
2023 REPORT

COLORADO RIVER SYSTEM CONSERVATION PILOT PROGRAM IN THE UPPER COLORADO RIVER BASIN

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The Upper Colorado River Commission

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I. Executive Summary

This report summarizes the outcomes and lessons learned from the 2023 Upper Colorado River Basin (UCRB) System Conservation Pilot Program (SCPP). The Upper Division States (UDS) acting through the Upper Colorado River Commission (UCRC) conducted a similar program from 2015 to 2018, through a different funding framework and agreements. The 2023 SCPP was authorized by Congress in the Federal Fiscal Year 2023 Omnibus Appropriations Bill. The authorization directed that the program be operated by the UDS acting through the UCRC. The program was funded by the Federal Inflation Reduction Act of 2022 (IRA), which provided four billion dollars to the U.S. Bureau of Reclamation (Reclamation) to mitigate the impacts of drought, primarily in the Colorado River Basin. Reclamation, through an agreement with the UCRC, allocated up to 125 million dollars for use in the SCPP. Similar to the 2015 to 2018 program, the UCRC coordinated SCPP with Reclamation and the UDS (Colorado, New Mexico, Utah, and Wyoming) water management and regulatory agencies, with support from a contractor (Wilson Water Group).

The SCPP was successfully administered by the UCRC with cooperation from Reclamation, the contractor, and UDS staff. These administrative procedures included soliciting proposals from water users; reviewing proposals; ranking and selection of projects; contracting with participants; field verification of project activities; payment management and processing; and management and coordination of all activities with Reclamation. Consistent with the agreement with Reclamation and the authorization from Congress, the UCRC contracted with participants for conservation activities and provided payments to participants.

The 2023 SCPP generated significantly more interest and participation than the 2015 to 2018 program. With assistance from the UDS and facilitation by key non-governmental organizations (NGOs), the SCPP received 88 applications. Of that number, 64 projects were funded, with an estimated conserved consumptive use (CCU) of approximately 37,810 acre-feet at a total cost of \$15,969,035.00. Projects funded spanned all four UDS and three different water sectors (Agriculture, Municipal, and Industrial). The hydrological conditions influenced the final amount of water conserved in 2023. During the 2023 program, feedback was solicited from SCPP participants, the UDS, and Reclamation on how the program functioned and potential improvements for a future SCPP or similar future water conservation program efforts.

II. Background

The Colorado River, often considered the lifeline of the American Southwest, supplies water to approximately 40 million people in the seven U.S. Basin States (Arizona, California, Nevada, Colorado, Wyoming, Utah, and New Mexico) and Mexico, and to approximately 5.5 million acres of irrigated land in the Basin and adjacent areas.¹ Prolonged drought conditions over the past 20 years, coupled with an increasing supply and demand imbalance particularly in the lower basin, have stressed this valuable water system.

In 2022, water levels in both Lake Powell and Lake Mead reached historic lows, with Lake Powell dropping below 3,523 feet and Lake Mead dropping below 1,041 feet.² Moreover, three of the last 12 years of inflows into Lake Powell were less than five million acre-feet,³ and the basin experienced three of the lowest consecutive years of inflow on record from 2020 through 2022, with 2021 among one of the lowest inflow years on record.⁴ From 2020 through 2022, the combined storage of Lake Powell and Lake Mead declined from about 50 percent to 25 percent of capacity, threatening the reservoirs' ability to generate hydroelectric power and continue to make releases to downstream users.⁵

In June of 2022, U.S. Bureau of Reclamation Commissioner Touton called for Colorado River Basin water users to save an additional 2 to 4 million acre-feet of water, and Reclamation began analyzing alternatives to modify the current operations at Lake Powell and Lake Mead in an effort to protect the Colorado River System.⁶

In response to the Commissioner's call for action, the Upper Division States and the UCRC developed a "5-Point Plan," which included a recommendation to reauthorize and reinstate the SCPP for 2023. In December of 2022, Congress, through the 2023 Omnibus Appropriations Bill, authorized SCPP for 2023 and 2024. In January 2023, the UCRC entered into a Funding Agreement with Reclamation which provided \$125 million to the UCRC for SCPP from funding appropriated under the Inflation Reduction Act. The Funding Agreement included a Facilitation Exhibit and the System Conservation Implementation Agreement (SCIA) template. The Funding Agreement provided the opportunity for water users in the UDS in 2023 and 2024 to be compensated for temporary and voluntary reductions in water use to help mitigate the impacts of long-term drought and depleted storage in the Colorado River System.⁷ Results from the implementation of the 2023 SCPP projects in the Upper Basin are provided below. Lessons learned from the implementation of the program in 2023 were summarized by the UCRC

¹ "Near Term Colorado River Operations Revised Draft Supplemental Environmental Impact Statement". U.S. Bureau of Reclamation, October 2023. Available at: www.usbr.gov/ColoradoRiverBasin/documents/NearTermColoradoRiverOperations/20231019-Near-termColoradoRiverOperations-RevisedDraftEIS-508.pdf.

² Lake Powell and Lake Mead Pool Elevation. U.S. Bureau of Reclamation. Available at: www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html.

³ "Lake Powell Unregulated Inflow" for 2012-2023 period. U.S. Bureau of Reclamation. Available at: www.usbr.gov/uc/water/crsp/studies/images/PowellForecast.png.

⁴ "Near Term Colorado River Operations Revised Draft Supplemental Environmental Impact Statement", *supra* Note 1.

⁵ "Near Term Colorado River Operations Revised Draft Supplemental Environmental Impact Statement", *supra* Note 1.

⁶ U.S. Department of the Interior Press Release. August 2022 Available at: <https://www.doi.gov/pressreleases/interior-department-announces-actions-protect-colorado-river-system-sets-2023>

⁷ "Final SCPP Funding Agreement". UCRC, January 2023. Available at: www.ucrccommission.com/wp-content/uploads/2023/04/Final-SCPP-Funding-Agreement-Executed-Jan-6-2023.pdf.

and are documented in Appendix A. A summary of the timeline for the 2023 SCPP program is attached as Appendix B. During a UCRC Special Meeting in September 2023, the UCRC Commissioners agreed to conduct the SCPP program in 2024 and implement the recommended improvements to the program from the 2023 lessons learned process.

