Fiscal Year 2024 Work Plan

July 1, 2023

THE COLORADO RIVER AUTHORITY OF UTAH

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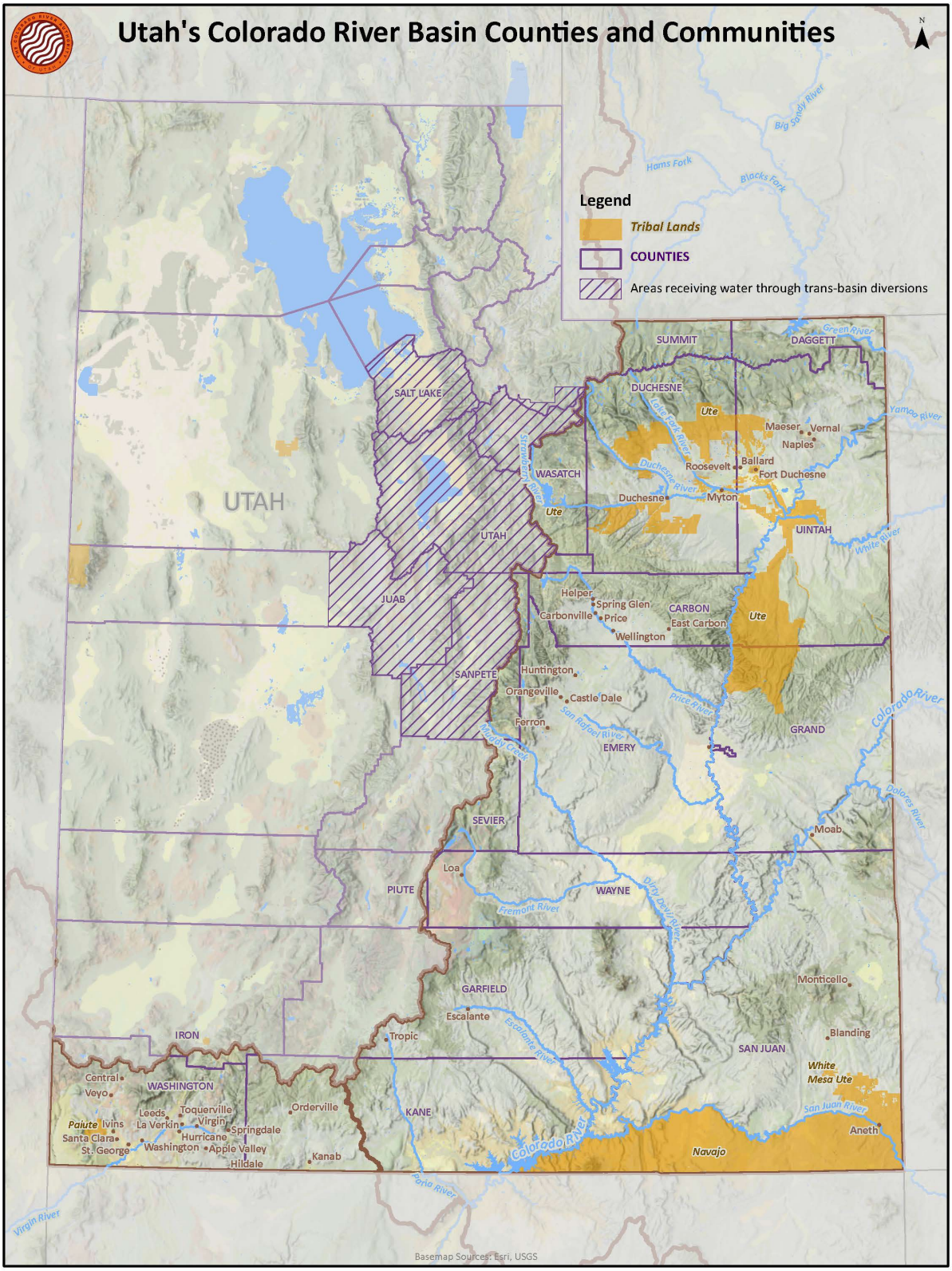
Utah's Colorado River Basin Counties and Communities
N
Legend
Tribal Lands
COUNTIES
Areas receiving water through trans-basin diversions
UTAH
SUMMIT
DAGGETT
DUCHESNE
SALT LAKE
WASATCH
UTAH
JUAB
SANPETE
SEVIER
PIUTE
WAYNE
EMERY
GRAND
CARBON
UINTAH
GARFIELD
KANE
IRON
WASHINGTON
SAN JUAN
Ute
Navajo
White Mesa Ute
Paiute
Maeser
Vernal
Naples
Ballard
Roosevelt
Fort Duchesne
Duchesne
Myton
Helper
Spring Glen
Carbonville
Price
East Carbon
Wellington
Huntington
Orangeville
Castle Dale
Ferron
Loa
Moab
Monticello
Blanding
Aneth
Tropic
Escalante
Orderville
Kanab
Central
Veyo
Leeds
Toquerville
Virgin
Springdale
Ivins
La Verkin
Santa Clara
Hurricane
St. George
Washington
Apple Valley
Hildale
Green River
Yampa River
White River
Colorado River
Dolores River
Price River
San Rafael River
Fremont River
Dirty Devil River
Escalante River
San Juan River
Big Sandy River
Hams Fork
Blacks Fork
Lake Fork River
Duchesne River
Strawberry River
Virgin River
Paria River
Basemap Sources: Esri, USGS

