

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Phase I Restoration Design, Implementation, and Effectiveness Monitoring: Upper Colorado River, Rocky Mountain National Park

Discipline: Natural
Type of Project: Technical Assistance/Research
Funding Agency: National Park Service
Cooperators: Colorado State University
Student Involvement: yes, graduate student and undergraduate field assistant
Effective Dates: 05/2015- 12/31/2018
Funding Amount: \$57,787

Investigators and Agency Representatives:

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Project Abstract: A breach in Grand Ditch in May 2003 initiated a debris flow that caused extensive damage to the Upper Colorado River and its tributaries in Rocky Mountain National Park (RMNP). The approximately 36,000 m³ of sediment mobilized by the debris flow heavily impacted channel, riparian, and wetland areas. In preparation for restoration, a Final Environmental Impact Statement (FEIS) was completed and a Record of Decision signed in summer 2013. Restoration designs to restore hydrologic processes, ecologic function and wilderness character of the impacted zones were developed in fall 2014 (Rathburn and Cooper, 2014a) and subjected to an independent review by experts with restoration experience. A restoration design review workshop was held in Sept. 2014 to discuss the restoration designs. Workshop outcomes include the recommendation to redirect the flow of the Colorado River into its historic channel through the center of the Lulu City wetland. The river had previously been directed to the west side of the wetland by alluvial fan deposition resulting from multiple historic debris flows. The work to redirect the flow of the river would be completed by hand in September or October of 2015, and is herein referred to as Phase I Restoration (Rathburn and Cooper, 2014b). This plan outlines the work proposed for Phase I only.

Objectives of the Phase I Restoration include assessing whether reconnecting the Colorado River through the center of the wetland will: 1) enhance channel-floodplain connectivity within the Lulu City wetland, 2) drain overly wetted regions of the floodplain within the wetland, and 3) transport fine sediment into and through the wetland. In addition, baseline data collection along Lulu Creek will be conducted to 1) assess unconsolidated fine sediment storage in berms and bars along Lulu Creek to quantify the sediment threat to downstream areas, and 2) map wood jams along Lulu Creek that are unstable and prone to breach causing channel avulsions and mobilization of large amounts of fine sediment.

This Phase I Restoration Plan is being submitted as part of a US Army Corps of Engineers Nationwide Permit 27 Pre-Construction Notification. The data collected during Phase I will inform Phase II of restoration. Phase II of restoration may include removal of additional 2003-breach related sediment from the Lulu City wetland, and revegetation with tall willow (*Salix drummondiana* and *S. monticola*). A new restoration plan for Phase II will be submitted in late 2016 as part of a subsequent Nationwide Permit. This project will help to assure the success of the restoration implemented allowing for increased visitor enjoyment and wilderness experience

Outcomes with Completion Dates: A timeline of May 2014 - May 2016 is proposed, with a Masters student in the Department of Geosciences at Colorado State University completing two field seasons within the study site. One Master's thesis within Geosciences at CSU will result from this project.

Keywords: restoration monitoring, Upper Colorado River, Rocky Mountain National Park, Colorado State University