III. System Conservation Pilot Program Selection Process

A. Evaluation Criteria and Project Recommendation

Evaluation criteria were developed and identified in the Funding Agreement between Reclamation and the UCRC and were shared as part of the solicitation and outreach to potential SCPP participants. The UCRC, UDS, and Reclamation staff members participated in the evaluation process. Evaluation criteria included:

- A history of recent consumptive use of Colorado River water by the project proponent
- Adherence of the proposal to the requirements of the Funding Agreement Facilitation Exhibit and request for proposals
- Prioritization of projects that are likely to mitigate impacts of the ongoing drought
- Diversity of location and type of conservation measures, including consideration of multiple benefits
- The relative size of the project in terms of acre-feet of water that may be conserved
- The comparative ease or difficulty of implementing the project, including the proposed verification plan for the project
- The amount of time required for the project to generate conserved consumptive use
- Permitting requirements and approvals, if any
- For non-fixed price proposals, the amount of the proposed price per acre-foot and a justification for the proposed price

As applications were submitted, the UDS staff with support from the contractor reviewed the projects to ensure water rights were in good standing, that the project was feasible, and that the applicant had a recent history of beneficial consumptive use of the water for the purpose described in the application. The initial review removed ineligible projects from further consideration. Reclamation reviewed project applications for National Environmental Policy Act for compliance and projects that may have a federal nexus. The UDS and the UCRC then held multiple meetings to review and recommend projects for consideration for implementation based on the evaluation criteria.

After projects were reviewed by the UDS, the UCRC, and Reclamation, those projects that met the criteria were recommended for consideration for implementation. The UCRC Commission, at its meeting on April 17, 2023, directed UCRC staff to finalize and execute the recommended SCIA.

B. Conserved Consumptive Use Estimates

SCPP participants were compensated based on an average CCU value estimated for their project. These estimates were required in the application and were typically developed by WWG using the standard approach outlined below. WWG reviewed the CCU values developed by the few applicants who

provided their own estimates and adjusted the estimates when necessary to ensure that a consistent approach was followed for all projects.

For agricultural projects, WWG utilized the eeMETRIC methodology accessed through the OpenET platform⁸ to estimate the historical average CCU. This method was adopted for interstate irrigated agriculture consumptive use estimates by the UCRC⁹ and was consistently used across the four states to estimate CCU savings for all projects that included full fallowing, partial fallowing, or crop switching. Annual consumptive use from eeMETRIC available for 2016 through 2022 was used as the basis for estimating historical average consumptive use from irrigation supplies and potential CCU savings. This recent period generally reflects variability between wet, dry, and average hydrologic years experienced in the basin since 2000; plus, it includes hot and cool irrigation seasons and wet and dry irrigation season rainfall patterns. The average consumptive use for the period 2016 through 2022 was determined to be a reasonable estimate of consumptive use for SPP for 2023. The following provides more information on how CCU estimates were determined by project type.

- **Agriculture - Full Season Fallow**

- Using OpenET, download monthly 2016 to 2022 eeMETRIC actual ET (i.e. consumptive use) data for each SPP project field.
- To account for consumptive use from precipitation, download monthly 2016 to 2022 eeMETRIC actual ET data for a nearby non-irrigated area. The non-irrigated area was a vegetated area near the project field, but based on the best information available, did not receive irrigation water. The non-irrigated area was in the same general area of the project field(s), but the distance between the irrigated and non-irrigated fields was influenced by the type of land around the project field. There was no standard size for the non-irrigated area, however a large enough area was chosen to produce accurate numbers from the satellite based eeMETRIC.
 - Note that if the project field(s) were deemed sub-irrigated from nearby fields or riparian areas, a non-irrigated area that was also sub-irrigated was chosen. The area chosen was chosen based on WWG's professional judgement, with input from the UDS staff.
- Subtract the consumptive use from the non-irrigated field from the consumptive use of the project fields to estimate the historical consumptive use from irrigation supplies on the project fields.
- Calculate an average value of historical consumptive use from irrigation supplies over the seven-year period; this average value was used as the CCU estimate for each SPP participant's SCIA.

⁸ "OpenET Methodologies". OpenET. Available at: openetdata.org/methodologies/

⁹ Upper Colorado River Commission Adoption Resolution for eeMETRIC and related Consumptive Use Estimation Methods: <http://www.ucrccommission.com/reports-studies/>.

- **Agriculture - Split Season Fallow**
 - The full season fallow approach was used, except the consumptive use was only estimated for the fallow period.
 - For fields that were to be irrigated before the start of the fallow period, water stored in the soil zone due to irrigation before the start of fallowing was estimated, as the crop would continue consuming that water during the fallow period. The estimated consumptive use from the soil storage was subtracted from the total CCU.
 - Available soil moisture was calculated as available water content from the USDA Soil Survey ¹⁰multiplied by the root zone depth. A standard root zone depth was used for all projects.
- **Agriculture - Crop Switching**
 - The same approach as described for full season fallow was used to estimate the field historical consumptive use from irrigation water supplies.
 - To estimate potential conservation compared to the historically crop grown, a ratio of what the lower water use crop could potentially consume compared to the current crop potential consumptive use was estimated. The ratio was applied to the field's average historical consumptive use from irrigation supplies. Potential consumptive use for both the historic crop and the lower water use crop was calculated using the single crop coefficient method described in FAO-56¹¹.
- **Reservoir Storage Forbearance**
 - The historical yield of the reservoir shares included in SCPP was estimated based on available records. This value was then reduced by an efficiency factor to account for both transit and irrigation efficiency losses that would have occurred if the water had been leased to an agricultural user. The transit and irrigation losses were based on WWG's professional judgment considering the type of irrigation application practices and whether the canal/ditch was dirt, lined, or piped.
- **Municipal and Industrial**
 - The amount of estimated savings was based on user-supplied information and discussion with UDS staff.

C. Compensation

The 2023 SCPP provided for a minimum compensation of \$150 per acre-foot of conserved consumptive use, with the opportunity for applicants to seek higher compensation based on the applicant's cost justification documentation for their proposed price. This approach resulted in a large range of proposed unit prices, with a mix of methods and details used for cost justification. During the application review phase, Reclamation performed an independent economic assessment of local crop pricing and set a maximum price paid per acre-foot of CCU, varying by state, project type, farming/ranching operation, and crop type as reflected in Table 1. User-supplied compensation was

¹⁰ United States Department of Agriculture Soil Survey Website. Available At: <https://websoilsurvey.nrcs.usda.gov/app/>

¹¹ Crop evapotranspiration – Guidelines for computing crop water requirements – FAO Irrigation and drainage paper 56. Available At: <https://www.fao.org/4/X0490E/x0490e00.htm>

used for the project if it did not fall into a pricing category set by Reclamation, or if the value was less than the maximum price set by Reclamation. No prices were set for New Mexico or municipal and industrial projects because the user-supplied cost justification for the single application in New Mexico and two municipal and Industrial projects were reviewed and determined to be reasonable by Reclamation. Utah provided additional funding up to \$650 per acre-foot, totaling \$93,680.17, for Utah projects that had justified costs above Reclamation's maximum compensation for CCU.