1 EXECUTIVE SUMMARY

In April 2022, the Colorado River Authority of Utah (Authority) approved a five-year Colorado River Management Plan (Management Plan) to accomplish its statutory mission to "protect, conserve, use, and develop Utah's waters of the Colorado River system." 63M-14-102, et seq. The Management Plan began July 1, 2022, and continues through June 30, 2027 (fiscal years 2023 – 2027). The Management Plan was developed with the intention of being dynamic to respond to changing hydrology and conditions in the Colorado River Basin.

In accordance with the Management Plan, annual plans (Work Plans) will be developed and approved by the Authority board. The Work Plans will include activity details, estimated budgets, and time frames for each remaining year of the Management Plan.

This document is the Authority's Fiscal Year 2024 (FY24, July 1, 2023, to June 30, 2024) annual Work Plan, constituting the Management Plan's second annual Work Plan. Accordingly, there are both ongoing Colorado River activities that began under the FY23 Work Plan, as well as new Colorado River activities being initiated.

This Work Plan includes:

- Participation in intrastate and interstate Colorado River commitments
- Investigation and analysis of water supply and use measurement gaps
- Installation and maintenance of agricultural consumptive use measurement instrumentation to improve accuracy of remote sensing technology and other water use optimization efforts
- Acquisition of consumptive use data using satellite-based remote sensing technology
- Research supporting water supply forecasting improvements
- Research supporting water use optimization and demand reduction
- Drought mitigation pilot projects
- Development of an accounting and forecasting model for the Colorado River System in Utah
- Modeling to evaluate the effectiveness of proposed operations under the Drought Response Operations Agreement (DROA), other operations related to the 2019 Drought Contingency Plans (DCP), and/or emergency actions taken in response to river conditions in the short to mid-term
- Modeling to evaluate long-term Colorado River operating policy
- Oversight of Authority Advisory Councils

Table 1. Summary of FY24 Work Plan elements, budgets, and funding sources. The total fiscal year 2024 budget for this Work Plan is **$7,529,400**[1,2].

