

Priority Guidelines for Reclamation Large Wood Research Proposals

Written by Jennifer Bountry, Connie Svoboda, Michael Sixta, Kendra Russell, and Sean Kimbrel for the Reclamation Science and Technology Program

Technical Service Center, Bureau of Reclamation

September 2012

In May 2011 an interagency workshop was held with the two largest federal water management agencies, Reclamation and the U.S. Army Corps of Engineers (USACE), to discuss opportunities to improve collaboration in the broad and complex field of river restoration. The river restoration workshop participants recommended a follow-up workgroup be convened to discuss the current state of practice and research needs for the use of large wood in river restoration projects. A large wood research workshop was held in Seattle, Washington from February 14-16, 2012. Participants were invited who currently are researching, designing, and/or implementing large wood roles and placement in river restoration projects. The goal of the Large Wood Workshop (Workshop) was to provide an opportunity for individuals and agencies actively working in the engineered placement of large wood to collectively develop a road map for future large wood research needs and priorities. Funding for the workshop was provided by the Research and Development Office of Reclamation with in-kind support from USACE staff and USACE ERDC's Ecosystem Management and Restoration Research Program. A report documenting discussions and large wood research ideas was completed (Reclamation and U.S. Army Corps of Engineers, June 2012, Large Wood Research Workshop Summary Report, Report Number: SRH-2012-20).

Following the completion of the workshop report, the Science and Technology Program requested a tailored roadmap of large wood research concepts specific to Reclamation to help with analysis of future research proposals in this area of river restoration. This report documents the roadmap components. Research is defined for this document as a hypothesis-driven approach that includes testing of defined variables with the objective of improving understanding of large wood roles and processes in riverine environments so better tool sets can be developed.

Research ideas listed in the roadmap were generated from the outcome of the February 2012 research workshop. The research concepts were then prioritized based on criteria intended to focus on Reclamation's recent technical and management roles in large wood river restoration projects. During discussions on the workshop outcome, research that would contribute to assessing risk and safety were identified as a high priority by Reclamation managers working with large wood design projects. Table 1 summarizes the criteria utilized to categorize the research ideas into high, medium, and low priority groups based on technical merit, collaboration opportunities, and relevance to risk and safety. The remaining portion of the document provides a list of research ideas sorted into each priority group.

Table 1. Criteria used to categorize large wood research priorities.

Category	Technical Merit <i>Proposed research is a critical step commonly used in standard of practice design, analysis, or monitoring</i>	Collaboration Opportunity <i>Partnerships with academia, agencies, etc</i>	Risk and Safety <i>Technical evaluation of liability associated with constructed features</i>
High Research Level	Poor surrogate tools are available and there is an immediate need to address a major data gap in the field of large wood design, analysis, or monitoring protocols	Known opportunity exists to work with technical partners already working on identified data gap	Research topic addresses safety and/or risk of constructed wood features and would help inform whether to implement a large wood project
Medium Research Level	Reasonable surrogate tools available for technical method but lacking specific data for large wood	Potential opportunity exists to work with technical partners but haven't started research	Proposed research does not address safety or risk
Low Research Level	Not a critical technique currently utilized but may benefit design, analysis, or monitoring in the future	Collaboration opportunities not yet identified; good candidate for scoping level proposal	Proposed research does not address safety or risk

High Priority Research Ideas

Develop technical guidelines for design, implementation/construction, and monitoring of constructed wood features *e.g. broad compilation of existing tools and methods or development of a new technical method that could be separately published or incorporated into a broader guideline*

Communicate the value of large wood and risks *e.g. education and outreach with stakeholders and the public; sharing lessons learned among agencies loading*

Develop tools to evaluate liability of wood-based restoration projects *e.g. risk of potential consequences from constructed wood features to adjacent property, downstream infrastructure, and public safety such as boating and recreational river use*

Conduct detailed performance assessments of constructed wood projects through field demonstrations to resolve outstanding technical data gaps *e.g. flume/numerical/field comparison study, long term monitoring efforts, instrument large wood with sensors, data collection techniques around large wood loading*

Design criteria to make safer structures and avoid failure *e.g. stability analysis, how porosity affects safety; long-term wood loading*

Develop more refined or robust techniques to represent large wood in numerical models

Develop techniques to model linkages between biologic benefit/use and hydraulics *e.g. habitat suitability, index of biological integrity, limiting factor analysis tools*

Develop a benefits/effects assessment tool of constructed wood features

Develop tools to evaluate interactions among multiple wood structures

Technical guidance on predicting scour and deposition resulting from constructed large wood features

Medium Priority Research Ideas

Scalable Success Metrics

e.g. development of quantitative methods to define success, definition of typical objectives used during project development

Development of large wood monitoring plans

e.g., development of decision frameworks and standard monitoring protocols, or development of monitoring tools

Better understanding of role and density of wood in undisturbed or historical settings as a guide for design

Methods to develop regional relationships between discharge, sediment, and large wood loads for design and implementation of large wood

Utilize low-risk environments to evaluate alternate wood construction methods *e.g. anchoring versus loose wood construction; member number and orientation*

Prediction of large wood structure evolution/recruitment *e.g. expected lifespan; when will project be self-sustaining*

Better understanding of large wood and floodplain interaction *e.g. better surrogates and tools for use in a modeling framework; effect of constructed features on side channel connectivity and evolution*

Efficacy of passive and assisted wood placement techniques *e.g. estimate wood loadings and monitor deposition & recruitment in natural systems and compare to recruitment of engineered structures to help with constructed design strategies.*

Low Priority Research Ideas

Centralized Project Database

e.g. compilation of technical data from completed projects

Training Tools for Regulators

e.g. technical guidance to assist with implementation and monitoring strategies

Incorporate Climate Change Predictions

e.g. use existing climate change tools in hydrologic component and sensitivity analysis of design process