Table 1 - Reclamation's Maximum Price per Acre-Foot of CCU

Project Type/Operation/Crop	Colorado	Utah	Wyoming
Commodity Alfalfa	\$462.00	\$595.00	
Commodity Grass Hay	\$564.00		\$513.00
Commodity Corn	\$541.00		
Cow-Calf Operation Alfalfa		\$621.00	
Cow-Calf Operation Grass Hay	\$631.00		\$575.00*
Crop Switching	\$201.00		
Reservoir Storage Forbearance		\$150.00	

* \$611.00 was set for a project extending across the Colorado/Wyoming border

D. Project Verification

The UCRC, UDS staff, and WWG worked with the selected project participants or their representatives to establish project-specific Verification Plans that were included in the final contracts between the participants and the UCRC. The primary focus of each Verification Plan outlined procedures to *verify and document* that the applicant performed the conservation measures and complied with the schedule and actions in their contract.

Each Verification Plan was tailored to site-specific conditions and available measuring and control devices, primarily flumes or other diversion measurement devices at river or farm headgates. The primary methods for verifying full or partial season fallowing included field site visits and review of remote sensing satellite data using the Normalized Difference Vegetation Index (NDVI) to assess that water was not being applied. Site visits and remote sensing were also used to verify the projects where crops were switched to a lower water use crop. Reservoir storage forbearance and municipal and industrial projects relied on accounting to verify that the agreed-upon conservation action was completed. A standard approach was used for site visits that included photographic documentation of the water delivery points and the participating fields.

IV. 2023 System Conservation Pilot Program Projects

A. Project Applications and Implemented Projects

There was stronger interest and participation in SCPP by water users across the UDS in 2023 compared to the previous programs, especially with the compressed and abbreviated time frame for participation. Focused outreach from representatives of Colorado Ag Water Alliance, Trout Unlimited, and The Nature Conservancy helped generate agricultural water user interest in key areas of Colorado, Utah, and Wyoming.

Table 2 provides an overview of the number of applications received and the number of projects implemented in each state. Figure 1 reflects the spatial range of the implemented projects across the states, including the number of implemented projects by sub-basin.

Table 2 – Project Applications and Implemented Projects by State

	Colorado	New Mexico	Utah	Wyoming*	Total
Project Applications	40	1	24	23	88
Implemented Projects	22	1	20	21	64

*Includes one project extending across the Colorado/Wyoming border

There were several reasons that project applications did not result in implemented projects, including failure to meet eligibility requirements; administration/operation complexity for implementation; notification of project selection and contracting after the start of the growing season; no or limited water savings; and concerns regarding compensation for conserved water. Specific “lessons learned” from the 2023 SCPP are captured in Appendix A.

Table 3 highlights the project categories implemented in 2023 by state. No irrigation water was applied to the enrolled full-season fallow project fields for the duration of the irrigation season. No irrigation water was applied during a specified period of the irrigation season (e.g., June 1 through September 30) for split-season fallow projects. The crop grown on the enrolled fields was switched to one that consumed less water (e.g., alfalfa to triticale) for the crop switching projects. For storage forbearance projects, conserved water was held in the reservoirs, either for the full year as carry-over for next season, or until it could be released when it would likely make it downstream – generally after the irrigation season. For the municipal and industrial projects, water typically used for municipal and industrial purposes was left in the stream or reservoir and recorded and accounted to reflect the reduction in use.

Table 3 – Types of Projects Implemented

Project Type	Colorado	New Mexico	Utah	Wyoming*	Total
Full Season Fallow	16	1	12	18	47
Split Season Fallow	3		2		5
Crop Switching	3		1		4
Storage Forbearance			3	1	4
Municipal & Industrial			2	2	4
Total	22	1	20	21	64