Priority Area	Work Plan Element	FY24 Budget[1]	FY25-27 Est. Budget[3]	Funding Source[4]
Colorado River Intrastate and Interstate Activities				
2	Intra/Interstate Engagement[4]	$1,663,400	$5,323,900	Annual Appropriations, In-kind
Measurement				
3.1	Metering and Gaging	$1,000,000[5]	$0	One-time Appropriation
3.2.1	Utah Flux Network	$83,000	$390,400	One-Time Appropriation
3.2.2	Open ET	$733,000	$1,179,500	One-Time Appropriation
Hydrology and Operations				
4.1	Short- and Mid-Term Operations modeling (CRMMS 24 Month Study/ESP)	$200,000	$150,000	One-time Appropriation/In-Kind
4.2	Long-Term Operations modeling (CRSS)	$613,000	$787,000	In-kind Contributions
4.3	Utah Climate Center (UCC) Weather Stations	$20,000	$90,000	One-Time Appropriation
4.3	Climate and Hydrology Work Group: Consumptive Use Modeling Study	$50,000	$50,000	One-time/In-kind
4.4	Snowpack and Runoff Hydrology Research	$650,000	$1,350,000	One-time Appropriation, In-Kind, Federal Funds
Drought Mitigation				
5.1	Agricultural Water Resiliency Study	$400,000	$0	In-kind
5.2.1	Utah State University (USU) Agricultural Water Optimization Project	$0	$0	In-kind
5.2.2	NDrip Irrigation Project	$0	$0	In-kind
5.3.1	System Conservation Pilot Program	$105,000	$0	One-Time Appropriation
5.3.2	Agricultural Demonstration Research Implementation Pilot Program	$1,000,000	$4,000,000	One-time Appropriation, In-Kind
5.3.3	Demand Management Pilots	TBD	$5,000,000	One-time
5.4.1	Utah Colorado River Accounting and Forecasting Model-Duchesne River Drainage Pilot	$389,000	$254,000	One-time
5.4.2	Utah Colorado River Accounting and Forecasting Model-San Rafael and Price River Drainages	$362,000	$348,000	One-time
Advisory Councils				
6	Advisory Councils	$281,000	$843,000	Annual Appropriations
	Total	**$7,529,400**	**$20,381,300**	

[1]Total provided for under this Work Plan. Work Plan budgets are subject to adjustment depending on conditions and activities in the Colorado River Basin that may be unknown when the Work Plan was developed.

[2]The approved annual budget for FY23 was $4,361,000.

[3]Total cost reflects estimate of three fiscal years from FY25 to FY27.

[4]Estimated costs are for Authority staff and in-kind contributions only and do not include charges of other state agencies participating.

[5]Funding from FY24 appropriation to DWRi and then to the Authority.

2 FISCAL YEAR 2024 WORK PLAN

This Fiscal Year 2024 Work Plan (FY24 Work Plan) describes Management Plan activities scheduled for FY24. The FY24 Work Plan also includes estimated costs, timeframes, and the relationship of each activity to the three Management Plan priority areas of Measurement (Section 3), Hydrology and Operations (Section 4), and Drought Mitigation (Section 5). Consistent with the mission of the Authority, the purpose of the Management Plan and associated annual Work Plans is to "*ensure that Utah can protect and develop the Colorado River System and work to ensure that Utah can live within the state's apportionment of the Colorado River System.*"

Activities and FY24 Work Plan elements described herein are supported by funding from several sources as illustrated in Table 1. These include annual ongoing appropriations and one-time appropriations to the Authority from the Utah Legislature, in-kind goods and services provided to the Authority by Colorado River water users and appropriations supporting activities performed by the Department of Natural Resources (DNR) in coordination with the Authority.

Certain activities to be performed during FY24 are reflected in the FY24 Work Plan as participation in work groups, teams, and committees, rather than being ascribed to a single focus area in the Work Plan. These activities are described in Section 2.1.

2.1 Interstate Colorado River Engagement

The Authority and partnering state of Utah entities are engaged in numerous intrastate and interstate Colorado River commitments, including but not limited to the Upper Colorado River Commission (UCRC), endangered fish recovery programs (Upper Colorado River Endangered Fish Recovery Program and San Juan Recovery Implementation Program), Glen Canyon Dam Adaptive Management Program, and the Salinity Control Forum. Additionally, there are ongoing intrastate activities that are not formally organized; however, it is appropriate to acknowledge them because of their critical role in successfully representing the interests and obligations embodied in the Authority mission. Table 2 tabulates interstate work groups, committees, and the participating organization[s]. Some of these are permanent groups, and others have been established to work on temporary and specific issues. Because of their temporary nature, this list may be added to, or reduced, during the fiscal year.

