

I. Project Title: Suspended Sediment Monitoring in the Upper Green River

II. Bureau of Reclamation Agreement Number(s): R17PG0047

Project/Grant Period: Start date (Mo/Day/Yr): 10/1/2016
End date: (Mo/Day/Yr): 9/30/2021
Reporting period end date: 9/30/2021
Is this the final report? Yes _____ No X

III. Principal Investigator(s):

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IV. Abstract:

The purpose of this project is to collect suspended sediment data that will help the Program better understand geomorphic processes that form and maintain habitats important to Colorado pikeminnow and razorback suckers in the Green River, including connected backwaters, side channels, and flooded bottomlands.

On the Green River, the Recovery Program is interested in: (1) describing and quantifying the existing sediment equilibrium conditions (or range of equilibrium conditions) as a function of the magnitude and timing of inputs of sediment and water; and (2) understanding if/how sediment balance/imbalance propagate downstream. This requires developing a sediment mass balance as a function of historical and existing flows, and determining the annual flow volume and nature of streamflows required to transport sediment delivered to these river reaches. This in turn requires a robust sediment monitoring campaign using continuous measurements at high temporal resolution, such that the sediment evacuation/accumulation can be measured independently without relying on inherently inaccurate sediment rating curves.

For this purpose, this project collects high-resolution suspended-sediment data using multi-frequency acoustics at USGS gages on the Green River at Jensen, Ouray, Mineral Bottom, and on the Colorado River at Potash. Among other things, the study will determine whether the reach between Jensen and Ouray is gaining or losing sediment, and whether those trends are driven by a reduction or increase in sediment supply, or changes in the in-channel sediment characteristics.

V. Study Schedule:

Collection of acoustic monitoring data for this project began at both Green River sites in 2017, as described below under “Accomplishments”. These sites will continue to be visited by field staff multiple times each year through FY 2021 for equipment maintenance, collection of suspended-sediment samples for the calibration and verification of acoustic data, and for tracking bedform migration to estimate the bedload component of total sediment transport.

VI. Relationship to RIPRAP:

General Recovery Program Support Action Plan I. Provide and Protect Instream Flows

VII. Accomplishment of FY 2017 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

In FY 2017, a 15-minute, two-frequency acoustic-sediment-transport monitoring station was installed upstream from the USGS gage Green River at Ouray, Utah (#09272400). The same instrumentation already had been installed near the Green River at Jensen, Utah gage (#09261000). Beginning with that installation on March 25, 2017, acoustical data were recorded without interruption at both gage locations at 15-minute intervals throughout the remainder of FY 2017.

Both sites were visited multiple times during 4 separate trips in FY 2017 for operation and maintenance purposes, including visits to collect suspended-sediment samples used for calibration and verification of the acoustic sampler data, and tracking of bedform migration for estimating the bedload component of sediment transport.

Results suggest that slight erosion of sand occurred in the Jensen-to-Ouray reach of the Green River during the higher river flows released from Flaming Gorge Dam this year.

The 15-minute-interval sediment transport data for the two stations on the Green River have been uploaded to the https://www.gcmrc.gov/discharge_qw_sediment/ website, and will be updated quarterly. On-demand user-interactive sediment budgets for the Jensen-Ouray reach will be available at this website before January 2018.

VIII. Additional noteworthy observations:

The abnormal sustained high releases from Flaming Gorge Dam followed by an unnaturally fast recession this year resulted in large, high-elevation sandbars near the Ouray sediment station. One large sandbar adversely affected the acoustical data after mid July. The river is slowly eroding this sandbar, which should allow for better data collection during 2018. Deposition of these sandbars caused simplification of the post-recession river. After July, the Green River near the Ouray sediment station was a single-thread river that meandered around these sandbars. In contrast, following the 2016 snowmelt flood, the Green River near the Ouray sediment station was a more complicated multi-thalweg river without such high-elevation sandbars.

IX. Recommendations: Continue this data collection work as described in the current work plan.

X. Project Status: Ongoing

XI. FY 2017 Budget Status

A. Funds provided:	\$66,037
B. Funds expended:	<u>\$54,021</u>
C. Difference:	\$12,016 (To be carried-over into FY18)

XII. Status of Data Submission (Where applicable): N/A

XIII. Signed: David Topping 11/13/2017
Principal Investigator Date