*Includes one project that extends across the Colorado/Wyoming border

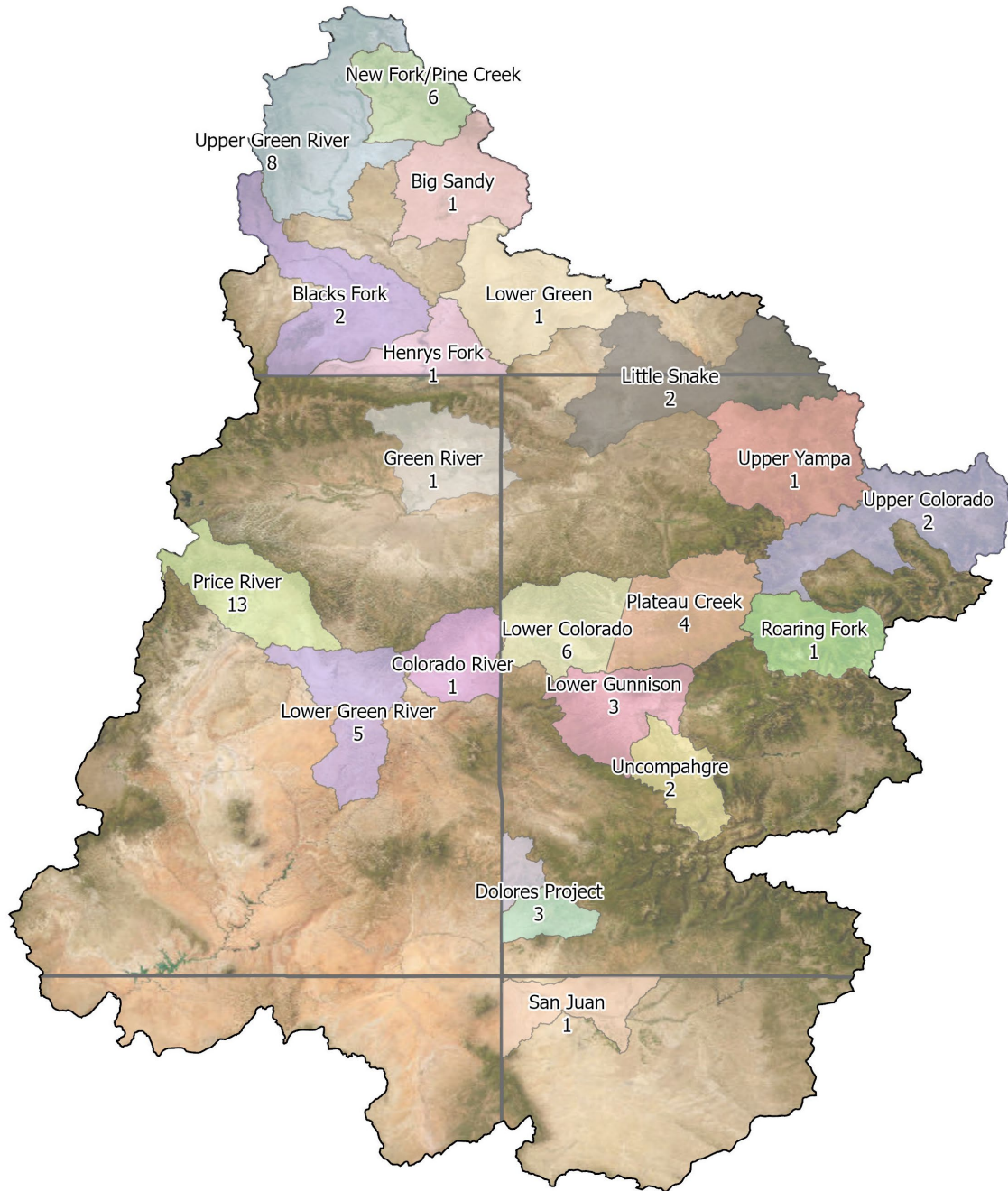


Figure 1 – Implemented SCPP Projects by Sub-Basin

Table 4 through Table 7 show the contracted CCU estimates and associated compensation for each state. Based on the contracted CCU estimates, a total of \$15,969,035.00 was paid to water users in the UDS to conserve 37,810 acre-feet of water through SCPP in 2023.

Table 4 – Contracted Conserved Consumptive Use (CCU) and Associated Compensation in Colorado

Tributary	Project Type	Agricultural Type	Acreage	Contracted CCU (AF)	Price Per AF	Total Compensation
Plateau Creek	Split Season Fallow	Commodity Grass Hay	96	97	\$303	\$ 29,300.10
Upper Colorado River	Full Season Fallow	Cow-Calf Grass Hay	877	484	\$150	\$ 72,544.50
Upper Colorado River	Full Season Fallow	Cow-Calf Grass Hay	5	3	\$350	\$ 1,001.00
Colorado River	Full Season Fallow	Commodity Alfalfa	59	137	\$332	\$ 45,634.00
Roaring Fork	Full Season Fallow	Commodity Grass Hay	73	83	\$564	\$ 46,812.00
Colorado River	Full Season Fallow	Commodity Alfalfa	5	13	\$240	\$ 3,144.00
Uncompahgre River	Full Season Fallow	Cow-Calf Grass Hay	34	46	\$291	\$ 13,275.00
Cimarron River	Full Season Fallow	Commodity Alfalfa	125	274	\$278	\$ 76,172.00
Dolores River	Crop Switching	Crop Switching	129	115	\$200	\$ 22,902.00
Dolores River	Crop Switching	Crop Switching	126	114	\$200	\$ 22,896.00
Dolores River	Crop Switching	Crop Switching	62	34	\$200	\$ 6,700.00
Colorado River	Full Season Fallow	Commodity Grass Hay	16	38	\$500	\$ 19,080.00
Gunnison River	Full Season Fallow	Commodity Grass Hay	17	43	\$496	\$ 21,100.00
Colorado River	Full Season Fallow	Commodity Corn	16	39	\$541	\$ 21,099.00
Colorado River	Full Season Fallow	Commodity Corn	104	195	\$541	\$ 105,278.60
Yampa River	Full Season Fallow	Cow-Calf Grass Hay	31	66	\$380	\$ 25,080.00
Colorado River	Full Season Fallow	Cow-Calf Grass Hay	31	71	\$631	\$ 44,801.00
Surface Creek	Split Season Fallow	Cow-Calf Grass Hay	132	128	\$588	\$ 75,506.00
Plateau Creek	Full Season Fallow	Cow-Calf Grass Hay	93	63	\$631	\$ 39,519.53
Plateau Creek	Full Season Fallow	Cow-Calf Grass Hay	309	305	\$631	\$ 192,139.50
Plateau Creek	Split Season Fallow	Cow-Calf Grass Hay	49	66	\$631	\$ 41,690.17
Uncompahgre River	Full Season Fallow	Cow-Calf Grass Hay	N/A	105	\$631	\$ 66,255.00
Total				2,517		\$ 991,929.40

Table 5 - Contracted Conserved Consumptive Use (CCU) and Associated Compensation in New Mexico

Tributary	Project Type	Agricultural Type	Acreage	Contracted CCU (AF)	Price Per AF	Total Compensation
San Juan	Full Season Fallow	Various Crops	2641	4,633.00	\$260.13	\$1,205,182.30

Table 6 - Contracted Conserved Consumptive Use (CCU) and Associated Compensation in Utah

Tributary	Project Type	Agricultural Type	Acreage	Contracted CCU (AF)	Price Per AF	Reclamation Compensation	Total Compensation
Price River	Municipal/Industrial	Storage	N/A	480	\$150	\$ 72,000.00	\$ 72,000.00
Price River	Crop Switching	Crop Switching	149	113	\$250	\$ 28,364.60	\$ 28,364.60
Colorado River	Split Season Fallow	Commodity Alfalfa	353	275	\$650*	\$ 163,387.00	\$ 178,490.00
Price River	Storage Forbearance	Storage	N/A	320	\$150	\$ 48,000.00	\$ 48,000.00
Green River	Full Season Fallow	Cow-Calf Alfalfa	124	238	\$650*	\$ 147,549.60	\$ 154,440.00
Green River	Full Season Fallow	Cow-Calf Alfalfa	438	924	\$650*	\$ 573,990.30	\$ 600,795.00
Price River	Full Season Fallow	Commodity Alfalfa	51	105	\$600*	\$ 62,296.50	\$ 62,820.00
Green River	Full Season Fallow	Commodity Alfalfa	46	116	\$650*	\$ 69,020.00	\$ 75,400.00
Price River	Split Season Fallow	Commodity Alfalfa	341	394	\$609*	\$ 234,132.50	\$ 239,800.00
Price River	Full Season Fallow	Cow-Calf Alfalfa	529	539	\$650*	\$ 334,470.60	\$ 350,090.00
Price River	Storage Forbearance	Storage	N/A	104	\$150	\$ 15,633.00	\$ 15,633.00
Price River	Full Season Fallow	Commodity Alfalfa	8	15	\$650*	\$ 8,728.65	\$ 9,535.50
Green River	Full Season Fallow	Commodity Alfalfa	4,816	9,094	\$329.87	\$ 3,000,000.00	\$ 3,000,000.00
Green River	Full Season Fallow	Cow-Calf Alfalfa	168	357	\$650*	\$ 221,436.18	\$ 231,777.00
Price River	Full Season Fallow	Storage	3	12	\$150	\$ 1,800.00	\$ 1,800.00