Table 2. List of Colorado River Interstate Activities.

Work Group, Committee	Utah Participating Organization
Standing UCRC Committees	
UCRC Legal Committee	Office of the Attorney General (OAG)
UCRC Engineering Committee	Authority/Division of Water Resources (DWRe)/Water Users
Ad Hoc UCRC, Upper Division State and Basinwide Work Groups and Committees	
UCRC Demand Management Committee	Authority/DWRe
UCRC Technical Team	Authority/DWRe
UCRC Depletion Demand Schedule Workgroup	Authority/DWRe/Water Users
Upper Basin Irrigated Agricultural Consumptive Use Study Workgroup	Authority/DWRe
Upper Basin Drought Response Operations Agreement Workgroups	Authority/OAG
Basin States Technical Work Group	Authority
US-Mexico Minute 323 Binational Work Groups	Authority
Colorado River Basin Climate and Hydrology Work Group	Authority/DWRe
Environmental and Water Quality	
Colorado River Salinity Control Forum	DWRe
Glen Canyon Dam Adaptive Management Program	
Adaptive Management Work Group (AMWG)	Authority/DWRe
Planning and Implementation Team	Authority/ DWRe
Technical Work Group (TWG)	Authority/DWRe
Upper Colorado River Fish Recovery Program	
Implementation Committee	Division of Wildlife Resources (DWR)
Management Committee	Department of Natural Resources (DNR)
Biology Committee	DWR
Water Acquisition Committee	Authority/Water Users
San Juan Recovery Implementation Program	
Coordination Committee	DNR
Biology Committee	DWR

3 MEASUREMENT

3.1 Streamflow and Diversion Measurement

3.1.1 Metering and Gaging Gap Analysis

Description

Investigation and analysis of water supply and use measurement gaps in the Colorado River Basin in Utah is the first step to supporting accurate measurement and distribution of Colorado River water. The Metering and Gaging Gap Analysis (Gap Analysis) assesses stream gaging and measurement needs on the Colorado River mainstem and its tributaries in Utah, including an estimation of the cost of installation or reinstallation of stream gages and installation of new or upgrades to existing measurement methods. This work will inform next steps in improving and expanding the metering and gaging system within the Colorado River Basin of Utah, which will facilitate implementation of drought mitigation measures.

FY23 Progress

After a competitive procurement process, the Gap Analysis contract was awarded to Bowen, Collins, and Associates (subcontract with Jones and Demille Engineering) with an effective project duration of November 1, 2022 through June 30, 2023. The selection team included representatives from the Authority, DWRi, DWRe, Central Utah Water Conservancy District (CUWCD), and Emery Water Conservancy District (EWCD).

The Gap Analysis consisted of three main phases: collection and organization of existing data, stakeholder interviews, and analysis and reporting. Stakeholder interviews were used to (1) verify existing data, (2) solicit information on measurement needs and proposed gaging locations, (3) obtain detailed attributes for existing gages (e.g., condition, owner, etc.), and (4) solicit general feedback and perspectives on metering and gaging gaps. The project team conducted 20 interviews over 10 weeks, mainly with DWRi regional engineers, river commissioners, and conservancy districts. The information obtained in the interviews was merged with the existing data and served as the basis for the Gap Analysis. Throughout the project, three agency coordination workshops were held with participation from Authority staff and contractors, DWRi, DWRe, UCRC, and the United States Geological Survey (USGS). The purpose of these coordination workshops was to solicit feedback and direction on data, gap definitions and characterization, prioritization of gaps, and the final project deliverables (report and geodatabase).

