

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022 ANNUAL REPORT

PROJECT: 8

Project Title

Basin-Wide Stream Gage Operation & Maintenance

Bureau of Reclamation Agreement Numbers:

R16PG00077 Colorado USGS Contract	End date: 09/30/25
R16PG00079 Utah USGS Contract	End date: 09/30/26
R12AP40009 State of Colorado	End date: 09/30/23

Project/Grant Period:

Start date: 1990

End date: As indicated above for each contract

Reporting period end date: 9/30/2022

Is this the final report? Yes _____ No X

Principal Investigator:

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Abstract:

The Upper Colorado River Recovery Program employs the nation's streamflow measurement expert, the U.S. Geological Survey, to provide data to assist in measuring and protecting streamflow for endangered fishes and other Program partner purposes. It also engages the Colorado State Engineer's Office to measure one streamflow site in the Yampa River basin on a seasonal basis.

The USGS operates and maintains the gages as specified in their Cooperative Agreement with the Bureau of Reclamation. A complete inventory of these sites and the entities supporting operation and maintenance of those sites is provided in the attached table. USGS measures daily streamflows and in many cases other data such as temperature, dissolved oxygen, turbidity, pH,... which are checked and posted to the internet. USGS near real-time data are available as provisional data at: [USGS | National Water Dashboard](#).

River runoff in Water Year 2022 for most subbasins in the Upper Colorado basin was generally between 60-80 percent of average April – July runoff, though peak Snow Water Equivalent (SWE) were between 80-100 of the 30-year average. Late summer and fall in 2021 did provide some relief from the exceptionally poor antecedent soil moisture during the 2021 runoff season, but U.S. Drought Monitor maps from Nov. 2, 2021 showed over 80 percent of the watershed in severe through exceptional drought (D2-D4), and over 40 percent in extreme or exceptional drought (D3-D4), suggesting that the monsoons had limited effect basin-wide on soil moisture storage. Snowfall and SWE in WY 2022 relative to long-term median or average SWE was well above average near January 1, 2022, then a long period of high pressure and limited snowfall reduced peak SWE to below average in most of the basin. As noted above, the result was April-July runoff that was well below median and average values, with the unregulated inflow to Lake Powell at only 59 percent of the 30-year median.

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Real-time USGS streamflow data from multiple gages throughout the basin were used daily during the irrigation season to help managers understand flow conditions, operate reservoirs, and administer water to benefit fish habitat while meeting other management and delivery needs. The need for real-time streamflow gaging is highlighted in the Yampa and Colorado River basins, where water managers meet weekly through the latter irrigation season to look at weather reports, streamflow forecasts, and water demands to determine how best to utilize Program and other partners' water supplies to best meet multiple needs.

Study Schedule:

1990 - Ongoing

Relationship to RIPRAP:

Colorado River Action Plan I.A.5: Legally protect in stream flows pursuant to Colorado River PBO;
Green River Action Plan I.A.3.d Operate Flaming Gorge Dam to provide flows;
Duchesne River Action Plan; I.A; Identify year-round flow needs for recovery
Yampa River Action Plan; I.A.1; Identify fish habitat and flow needs.

Accomplishment of FY 2022 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Operations in WY2022 ran smoothly through the majority of gages, though a more pronounced monsoon season in summer and early fall 2022 gage operations in some locations were challenging. The USGS was prompt, responsive and transparent in identifying and rectifying issues as they occurred, and rating of stream gages occurred regularly throughout the network. In addition, the USGS added an additional multi-parameter seasonal gaging location on the Colorado River near Rulison (

USGS staff also participated regularly throughout the 2022 irrigation season in the weekly Colorado River HUP flow coordination calls (coordinated by the Bureau of Reclamation), and in the weekly lower Yampa River flow coordination calls (coordinated by the Program Director's Office). USGS gages throughout the network (including those funded by entities other than Program Partners) comprise a heavily utilized source of real-time data and information (including important water quality parameters) that assist in water administration and help optimize use and delivery of the storage water used for supplemental flows for endangered fish. The USGS partnership reflected by Project 8 funding and operation is an important component that includes USBR, NWS, UCRBFC, and multiple Recovery Program partners.

Additional noteworthy observations:

The Duchesne River gage near Randlett (#09302000) had issues with the air bubbler, leading to over-calculation of stage (and therefore discharge) beginning approximately July 15 through August 2. The resulting provisional data was adjusted downward, leading to actual flows that were often less than the 50 cfs target flow through this reach. Calculations by the DWR's river commissioner and CUWCD staff

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from other gages suggested there was an issue, so USGS was called to perform a discharge measurement and to service the gage. The bubbler was replaced, and subsequent readings were accurate.

Recommendations:

Continue with these stream gaging locations. Seek additional cost-sharing partners for selected gages. Ongoing discussions are occurring in Water Division 6 in the Yampa River to better assess flow gains (and losses) between the Maybell gage and Deerlodge gage, both located with designated critical habitat, and in a reach receiving Recovery Program water supplies released from Elkhead Reservoir. The late season effects of groundwater contributions from either canyon reaches or potentially, the alluvial aquifer underlying the Little Snake River, are not well understood, but could allow the Program to more efficiently utilize water released from Elkhead Reservoir.

Project Status:

On-track and ongoing. All these gages are operational and the data are available on the Internet in real-time from the USGS Water Resources Division in Colorado and Utah.