Tributary	Project Type	Agricultural Type	Acreage	Contracted CCU (AF)	Price Per AF	Reclamation Compensation	Total Compensation
Price River	Full Season Fallow	Commodity Alfalfa	17	44	\$436.94	\$ 19,400.00	\$ 19,400.00
Price River	Municipal/ Industrial	Storage	N/A	1,279	\$150	\$ 191,790.00	\$ 191,790.00
Price River	Storage Forbearance	Storage	N/A	554	\$150	\$ 81,600.00	\$ 81,600.00
Price River	Full Season Fallow	Commodity Alfalfa	55	101	\$650*	\$ 59,976.00	\$ 65,520.00
Green River	Full Season Fallow	Commodity Alfalfa	14	28	\$353.36	\$ 10,000.00	\$ 10,000.00
Total				15,091		\$ 5,343,574.93	\$ 5,437,255.10

* Additional funding for these projects came from the Colorado River Authority of Utah funds.

Table 7 - Contracted Conserved Consumptive Use (CCU) and Associated Compensation in Wyoming

Tributary	Project Type	Agricultural Type	Acreage	Contracted CCU (AF)	Price Per AF	Total Compensation
Little Snake	Municipal/Industrial	Municipal	N/A	1,000	\$163	\$ 163,000.00
Green River	Municipal/Industrial	Industrial	N/A	8	\$150	\$ 1,200.00
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	590	856	\$389.25	\$ 333,000.00
Cottonwood Creek	Full Season Fallow	Cow-Calf Grass Hay	705	578	\$525	\$ 303,450.00
Blacks Fork	Storage Forbearance	Commodity Grass Hay	N/A	405	\$300	\$ 121,500.00
North Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	333	280	\$575	\$ 161,115.00
Henrys Fork	Full Season Fallow	Cow-Calf Grass Hay	157	191	\$408.38	\$ 78,000.00
South Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	21	31	\$575	\$ 17,652.50
Fontenelle Creek	Full Season Fallow	Cow-Calf Grass Hay	194	310	\$575	\$ 178,169.50
North and Middle Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	630	685	\$575	\$ 393,984.25
Big Sandy River	Full Season Fallow	Cow-Calf Grass Hay	221	329	\$575	\$ 188,916.25
Middle and South Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	2,898	2,742	\$575	\$ 1,576,822.50
North Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	563	771	\$575	\$ 443,043.25
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	61	78	\$274	\$ 21,375.00
South Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	558	718	\$575	\$ 412,694.75
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	37	34	\$571.23	\$ 19,536.07
North Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	518	601	\$575	\$ 345,575.00
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	27	15	\$575	\$ 8,510.00
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	62	95	\$575	\$ 54,366.25
Duck Creek and Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	1,327	1,613	\$575	\$ 927,647.50
Little Snake*	Full Season Fallow	Cow-Calf Grass Hay	2,631	4,231	\$611	\$ 2,585,110.45
Total				15,571		\$ 8,334,668.27

*Project extending across the Colorado/Wyoming border

V. System Conservation Pilot Program Consumptive Use End-of-Season Analysis

A. *Approach to Calculation of End-of-Season CCU*

This section summarizes the approaches used by WWG to estimate CCU at the end of the growing season for SCPP projects in 2023. As summarized in Section III above, SCPP participants were compensated based on an average historical CCU value for their project as estimated through a series of analyses. After the 2023 projects were completed, WWG estimated CCU based on the actual hydrological and climate conditions in 2023. The end-of-season CCU did not impact compensation but was used to understand more about potential water savings under different project types, locations, and hydrologic year types.

WWG performed the end-of-season analyses using the same methods used to estimate the average CCU for determination of compensation to understand how conditions experienced during the 2023 project period compared to the average conditions from 2016 through 2022. Because the enrolled fields were either not fully irrigated or not irrigated at all in 2023, consumptive use savings for 2023 were estimated based on comparisons to nearby irrigated “reference fields”. The following summarizes the approaches used for each project type to estimate end-of-season CCU for 2023.

- **Agricultural Projects**
 - Using OpenET, download monthly 2023 eeMETRIC actual ET (i.e., consumptive use) data for each SCPP project field and the nearby non-irrigated area. Note that the same non-irrigated area was used for this analysis as was used during the average historical consumptive use estimate.
 - Estimate 2023 consumptive use for the project field by subtracting the 2023 non-irrigated consumptive use from the 2023 project field consumptive use.
 - Identify a nearby field growing the same “pre-2023” crop (i.e., reference field) and use OpenET to download monthly 2023 data. Calculate the 2023 consumptive use from irrigation supplies by subtracting the consumptive use from the non-irrigated area. Note that the consumptive use for the reference field was estimated for the same enrollment period as the project field (i.e. April 1 through October 31 for full-season fallow).
 - The nearby fields were selected based on professional judgement with the goal for the field to have been irrigated similarly to the enrolled field’s historical practices and to assure the selected field was a large enough for the calculation of consumptive use from eeMETRIC.
 - Determine the estimated water conserved by subtracting the consumptive use of the participating field from the consumptive use of the reference field.
- **Reservoir Storage Forbearance**
 - Using records provided by the entity operating the reservoir and any available state data, determine the yield of the reservoir shares included in SCPP for 2023. Reduce that value by the same efficiency factor used in the initial CCU analysis to account for both

transit and irrigation efficiency losses that would have occurred if the water had been leased to an agricultural user in 2023.