Throughout FY23, the project remained on-schedule, on-budget, and within the project scope. The deliverables were finalized on June 30, 2023, and include a detailed geodatabase (and supporting geospatial analysis) and a final report. The report provides an overview of the various project components, synthesizes the different data gaps, and outlines a preliminary gap prioritization and cost estimate.

FY24 Work Plan
In early FY24, the Authority will evaluate the Gap Analysis report and geodatabase to inform other activities related to metering and gaging in the FY24 Work Plan (Sections 3.1.2, 3.1.3). The Authority will also share the Gap Analysis deliverables with interested agencies and stakeholders and continue coordination of next steps in improving the metering and gaging system within Utah's Colorado River Basin.

Contract Effective November 2022 - June 2023

- A competitive procurement process was conducted to engage a contractor to conduct the Gap Analysis.

Budget, Funding Source(s), and Time Frame

- FY23: $300,000
- FY24: No additional costs
- One-time appropriations
- Gap Analysis completion June 30, 2023

Key Partners

- Bowen, Collins, and Associates (contractor)
- Jones and Demille Engineering (subcontractor)
- Stakeholder Interviewees (local knowledge)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- Precision Water Resources Engineering (technical collaboration)
- Follum Hydrologic Solutions (technical collaboration)
- United States Geological Survey (technical collaboration)
- Upper Colorado River Commission (interstate technical collaboration)

3.1.2 Coordination and Implementation Plan

Description
A Coordination and Implementation Plan for metering and gaging improvements is the intermediate step between the Gap Analysis and on-the-ground implementation of metering and gaging improvements in the Colorado River Basin in Utah. This effort involves further planning and coordination between the Authority and other local, state, and federal entities on addressing the gaps described in the Gap Analysis. This may include consideration of state and federal funding mechanisms for both capital costs and long-term operations and maintenance expenses. A goal of this plan is to leverage agency coordination and to identify improvements that are mutually beneficial to the Authority and partner entities.

FY24 Work Plan
The scope of this action will be informed by the outcome and findings of the Gap Analysis and will be coordinated with partner agencies.

Potential Contractual Services

- To be determined early in FY24

Budget, Funding Source(s), and Time Frame

- If contracting services are needed, a competitive procurement process may be required
- Funding may come from one-time appropriations
- Anticipated duration: FY24

Key Partners

- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- United States Geological Survey (technical collaboration)
- Upper Colorado River Commission (interstate technical collaboration)
- Local Water Entities (technical collaboration)

3.1.3 Instrumentation and Maintenance

Description

Under this task, the Authority will pursue on-the-ground improvements to the stream gaging and diversion metering network within the Colorado River Basin in Utah. This effort supports the initial purchase and installation of measurement infrastructure (capital costs) as well as long-term operations and maintenance costs. This effort will be informed by the activities described in Sections 3.1.1 and 3.1.2 of the FY24 Work Plan and by partner agency and stakeholder coordination.

FY24 Work Plan

Following a thorough review of the Gap Analysis deliverables and coordination with partner agencies (e.g., DWRi, DWRe), work in FY24 will focus on implementing high priority measurement improvements identified through the Gap Analysis. While the Coordination and Implementation Plan is being developed (Section 3.1.2), FY24 efforts will likely focus on readily achievable improvements, such as installing telemetry on existing high priority diversions or cooperatively funding existing gages (e.g., USGS). In addition, metering and gaging infrastructure may be installed in coordination with the UCRC and funding available through the Bipartisan Infrastructure Law (BIL) Drought Contingency Plan (DCP) to address infrastructure needs in the Upper Colorado River. The scope of these immediate improvements will be identified early in FY24 and in coordination with partner entities.

