Project Title
Coordinated Reservoir Operations (CROS) and Information and Education (I&E)

Bureau of Reclamation Agreement Number:
N/A

Project/Grant Period:
Start date: 1995
End date: Present
Reporting period end date: 09/30/2023
Is this the final report? Yes _____ No _X___

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Abstract:
This project involves coordinated voluntary operations of selected reservoirs and trans-mountain diversion projects in the Colorado River Basin upstream from the confluence of the Colorado and Gunnison rivers. The goal is to enhance spring peak flows to improve endangered fish species habitat in the 15-Mile Reach of the Colorado River without diminishing reservoir or diversion yields or affecting the timing of reservoir filling.

Over the years, reservoirs and trans-mountain diversion projects that have participated in the operation have included the Colorado-Big Thompson Project, Granby Reservoir, Green Mountain Reservoir, the Fryingpan-Arkansas Project, the Homestake Project, the Moffat Tunnel Project, Ruedi Reservoir, Williams Fork Reservoir, Willow Creek Reservoir, Windy Gap Project and Wolford Mountain Reservoir. Participating water management agencies include Bureau of Reclamation (Reclamation), City of Aurora, Colorado River Conservation District, Colorado Spring Utilities, Denver Water Board, Northern Water Conservancy District and Northern Water Municipal Subdistrict.

CROS occurs in years when runoff conditions allow participating reservoirs and trans-basin diversion projects to bypass anticipated surplus water without affecting their yield. The intent of CROS is to enhance the natural peak flows on the Colorado River for approximately one to two weeks. This typically occurs around the last week of May and first week of June.

Since the first coordinated operations were made in 1997, CROS operations to augment peak flows have been implemented in eleven years, including 2019.

Study Schedule:
Initial: 1995
Final Year: Ongoing

Relationship to RIPRAP:
Colorado Mainstem Action Plan I.A.5.g.(2): Coordinated Reservoir Operations: If available, deliver additional peak flows, evaluate process and hydrology, and provide annual report.

Accomplishment of FY 2023 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Coordinated Reservoir Operations (CROS) were not conducted in 2023. CROS was implemented previously in 2015, 2016, 2017, 2019, and 2020 (Table 1). However dry hydrologic conditions in 2021 and 2022 precluded implementation of CROS. In 2023, unusual hydrologic circumstances led to the decision to not implement CROS this year. This was due to uncertainly of fill in Ruedi, Granby, and other upper basin reservoirs (e.g., Dillon and Williams Fork), and a late, wet spring on the Front Range of Colorado. With limited capacity and an opportunity to fill Front Range reservoirs in priority with native eastern slope sources, trans-mountain diversions were limited and resulted in unexpected spills from Western Slope reservoirs. For example, the April 1 prediction for Granby Reservoir indicated a spill of ~1000 AF; post-runoff accounting indicated the reservoir spilled ~66,000 AF. In addition, the yield in the Willow Ck subbasin was much greater than expected due to the East Troublesome fire, which limited infiltration in the drainage and also resulted in excessive sedimentation in Willow Creek Reservoir. Below the 15 Mile Reach at the western end of the Grand Valley near Loma, there were flooding concerns at the highway overpass of a side channel of the Colorado River, which generally occur when flows approach 30,000 cfs.

Peak flows at the Stateline gage on the CO west of Loma exceeded 30,000 cfs May 17-May 27, and peaked at 35,200 cfs May 19, significantly aided by un- or lightly regulated flows from from the N. Fork Gunnison and Uncompahgre Rivers.

Table 1. History of Coordinated Reservoir Operations (CROS) Augmentation Volume of Peak Flows

	Operations for Augmentation of Peak Flows (Acre-Feet)												
Reservoir	1997	1998	1999	2006	2008	2009	2010	2015	2016	2017	2019	2020	*Total*
Homestake	--	--	--	--	--	--	--	--	1,430	--	655	--	*2,085*
Grandby	--	--	8,515	--	--	--	--	18,002	--	--	--	--	*26,517*
Green Mountain	3,568	12,482	11,010	6,788	2,101	14,113	34,666	11,292	8,632	14,410	21,223	14,365	*154,650*
Ruedi	693	5,106	3,602	6,297	4,848	5,858	10,050	4,599	4,007	4,502	5,998	--	*55,560*
Williams Fork	946	1,672	1,543	6,625	--	5,044	19,982	2,733	4,893	3,293	9,273	2,920	*58,924*
Willow Creek	--	--	6,631	--	--	2,638	--	8,000	--	7,206	--	799	*25,274*
Windy Gap	--	--	--	--	--	2,061	--	906	--	--	2,007	--	*4,974*
Wolford Mountain	10,635	4,431	8,555	9,007	--	13,069	9,273	4,587	8,452	4,245	--	625	*72,879*
Moffat	--	--	--	--	--	--	--	--	1,960	2,079	--	3,541	*7,580*
Total	*15,842*	*23,691*	*39,856*	*28,717*	*6,949*	*42,783*	*73,971*	*50,119*	*29,374*	*35,735*	*39,156*	*22,250*	*408,443*

Recommendations:
The Recovery Program should continue to support these efforts and encourage participation in Coordinated Reservoir Operations. The participating entities should continue to work with the National Weather Service Colorado River Basin Forecast Center to improve snowmelt runoff forecasts and near-term flows on both the eastern and western slopes. Program partners should continue to maintain effective communication and coordination, address any remaining issues associated with inundation concerns downstream of participating reservoirs, and maintain effective accounting and monitoring. Initiation of CROS discussions should occur after the April 1 forecasts are available, with regular communication occurring throughout the snowmelt runoff season. Additionally, the Recovery Program's Outreach Committee is encouraged to work with participants and the U.S. Fish and Wildlife Service to improve the public's understanding of the role, function, and habitat benefits the Coordinated Reservoir Operations provides for listed fish in the mainstem of the Colorado River.

Project Status:
CROS is an ongoing activity and efforts will continue to refine and improve the process and address issues identified to allow for maximum effectiveness. The completion of the 15 Mile Reach Study Plan (anticipated in early 2024) will also highlight 'hydrology studies' (including peak flow enhancement) as part of a broader inquiry into flows, habitat, and biological response. The Recovery Program has also completed a draft of the 'Phase 3 Coordinated Facilities Operation Study', which assesses the feasibility of additional activities to augment peak flows in the 15-Mile Reach including 'enhanced coordinated reservoir operations' (enhanced CROS), 'coordinated facilities operations' (CFOPS), and the potential for multi-year consideration for use of Program and partner water supplies. Enhanced CROS would provide additional bypass flows to CROS flows when feasible, CFOPS may provide up to 20,000 AF of additional water to further enhance peak flows, and would include multi-year flow management considerations if this can be done without significant costs and risks to water users or Reclamation.

FY 2023 Budget Status
Funds Provided: State of Colorado (In-Kind): $12,000 Federal: $0
Funds Expended: State of Colorado (In-Kind): $12,000 Federal: $0
Difference: $0.00

Percent of the FY 2023 work completed, and projected costs to complete: 100%
Recovery Program funds spent for publication charges: $0.00

Status of Data Submission
Not applicable

Signed: 12/29/2023 (dg)