- **Municipal and Industrial**

- Relied on user-supplied accounting and worked with UDS staff to verify the 2023 CCU.

Using a nearby reference field provides a comparative method to estimate water savings for agricultural projects; however, it is important to note that the reference field may not actually be representative of the amount of water the participating field could have used. The reference field could have a more senior or junior water right, or the reference field could have different (better or worse) irrigation practice methods than the participating field. Although there are pros and cons to using a reference field for end-of-season CCU calculations, this approach was determined to be appropriate, as it can be used in all four states and is consistent with the approach used for determining initial CCU estimates.

B. Discussion and Results

Table 8 through 11 summarize the contracted and compensated CCU and the end of season CCU estimates for each project. It is important to note that, in all cases, the participant completed the required conservation activities. For agricultural projects, irrigation water deliveries were reduced consistent with the conservation activities and SCIA's. In some cases, the end of season CCU is less than the contracted CCU. Climate conditions (temperature and precipitation) and water supply in any given year are extremely unlikely to be "the average" from 2016 to 2022; variation in average estimated CCU and actual CCU is to be expected. The following are likely reasons that CCU for 2023 on average was less than the average estimated CCU derived from the 2016 to 2022:

- In general, the Upper Colorado River Basin experienced above average precipitation (rain and snowfall) in the spring of 2023 and a cooler spring and early summer. According to the Natural Resource Conservation Service Snow and Monitoring Climate Office, on May 31, 2023 the basin as a whole had a snow water equivalent 138 percent of the median¹². This was further highlighted by the fact that some of the participating fields in Wyoming still had snow on them and were inaccessible in June of 2023. Note that when more of the crop demand is met from precipitation, less irrigation water is required, resulting in less CCU savings. Similarly, when the spring and early summer are cooler, crops require less water, also resulting in less CCU savings.
- Some participating fields closer to streams experienced flooding and higher groundwater levels due to above-average runoff and irrigation season precipitation. For example, the snowpack for the Little Snake subbasin was about 127 percent of average for water year 2023¹³.
- Irrigation water from adjacent/nearby fields, both from surface runoff and shallow groundwater flow, impacted some of the participating fields due to more available water for irrigation than in recent years.

¹² Natural Resources Conservation Service Snow and Climate Monitoring. Available at: <https://www.nrcs.usda.gov/resources/data-and-reports/snow-and-climate-monitoring-predefined-reports-and-maps>

¹³ Water Resources Data System & Wyoming State Climate Office, Report #23, Weekly Snow Report. Available at: <https://www.wrds.uwyo.edu/wrds/nrcs/snowrept/snowrept.html>

- A few participants removed vegetation and disked their fields, but OpenET still indicated some consumptive use on these fields. These fields were typically smaller, and it is possible that the estimates from OpenET could have been influenced by the well-irrigated fields around the disked fields.

Although for the total UCRB the savings were generally not as high as the contracted amount, both Utah and New Mexico had savings greater than the contracted amount. Even though the overall UCRB savings were not as high as the full contracted amount, projects did show water savings compared to the nearby reference fields. Crop switching projects had similar estimated CCU to that estimated for the contract. Due to the wet hydrologic year, reservoir shares in reservoir storage forbearance projects generally resulted in full allocation per share.

Table 8 – End of Season Conserved Consumptive Use (CCU) Comparison in Colorado

Tributary	Project Type	Agricultural Type	Acreage	Contracted Estimated CCU (AF)	End of Season Estimated CCU (AF)
Plateau Creek	Split Season Fallow	Commodity Grass Hay	96	97	36
Upper Colorado River	Full Season Fallow	Cow-Calf Grass Hay	877	484	563
Upper Colorado River	Full Season Fallow	Cow-Calf Grass Hay	5	3	2
Colorado River	Full Season Fallow	Commodity Alfalfa	69	137	43
Roaring Fork	Full Season Fallow	Commodity Grass Hay	73	83	67
Colorado River	Full Season Fallow	Commodity Alfalfa	5	13	8
Uncompahgre River	Full Season Fallow	Cow-Calf Grass Hay	34	46	72
Cimarron River	Full Season Fallow	Commodity Alfalfa	125	274	56
Dolores River	Crop Switching	Crop Switching	129	115	176
Dolores River	Crop Switching	Crop Switching	126	114	104
Dolores River	Crop Switching	Crop Switching	62	34	97
Colorado River	Full Season Fallow	Commodity Grass Hay	16	38	10
Gunnison River	Full Season Fallow	Commodity Grass Hay	17	43	16
Colorado River	Full Season Fallow	Commodity Corn	16	39	20
Colorado River	Full Season Fallow	Commodity Corn	104	195	129
Yampa River	Full Season Fallow	Cow-Calf Grass Hay	31	66	33
Colorado River	Full Season Fallow	Cow-Calf Grass Hay	31	71	43
Surface Creek	Split Season Fallow	Cow-Calf Grass Hay	132	128	131
Plateau Creek	Full Season Fallow	Cow-Calf Grass Hay	93	63	93
Plateau Creek	Full Season Fallow	Cow-Calf Grass Hay	309	305	175
Plateau Creek	Split Season Fallow	Cow-Calf Grass Hay	49	66	45
Uncompahgre River	Storage Forbearance	Cow-Calf Grass Hay	N/A	105	105
Total				2,517	2,024

Table 9 - End of Season Conserved Consumptive Use (CCU) Comparison in New Mexico

Tributary	Project Type	Agricultural Type	Acreage	Contracted Estimated CCU (AF)	End of Season Estimated CCU (AF)
San Juan	Full Season Fallow	Various Crops	2,641	4,633	5,554

Table 10 - End of Season Conserved Consumptive Use (CCU) Comparison in Utah

Tributary	Project Type	Agricultural Type	Acreage	Contracted Estimated CCU (AF)	End of Season Estimated CCU (AF)
Price River	Storage Forbearance	Storage	N/A	480	480
Price River	Crop Switching	Crop Switching	150	114	85
Colorado River	Split Season Fallow	Commodity Alfalfa	353	275	456
Price River	Storage Forbearance	Storage	N/A	320	320
Green River	Full Season Fallow	Cow-Calf Alfalfa	124	238	204
Green River	Full Season Fallow	Cow-Calf Alfalfa	438	924	375
Price River	Full Season Fallow	Commodity Alfalfa	51	105	40
Green River	Full Season Fallow	Commodity Alfalfa	46	116	32
Price River	Split Season Fallow	Commodity Alfalfa	341	394	144
Price River	Full Season Fallow	Cow-Calf Alfalfa	529	539	620
Price River	Storage Forbearance	Storage	N/A	104	104
Price River	Full Season Fallow	Commodity Alfalfa	8	15	6
Green River	Full Season Fallow	Commodity Alfalfa	4816	9,094	10,361
Green River	Full Season Fallow	Cow-Calf Alfalfa	168	357	223
Price River	Full Season Fallow	Storage	N/A	12	12