Potential Contractual Services

- To be determined early in FY24

Budget, Funding Source(s), and Time Frame

- $1M appropriation from DWRi
- BIL DCP Appropriations through UCRC (to be determined in FY24)
- Duration to be determined between the Authority and DWRi

Key Partners

- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- United States Geological Survey (technical collaboration)
- Upper Colorado River Commission (interstate technical collaboration)
- Local Water Entities (technical collaboration)

3.2 Consumptive Use Measurement

3.2.1 Utah Flux Network

Description

The Authority is investing in the Utah Geological Survey's (UGS) Utah Flux Network (UFN) to support measurement of consumptive water use from field to basin scale within the Colorado River Basin in Utah. UFN is a new and growing assemblage of Eddy Covariance (EC) towers, instruments that provide the best-available measurement of field-scale evapotranspiration, or consumptive water use. Although EC towers provide accurate evapotranspiration measurements, they are only fully representative of the field in which they are located, and they are expensive to acquire and maintain.

UGS will use UFN EC tower data to ground-truth the larger scale, remotely-sensed evapotranspiration data from OpenET (Section 3.2.2). UGS will acquire, install, and maintain EC towers in the Colorado River Basin in Utah, and perform data management, analysis, and intercomparison. Data and results from the UFN will support the Authority's objectives of defensible, accurate, and timely measurement that builds trust in decision making, optimized consumptive water use, and verifiable execution of drought mitigation projects. UFN activities on behalf of the Authority also complement and support an existing memorandum of understanding between DWRi and UGS.

FY23 Progress

Under an Interagency Funding Agreement with the Authority, UGS purchased six new EC towers from Campbell Scientific, and agreements were initiated with landowners to locate an EC tower on their property. Three EC towers were either already installed and maintained by UGS through FY23 or acquired to be updated or installed in a new location. A summary of all EC Towers is included in Table 3. UGS developed code and protocol to thoroughly and efficiently streamline management of raw data, data quality assurance and quality control, and post-processing needed to generate reliable flux information. Development of the data management protocol was based on best practices established by academic partners, academic literature, and Campbell Scientific. Five UGS

staff and one Authority staff attended a three-day EC tower training at Campbell Scientific to build capacity and knowledge for management of the instruments and data. One new EC tower installation was completed at Dugout Ranch at The Nature Conservancy's Canyonlands Research Center (Figure 1, Table 3).

Ground-truthing and intercomparison of remotely-sensed evapotranspiration data with EC tower data and other available datasets began with a case-study of the EWCD service area, with a report expected early in FY24. The initial case-study has been used to learn what validation methods are effective and what data is still needed to substantiate remotely-sensed data. Local water leaders from EWCD and DWRi Southeastern Region Office have provided insight into the validation process as the Authority expands applications of remotely-sensed and ground-based data.

Table 3. EC tower status summary.

#	Location	Funding Source	New or Pre-existing Instrument	Contract with Landowner	Status & Notes
1	Wellington	CUWCD	Pre-existing	Complete, Underway	Installed, maintenance and data QAQC
2	Matheson	DWRi, Reclamation	Pre-existing	Complete, Underway	Installed, maintenance and data QAQC
8	Nephi[5]	DWRi, Reclamation	Pre-existing	TBD	Will be relocated to Colorado River Basin in Utah, likely a mobile temporary site to support existing locations and other research
3	Dugout	Authority	New	Complete, Underway	Intalled, establishing remote communications
4	Myton	Authority	New	Complete, Scheduled	Installation scheduled Fall 2023
5	Cedar Mesa	Authority	Pre-existing tower, replacing all instruments	Complete, Scheduled	Phenocam added Transfer scheduled October 2023 On state land Partnership with Northern Arizona University and University of Utah
6	Bluff	Authority	New	Complete, In Scheduling	Installation to be scheduled
7	Escalante	Authority	New	In Review	Contracting to be completed Installation to be scheduled
8	Orchard	Authority	New	In Development	Contracting to be completed Installation to be scheduled

[5]Outside Colorado River Basin in Utah, water supplied by Colorado River Basin in Utah

Figure 1. EC Tower installed at Dugout Ranch, part of the Canyonlands Research Center

FY24 Work Plan

In FY24, the UFN will expand upon the efforts started in FY23. EC Tower siting will be completed, acquired instruments will be installed and data will be collected, post-processed and analyzed. As needed, adjustments to instrument locations will take place. Intercomparison of EC Tower data with OpenET and other available datasets will proceed, with close collaboration with the OpenET team and discipline experts. Staff training within UGS and the Authority will continue, ensuring the UFN has adequate personnel support. Finally, UGS will continue to collaborate with local water managers and water users to build trust in UFN's findings.