FY 2022 Budget Status

UCREFRP FY 2022 Cost	\$171,214* (sum of CO and UT for USGS and Colorado SEO)
Wyoming Contribution	<u>\$ 30,939*</u>
Total	\$202,153*

* These are estimated costs for 2022 (Project 8 Gages O&M SOW FY22-23); practice has been to replace w/ actual expenditures when they are determined. WY and CO USGS costs in FY22 confirmed as estimated.

RIP costs BOR paid to USGS in FY 2022 to USGS Colorado (Grand Junction office): \$44,331 (CO-UT state line gage temperature funding not included). RIP funding to the Utah USGS: \$126,883*.

The attached Table 1 shows the actual FY2022 costs by gage. Actual costs were somewhat lower than budgeted within the FY2019-20 Scope of Work (\$202,153 versus the total budgeted \$211,309.) One continuous temperature gage shown in the FY2019-2020 and Scope of Work table (Duchesne River above Uintah River near Randlett) does not exist and has been removed from Table 1.

Status of Data Submission

Not applicable, data reside on the internet.

Signed:

David Graf
Principal Investigator
February 9, 2023

Cooperators:

Colorado USGS gages

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Table 1.

List of river gage sites, measured parameters, cost-share responsibilities, and costs for 2022 are summarized. USGS Colorado and Wyoming cost shares are actual costs for 2022.

FY2022 Gage Costs

ID	Site	Parameter	FY2022 Cost (Total)	Cost-share Responsibilities						FY2022 Cost Share			
				Recovery Program	State of WY	CWCB	CRWCD + City of Craig	USBR	USGS	Recovery Program Share	State of WY share	CWCB share	
Yampa River Basin													
CO WMFKMHCO	Williams Fork near Hamilton, CO	Flow	6,194	100%		0%					\$ 6,194	\$ -	\$ -
USGS #09244490	Yampa River above Elkhead Creek, CO	Flow	18,860	52%	48%						\$ 9,807	\$ 9,053	\$ -
USGS #09247600	Yampa River below Craig, CO	Flow	18,860		25%		75%				\$ -	\$ 4,715	\$ -
USGS #09260050	Yampa River at Deerlodge Park, CO	Flow	18,860	50%	50%						\$ 9,430	\$ 9,430	\$ -
USGS #09260050	Yampa River at Deerlodge Park, CO	Temperature	4,838	20%	80%						\$ 968	\$ 3,870	\$ -
Mainstem Colorado River													
USGS #09106150	Colorado River near Palisade, CO	Flow	18,860	100%							\$ 18,860	\$ -	\$ -
USGS #09163500	Colorado River at Colo-Utah State Line	Temperature	4,838	100%						0%	\$ 4,838	\$ -	\$ -
Green River													
404417108524900	Green River above Gates of Ladore, CO	Temperature	4,838	20%	80%						\$ 968	\$ 3,870	\$ -
USGS #09261000	Green River near Jensen, UT	Flow	16,800	0%						100%	\$ -	\$ -	\$ -
USGS #09261000	Green River near Jensen, UT	Temperature	5,700	100%							\$ 5,700	\$ -	\$ -
USGS #09272400	Green River at Ouray, UT	Flow	17,220	100%							\$ 17,220	\$ -	\$ -
Duchesne River													
USGS #09295100	Duchesne River abv Uinta R nr Randlett, UT	Flow	17,220	100%							\$ 17,220	\$ -	\$ -
USGS #09295100	Duchesne River abv Uinta R nr Randlett, UT	Temp	---	100%							-	-	-
USGS #09301500	Uinta River nr Randlett, UT	Flow	17,220	100%							\$ 17,220	\$ -	\$ -
USGS #09302000	Duchesne River near Randlett, UT	Flow	17,220	100%							\$ 17,220	\$ -	\$ -
USGS #09302000	Duchesne River near Randlett, UT	Temp	5,700	50%					50%		\$ 2,850	\$ -	\$ -
USGS #09302000	Duchesne River near Randlett, UT	Conductance		0%					100%		\$ -	\$ -	\$ -
USGS #09295000	Duchesne River at Myton, UT	Flow	17,220	100%							\$ 17,220	\$ -	\$ -
Other													
USGS #09314500	Price River near Woodside, UT	Flow	22,650	100%							\$ 22,650	\$ -	\$ -
USGS #09314500	Price River near Woodside, UT	Temp	5,700	50%					50%		\$ 2,850	\$ -	\$ -
USGS #09314500	Price River near Woodside, UT	Conductance		0%							\$ -	\$ -	\$ -
	TOTALS										\$ 171,214	\$ 30,939	\$ -

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ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBERS:

Utah USGS Contract: R16PG00079

End date: 9/30/26

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 8

Project Title: Basin Wide Stream Gage Operation & Maintenance

Principal Investigator:

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Project/Grant Period: Period of performance: FY2022 these gages are funded year round and this activity is ongoing.

Performance: All partners are very helpful and this project ran smoothly in 2022

USGS: both in Utah and Colorado the USGS runs all aforementioned stream gages year-round during all types of weather and flow conditions. The USGS is the nation's expert in collecting and reporting stream flow data. Similar to Colorado gage operation in 2021, a good monsoon resulted in significant streamflow variability on tributaries to the Green River, mostly during the Aug-October time period. Low flow rating curve calibration occurred during the June-July timeframe.

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ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBERS:

State of Colorado Contract: SEO R14AP40009

End date: 9/30/23

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