Tributary	Project Type	Agricultural Type	Acreage	Contracted Estimated CCU (AF)	End of Season Estimated CCU (AF)
Price River	Full Season Fallow	Commodity Alfalfa	17	44	0
Price River	Storage Forbearance	Storage	N/A	1,279	1,279
Price River	Storage Forbearance	Storage	N/A	554	544
Price River	Full Season Fallow	Commodity Alfalfa	55	101	0
Green River	Full Season Fallow	Commodity Alfalfa	14	28	17
Total				15,091	15,301

Table 11 - End of Season Conserved Consumptive Use (CCU) Comparison in Wyoming

Tributary	Project Type	Agricultural Type	Acreage	Contracted Estimated CCU (AF)	End of Season Estimated CCU (AF)
Little Snake	Municipal/Industrial	Municipal	N/A	1,000	1,000
Green River	Municipal/Industrial	Industrial	N/A	8	8
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	585	856	374
Cottonwood Creek	Full Season Fallow	Cow-Calf Grass Hay	705	578	850
Blacks Fork	Storage Forbearance	Commodity Grass Hay	N/A	405	323
North Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	333	280	298
Henrys Fork	Full Season Fallow	Cow-Calf Grass Hay	157	191	60
South Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	21	31	9
Fontenelle Creek	Full Season Fallow	Cow-Calf Grass Hay	194	310	109
North and Middle Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	630	685	484
Big Sandy River	Full Season Fallow	Cow-Calf Grass Hay	221	329	166
Middle and South Piney Creeks	Full Season Fallow	Cow-Calf Grass Hay	2,898	2,742	1,671
North Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	563	771	355
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	61	78	49
South Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	558	718	389
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	37	34	19
North Piney Creek	Full Season Fallow	Cow-Calf Grass Hay	518	601	55
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	27	15	22
Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	62	95	35
Duck Creek and Pine Creek	Full Season Fallow	Cow-Calf Grass Hay	1,327	1,613	437
Little Snake*	Full Season Fallow	Cow-Calf Grass Hay	2,631	4,231	1,764
Total				15,570	8,477

*Project extended across the Colorado/Wyoming border

APPENDIX A



UPPER COLORADO RIVER COMMISSION

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2023 System Conservation Pilot Program (SCPP) Lessons Learned Summary

Introduction

At the 303rd Meeting of the Upper Colorado River Commission (UCRC) on June 16, 2023, the Commissioners requested that UCRC staff evaluate and compile “Lessons Learned” from the 2023 SCPP experience to inform potential consideration of future SCPP programs. The Commissioners also directed UCRC staff to identify opportunities to consider Demand Management Program (DM Program) demonstration projects or studies to inform potential future consideration of Demand Management feasibility by the Commission. UCRC staff have compiled lessons learned from the 2023 SCPP effort and outlined five broad themes for improvements with more than 20 specific recommendations for consideration in potential future programs. The recommendations are based on interviews with about 30% of the SCPP participants, Reclamation, NGOs, external commenters, and others. Further, UCRC staff have compiled four main messages conveyed by the SCPP participants for the Commissioners’ consideration. Finally, UCRC staff are providing three options for consideration regarding a potential SCPP effort in 2024.

Five themes to improve future SCPP:

1. **Timing:** All participants and interviewees indicated initiating a the SCPP process including request for proposals (RFP) for a program in early fall. An October 1 target for initiating is preferable.
2. **Pricing:** All participants and interviewees indicated a preference for firm fixed pricing (aka “take it or leave it” pricing) is preferable to the 2023 process which included a minimum acceptable price and individual negotiations for higher compensation on a case-by-case basis.
3. **Clarity on Conserved Consumptive Use (CCU) Calculations:** Many participants and interviewees outlined the need for greater clarity and certainty on the calculation of CCU, since is the basis for payment. They indicated that a process that begins in October would allow the participants time to consult with Upper Division States (UDS)/UCRC/UCRC consultants to provide certainty on the CCU calculations and basis of the proposed payment.
4. **Consistent and clear messaging:** All participants and most interviewees indicated that, due to the compressed timeframe, there were mixed messages, largely from parties outside of the SCPP, and some lack of consistency in describing key elements of the program. In addition, in one region, there were mischaracterizations that served to undermine confidence in the effort. Due to the UDS/UCRC/UCRC consultant focus on establishing the program in a very short

timeframe, the mischaracterizations went largely unchallenged. Consistent and persistent messaging over a longer time frame can help address misunderstandings and refute mischaracterizations.

5. **Greater transparency and clarity regarding approach, purpose, and review processes.** Several participants and interviewees noted the need for more clarity on the purpose and intent of the program. Several commenters requested greater transparency in understanding the review process. They suggested providing an outline and review flow chart for the process, so the public knew how to get more information.

Four messages conveyed by SCPP participants (e.g., farmers, ranchers, producers):

1. **SCPP provides a way to reduce risks to test new, innovative water management strategies to adapt their production to a drier future.** The SCPP provided a financial buffer which supported testing new tools.
2. **Participants would like to see the development of longer-term programs that support innovation, water efficiency investments, and new tools to build resiliency for their future.** Most participants are 4th or 5th-generation producers. They want longer-term tools and choices to build resiliency for their future.
3. **The participants want to protect vibrant, but fragile, local economies and therefore prefer production with lower water use to large-scale fallowing.** Interviewed participants support fallowing to transition to more water-efficient practices and to invest their system improvements but oppose large-scale rotational fallowing programs as a long-term tool.
4. **The participants forcefully expressed that their water and production are equally valuable. They do not consider any of their lands or production “marginal” or “less than” anyone else, locally or across the Basin.** They want and intend to participate in programs that bring new tools to support their future through local sustainability and resiliency.

