habitat creation to management of sandbar habitat created by the high flows. The report made a number of recommendations to capitalize on opportunities to enhance newly created habitat, and conduct research on activities that might slow the rate of degradation of sandbar habitat. These recommendations sounded quite reasonable and represent the spirit of AM and the need to take advantage of rare natural events when they occur. Has the management focus on the river been changed in response to these recommendations? What was the decision process? Can we learn from what has been done (or not done) in this situation in planning a future organizational or governance structure and decision process? We urge further review of this experience for ideas that may guide the AM approach in the future. That is, it may be useful to articulate and specify how those decisions were made in order to understand what the current "default" governance structure is, and what changes may or may not be needed when moving to a more formalized AM program.

SPA as the communications link on technical matters with MRRIC and the lead agencies

It is difficult to have all MRRIC members fully engaged and knowledgeable about all aspects of the MRRMP process. Therefore, it is important that the SPA (or, perhaps another entity) assumes the role of communicator to MRRIC on scientific issues in the MRRMP and AM processes as they move forward. The ISAP acknowledges that its direct communications with MRRIC are limited, and not adequate to convey the full scope and breadth of scientific endeavors behind the process. The ISAP commits to continuing interaction with the SPA, as needed, so that it feels comfortable with the scientific quality of the process and can communicate that comfort level to MRRIC as the process moves forward. It will be crucial that all stakeholders have confidence in the assumptions and the techniques behind the adaptive management process as it moves toward decision points.

The ISAP is enthused with progress of the past six months, and looks forward to continued engagement in transitioning the Effects Analysis into the ACT process and eventual Adaptive Management process for the MRRP.

Examples of Adaptive Management for Further Learning

Program Specific:

King, A. J., K. A. Ward, P. O'Connor, D. Green, Z. Tonkin, and J. Mahoney. 2010. Adaptive management of an environmental watering event to enhance native fish spawning and recruitment. Freshwater Biology 55:17-31.

Describes the adaptive management approach employed during the delivery of the 2005 Environmental Water Allocations, Barmah-Millewa Forest wetlands in the Murray-Darling Basin which successfully achieved multiple ecological goals including enhanced native fish spawning and recruitment.

Pearsall, S. H., B. J. McCrodden, and P. A. Townsend. 2006. Adaptive management of flows in the Lower Roanoke River, North Carolina, USA. Environmental Management 36:353-367.

Introduces the lower Roanoke River, describes the regulatory context for negotiating towards an active adaptive management program, presents conservation objective for bottomland hardwoods, and describes investigations for successfully employing a series of models to develop testable management hypotheses. Proposes adaptive management strategies that will enable the bottomland hardwoods to regenerate and support their associated biota and that are reasonable, flexible, and economically sustainable.

Smith, C. B. 2011. Adaptive management on the central Platte River - Science, engineering and decision analysis to assist in the recovery of four species. Journal of Environmental Management 92:1414-1419.

Overview of Platte River Recovery Implementation Program, also see https://www.platteriverprogram.org/Pages/default.aspx.

Susskind, L., E. C. A, and T. Schenk. 2012. A critical assessment of collaborative adaptive management in practice. Journal of Applied Ecology 49:47-51.

Examines the Glen Canyon Dam Adaptive Management Program (AMP) in the United States, and other CAM efforts, to illustrate why and how procedural shortcomings may lead to natural resource management failures and reflect on how they may be overcome.

U.S. Army Corps of Engineers. 2006. Adaptive Environmental Management for the Columbia River Channel Improvement Project. Overview of AM plan, team workbook, annual reports, quarterly meetings. http://www.nwp.usace.army.mil/Missions/Environment/AEM.aspx.

Useful AM Reviews:

Doyle, M., and C. A. Drew, editors. 2008. Large-scale ecosystem restoration: five case studies from the United States. Island Press, Washington, D.C.

In-depth reviews of the Everglades, Platte River, CA-Bay Delta, Chesapeake Bay, and the Upper MS, all which have AM components.

Greig, L. A., D. R. Marmorek, C. Murray, and D. C. E. Robinson. 2013. Insight into enabling adaptive management. *Ecology and Society* 18(3): 24. http://dx.doi.org/10.5751/ES-05686-180324
Comparisons across multiple adaptive management trials in the forest sector provides insight into factors that enable or inhibit adaptive management. Provides insights into a hierarchy of ten factors that can serve to either enable or inhibit implementation.

McFadden, J. E., T. L. Hiller, and A. J. Tyre. 2011. Evaluating the efficacy of adaptive management approaches: is there a formula for success? Journal of Environmental Management 92:1354-1359.

Identified components of successful adaptive management plans. Defined a scale of degrees of success to make comparisons between the two major adaptive management schools of thought.

National Research Council. 2004. Adaptive management for water resource project planning. The National Academies Press, Washington, DC.

Reviews some of the Corps' initial efforts in implementing adaptive management principles, most of which were initiated during the mid-1990s. Case studies include the Florida Everglades, the Missouri River Dam and Reservoir System, the Upper Mississippi River, and coastal Louisiana. A case study of the Adaptive Management Program at the Glen Canyon Dam and Colorado River ecosystem, in which the Corps is not involved, is included for comparative purposes. Lessons from experiences in this breadth of settings may reveal general principles regarding potential barriers, useful management actions, or inter-agency relations that merit consideration in establishing and managing adaptive management programs.

Westgate, M. J., G. E. Likens, and D. B. Lindenmayer. 2013. Adaptive management of biological systems: A review. Biological Conservation 158:128-139.

A structured review of the AM literature that relates to biodiversity and ecosystem management, showing how rare are robust AM projects with recommendations for improvements. Good source of literature on AM projects.