COOPERATIVE ECOSYSTEM STUDIES UNITS
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CESU Final Report Summary for

Side Channels of the Impounded and Middle Mississippi River: Opportunities and Challenges to Maximize Restoration Potential -
W912HZ-11-2-0009

Purpose: The preferred method for conducting large-scale ecosystem restoration is Adaptive Environmental Assessment and Management. AEAM involves a systematic approach to understanding environmental and biological dynamics (change) resulting from outcomes of a set of management policies and practices. A scoping meeting to organize a workshop to create a new vision document was held in Cape Girardeau, MO on 20-21 January 2010. The report covers this workshop, and a follow up workshop held in Cape Girardeau, Mo from 9-13 January of 2011. The goal of the second workshop was to develop a comprehensive conceptual model (supplemented by a decision-tree) of potential side channel functions, processes, and structures that would allow them to maximally contribute to Mississippi River restoration consistent with the system-wide goals and objectives of the UMRS.

Location: Upper Mississippi River.

Methods: Conduct 2 interagency and interdisciplinary workshops to prepare a vision for ecosystem restoration on the Upper Mississippi River. Workshop attendees were given:
1) Historical context of the workshop culminating in a concise list of goals, objectives, and desired outcomes at reach and system scales; 2) A general description of the Middle Mississippi River; 3) The restoration and management perspective of both the Corps of Engineers and the Missouri Department of Conservation, and 4) A primer on conceptual model building.

Results: Break out groups were established to address different topics. Group A covered a functional unit inventory and gap analysis and implementing a FUIGA synthesis. Examples of how data collected under FUIGA could supplement AEAM include: sequential mapping to describe change dynamics, creation of multiple reference conditions to understand the system at different levels of basin and channel modification, inventory different habitat categories over time to help explain population dynamics of individual species, infer the size and distribution of different functional process zones as a function of hydrologic patterns that together offer insight into the system dynamics of the MMR, and analyze this inventory to identify missing or heavily impacted functional process zones in the present river. This "inventory and analysis" phase is the first step in developing a unique planning tool for the MMR that can be made quantitative. Group B addressed Integrating Ecosystem Process, Function, and Essential Characteristics. The recognition that ecosystem process is important in addition to ecosystem function is critical for the learning phase of AEAM. Restricting AEAM focus primarily to function, recognizing that functions are typically associated with natural (water quality) or living resource

(sport fishes) categories, will work only if a management action is successful. If a management action is unsuccessful, then function monitoring by itself will likely not inform the next round of decision-making because all that will be learned is that the management action did not work. Process level information is needed to understand why a particular management action if not successful and to redirect management action in a more positive direction. Group C covered "Influence Effects" Generalized Conceptual Model. The combined products from Breakout Groups A and B led to an integrated, hierarchical framework that spanned fine-scale ecological process description to system-scale assessment of ecological function. Breakout Group C developed a more conventional conceptual model that organized technical elements of side channel restoration into a framework and therefore provided a structure that could contextualize the products of Breakout Groups A and B. While scale was not explicit in the formulation, it is clear that the Group C CM could be applied at a wide range of spatial and temporal scales. It is useful to be aware of different CMs and their relative strengths and weaknesses, but that over reliance on a cook-book CM would probably interfere with efficient planning rather than be conducive to efficient planning. Together, the integrated three CMs create an overall framework to allow planners to move sequentially through a hierarchy of spatial scales from the system-level at the largest scale down to the functional unit at the smallest hierarchical scale. The framework can be used for multiple purposes: to assess existing conditions, to determine opportunities for restoration, and to employ the reference condition concept to prioritize alternative management actions. Moreover, the framework is generally consistent with the water resources decision-making process. Additional recommendations for future work are provided.
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