Options for consideration of a potential SCPP in 2024:

1. **No 2024 Program**
 - a. Pros:
 - i. Allows for full focus on the post-2026 process
 - ii. Asserts that Upper Basin tools are narrow and limited
 - b. Cons:
 - i. Does not support innovation and development of new tools for Upper Basin water users
 - ii. Could invite unilateral actions from the Bureau of Reclamation (Reclamation)
 - iii. Optics of no Upper Basin “skin” to address Colorado River System risks
 - iv. Forgoing federal funding available to address Upper Basin interests
 - v. Contradicts what the Upper Basin stated it would do in its 5-Point Plan
2. **Revised 2024 SCPP Program (implement the recommended process improvements)**
 - a. Pros:
 - i. Tests revised approach to determining the potential scale of voluntary, temporary, and compensated conservation programs in the Upper Basin (i.e., in an optimal program, how big could we get?)
 - ii. Fully uses the SCPP tool using available federal funding

- iii. Broadens tools for consideration of a DM Program in the future
- b. Cons:
 - i. Both the UCRC and the States are likely to have bandwidth constraints with a larger program
 - ii. Implementing such a program may take staff time away from more important work (Post-2026 operations work)
 - iii. There is some risk that system water conserved through SCPP may be released from Lake Powell downstream in Water Year 2025, depending on 2025 operational determinations
 - iv. Doesn't explicitly assist with the development of longer-term tools/solution
- 3. Narrowly Purpose 2024 SCPP (implement improvement recommendations and provide project criteria that to inform DM Program demonstration projects and support local innovation and build drought resiliency)**
 - a. Pros:
 - i. Test a revised approach to assess process improvements
 - ii. Supports innovation and development of longer-term tools/solutions in the Upper Basin
 - iii. Informs future consideration of a DM Program through demonstration projects and exploration of provisional accounting
 - iv. May reduce risk to Upper Basin system conservation while attempting to protect/preserve conserved water
 - v. Promotes cooperation with the Bureau of Reclamation to figure out how to potentially manage a DM Program
 - b. Cons:
 - i. Bandwidth considerations
 - ii. Will require clear and consistent messaging on purpose and intent to avoid a perception of discrimination
 - c. Examples of DM Program Studies and Projects
 - i. Mainstem and proximal tributaries conservation and accounting that may avoid shepherding and facilitate exploration of accounting (i.e. areas or reaches that have limited to no history of calls or broad participation on a reach)
 - ii. Flowing resulting in reservoir storage and exploration of accounting with potential winter release studies (e.g., Navajo Indian Irrigation Project/Navajo Agriculture Products Industries)
 - d. Examples of Local Innovation and Drought Resiliency Projects
 - i. Crop-switching conservation and exploration of accounting and quantification
 - ii. Alternative irrigation strategies resulting conservation with exploration of quantification and accounting
 - iii. Flowing projects that support on-farm improvements or transition to lower water use crops along with exploration of accounting and quantification

APPENDIX B

Upper Colorado River Basin System Conservation Pilot Program (SCPP) Timeline for 2023 Program

June 2022 – Reclamation Commissioner Touton requests Colorado River Basin States take action to protect the Colorado River System due to the impending crisis at Lake Powell and Lake Mead

July 2022 – Upper Division States (UDS) of Colorado, New Mexico, Utah, and Wyoming, acting through the Upper Colorado River Commission (UCRC), outline a [5-Point Plan](#) detailing strategic actions to contribute to protecting the Colorado River System

August 2022 – UDS, acting through UCRC at a UCRC Special Meeting, direct staff to begin developing a System Conservation Pilot Program (SCPP).

August 2022 – President Biden signs the Inflation Reduction Act (IRA), which appropriates \$4B for drought mitigation and conservation activities in the Reclamation States, including funding for the SCPP, with priority given to the Colorado River Basin.

September – October 2022 – UCRC Staff and U.S. Bureau of Reclamation (Reclamation) staff draft the SCPP [Funding Agreement](#), [Facilitation Exhibit](#), and [System Conservation Implementation Agreement \(SCIA\) Template](#).

November 2022 – UDS, acting through UCRC at a Special UCRC Meeting, approve the Funding Agreement with Reclamation regarding the SCPP funding, project selection criteria, and process to govern how the UDS, acting through UCRC, would work with Reclamation staff to select projects for 2023 SCPP

- The Funding Agreement details the multi-layer project application review process involving a contractor, the UDS, UCRC, and Reclamation
- The Funding Agreement also details the multi-layer project monitoring, verification, and review process, involving a contractor, UDS, UCRC, and Reclamation

December 2022 – UDS approve the initiation of a Notice of Intent to proceed [with Request for Proposals \(RFP\)](#) (UCRC staff draft a Notice in coordination with Reclamation). [All SCPP outreach materials posted on the UCRC website.](#)

December 2022 – U.S. Congress provides authorization to conduct SCPP through the UCRC

January 6, 2023 – Reclamation executes the SCPP Funding Agreement

January 2023 – UCRC staff work with UDS to draft and review SOW for Wilson Water Group (WWG) for SCPP services

January 18, 2023 – UCRC staff, in collaboration and with assistance from UDS and Reclamation staff, [conduct outreach meetings \(webinars\)](#) regarding the SCPP initiation

February 2023 – UCRC staff, through requests from key stakeholders (NGOs and Tribes), extend the RFP deadline for 2023 SCPP to March 1st

March 2023 – WWG, UDS, and UCRC begin review of SCPP applications for conformance with State water management policies and eligibility criteria – conduct weekly meetings as well as ad hoc meetings

March 2023 – UCRC staff meeting with Reclamation staff on the status of reviews and outline Reclamation’s timeline for review and approval of SCPP applications

April 2023 – UDS and UCRC staff recommend projects to move forward for consideration – UDS, acting through the UCRC at a UCRC Special Meeting, direct the UCRC to move forward with recommended projects – UCRC/WWG provide recommended projects to Reclamation for review and consideration

May 2023 – UDS and Reclamation give their final approvals and SCIAs are executed

May – June 2023 – Initial payments provided to SCPP participants, per their SCIAs

June – October 2023 – Monitoring and verification (monthly reviews consisting of a mix of in-person visits by UDS, UCRC, and WWG staff, and remote-sensing analysis)

October 2023 – Closeout reviews and development of final verification reports with each report reviewed by staff for the UDS, the UCRC, and Reclamation

October – December 2023 – Final payments provided to SCPP participants, per verification and their SCIAs

January – March 2024 – Preparation of 2023 SCPP review and report to Reclamation