

**FY-2008 2009 PROPOSED SCOPE OF WORK for:**

**Project #: 8b**

Operation and Maintenance of a Sediment Monitoring Station on the Duchesne River

Lead Agency: Central Utah Water Conservancy District.

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Category:

- Ongoing project
- Ongoing-revised project
- Requested new project
- Unsolicited proposal

Expected Funding Source:

- Annual funds
- Capital funds
- O&M funds
- Other

I. Title of Proposal: Operation and Maintenance of a Sediment Monitoring Station on the Duchesne River.

II. Relationship to RIPRAP:

**Duchesne River Action Plan**

Task #                      Task Description

I.F.1. Conduct additional gaging ( in this case sediment monitoring)

III. Study Background/Rationale and Hypotheses:

The recently developed flow recommendations for the Duchesne River rely on the provision of high spring flows to scour and rework the river channel to provide and maintain in channel habitat conditions. Several uncertainties exist regarding development of high flow recommendations (Gaeuman et al 2003). Of the 136 measurements of suspended sediment concentration used to develop the rating relations, only two were taken at discharges greater than the 1.5-year flood (1840 cfs). Therefore, "significant uncertainty exists regarding the accuracy of the ratings relations for high discharges when a disproportionately large quantity of sediment is transported." Alternative methods of estimating the average suspended sediment flux in the lower Duchesne River suggest that estimates derived from the rating relations may be low. The estimated average annual suspended sediment load for the lower Duchesne River, as determined from suspended sediment concentration measurements at the Randlett gage, is at least four-fold less than

other estimates (see Gaeuman et al. 2003). The only measurements of suspended sediment concentration at discharges greater than the 1.5-year flood discharge were made on June 2, 1986 and June 22, 1983 when discharges were 9,000 cfs on the rising limb of the annual hydrograph and 11,020 cfs on the falling limb, respectively. The concentrations measured on these two dates were 1,150 mg/L in 1986 and 322 mg/L in 1983. Typical suspended sediment concentrations at high discharges may be much larger than the values obtained by Gaeuman et al. (2003). If so, these curves may significantly underestimate the quantity of sediment transported by infrequent high discharge events or during particularly wet years. Gaeuman et al. (2003) suggest that an extended sampling program to monitor suspended sediment concentrations in the lower Duchesne River during peak flow events may be required to resolve this issue.

To address these issues in other basins the Recovery Program has implemented a program of installing automatic sediment samplers to determine the timing and composition of sediment movement. To address the uncertainty associated with flow recommendations for the Duchesne River, the Recovery Program believes it would be beneficial to install an automatic sediment sampler at the new Randlett gage site.

#### Study Goals, Objectives, End Products:

Provide a basis for refining the peak flow recommendations for the important stream reaches of the Duchesne River.

Provide a benchmark for future sediment monitoring.

Provide basic information for sediment modeling if needed for the Duchesne River.

#### V. Description of Past Performance:

The Central Utah Water Conservancy District has a long record of working cooperatively with the Recovery Program and the U.S. Geological Survey on projects of mutual interest and benefit.

#### VI. Study Area:

Duchesne River.

#### VII. Study Methods/Approach:

Based upon a site visit to the area near the confluence of the Duchesne and Uinta rivers to determine the feasibility of producing a sediment record at the Duchesne River NR Randlett (09302000) gaging station, it appears a manned cableway will be needed at this site. Without a manned cableway collection of cross-sectional sediment samples during high flows would be impossible. To address this problem USGS proposes to install a manned cableway from which samples can be collected. In order to determine the daily suspended-sediment load for the site, a combination of samples from the automated

suspended sediment sampler and cross-sectional samples taken from the cableway will be collected. The automated suspended sediment samples define suspended-sediment concentrations at one location in the stream cross section; cross-sectional samples define the average concentration of the entire cross section. Use of both samples in conjunction, allows for a relation to be defined between the pump-sample values and the cross-sectional sample values. These relationships will be then used to build sediment transport equations which can be used to fine tune the flow recommendations if needed.

VIII. Task Description and Schedule:

1. Spring-Summer 2008 - Collect daily samples on the Duchesne River near Randlett Rivers. Daily samples will be during spring runoff, approx 100 days worth. Collect six cross-sectional sediment samples at the Randlett gage using the manned cableway.
3. Spring runoff 2008 - Operate sediment sampler and maintain the equipment and produce a suspended sediment record at all three sites.
4. Summer, fall 2008 - Analyze sampler data and determine if the point sediment concentration at the downstream site is correlated to the cross-sectional samples collected at the upstream sites.
5. November 2008 Provide narrative annual report to the Recovery Program.

IX Study Schedule: The sediment sampler will be operated for three months during spring the high flow on the Duchesne River. These months are typically May, June and July.

**2008 Budget**

Salary (GS-11) Hydro Tech - gage operation/sample collection/record development	\$3,270
Salary (GS-11) Hydro Tech - gage installation assistance/sample collection assistance	\$1,870
Supplies/Materials - Sample bottles/sampler shelter/hoses/coolers	\$1,430
Vehicle - GSA vehicle 2400 miles + charges	\$ 858
Sample shipment	\$ 730
Sediment Analysis(178 samples @ \$25)	\$4,460

Travel to field location for sampler installation/gage maintenance/sample collection (10 nights)	\$500
Science Support and Project Management/Computer Support and Information Management	\$2,970
Science Center Overhead	\$2,700
Bureau Overhead	\$1,210
Total	\$20,000
Recovery Program share	\$20,000*.60 = \$12,000

XI. 2009 Tasks and Budget The USGS will summarize the data and provide the Recovery program with a “Fiscal year 2008, was the third year of data collection, in 2009 the USGS will prepare a Digital-Data/Data Series Report (data report) with tables containing available daily mean suspended-sediment load and concentration, concentration and particle-size data from periodic and point suspended-sediment samples, as well as bed-material size information.

2009 Budget \$ TBD

XII Reviewers: Water Acquisition Committee

XIII References:

Gaeuman, D.A., P.R. Wilcock, and J.C. Schmidt. 2003. A recommendation for channel Maintenance flows for the lower Duchesne River between Randlett and Ouray, Utah, Based on geomorphic analyses. Draft Final Report, Project No. 84-4, Submitted to the Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.