Contract Executed July 2022

- Interagency Funding Agreement with UGS

Budget, Funding Source(s), and Time Frame

- FY23 - FY27: $1,030,000
- FY23: $557,000
- FY24: $83,000
- One-time appropriation
- Capital cost of EC Tower acquisition in FY23
- 2022 - 2027, Management Plan 5-year duration

Key Partners

- Utah Geological Survey (contractor)
- OpenET (technical collaboration)
- Trout Unlimited and The Nature Conservancy (local knowledge)
- Landowners (host instruments)
- Division of Water Rights (local knowledge and technical collaboration)
- Emery Water Conservancy District (local knowledge)
- Upper Colorado River Commission (interstate technical collaboration)

3.2.2 OpenET

Description

OpenET will support measurement of consumptive water use from field to basin scale within the Colorado River Basin in Utah. OpenET has developed a platform for public, transparent, and reproducible measurement and reporting of evapotranspiration (also referred to as depletion or consumptive water use in agriculture) using remote sensing. Remote sensing uses satellite imagery of the entire surface area of a landscape, enabling consistent analysis of the Colorado River Basin and aligning the Authority with interstate water management efforts. Remote sensing of consumptive water use is a relatively new method and requires ground-truthing and continued verification research. Therefore, OpenET data will be intercompared with UFN EC Tower data (Section 3.2.1) through collaboration between each team and coordination by the Authority.

The Authority requires consumptive use data to:

1 Link consumptive use of water to place of use associated with a water right;
2 Evaluate priority distribution as a function of consumptive use for evaluation of planning scenarios and drought mitigation measures, and implementation of drought mitigation programs;
3 Access near "real time" consumptive use data (approximate 21-day latency) for implementation and verification of drought mitigation measures;
4 Plan infrastructure (modifications to, improvements to, and/or new infrastructure); and
5 Standardize calculation of consumptive use with the Upper Colorado River Basin.

OpenET will provide (1) administrative support through training, review of reports reliant upon OpenET data, data services and access, (2) data improvement through historic data production (from 1992 to current), crop type and land use updates, and consumptive use accounting for

effective precipitation, and (3) data comparison through correlation of historic OpenET data to crop coefficient methods. Together, these deliverables will provide a longer and higher frequency dataset than is publicly available and will streamline the process for incorporating effective precipitation for consumptive use determination, while improving the publicly available data. Through the above applications and others, OpenET's products will support the Authority's objective of establishing confidence in remote sensing methods and their applications to drought mitigation planning, implementation, and verification (Section 5).

FY23 Progress

In FY23, OpenET began work on the three service areas: administrative support, data improvement, and data comparison. For administrative support, OpenET and the Authority established administrative protocols, OpenET reviewed Jacobs Engineering's (Jacobs) draft Agricultural Water Resiliency Report and DWRe's preliminary comparison of OpenET and GridET, and OpenET fulfilled initial data requests and access administration for UGS, Jacobs, and Precision Water Resources Engineering/Follum Hydrologic Solutions. For data improvement, OpenET worked with the Authority and DWRe to vet field boundaries. For data comparison, OpenET assessed and selected ground-truthing instrumentation in and outside of the Colorado River Basin in Utah and developed a reference manual on how to compare OpenET data with other data sets. Together, these efforts laid the foundation for the remainder of the work to be performed by OpenET for the Authority.

FY24 Work Plan

In FY24, OpenET will continue contracted efforts for the Authority. Tasks will focus on producing and providing datasets to Authority collaborators, comparison of OpenET results with other datasets, and evaluation of additional ground-truthing measurements needed to confirm the reliability of OpenET data. Close coordination between the Authority, OpenET, partner agencies, other Authority contractors, and local water managers will occur throughout all efforts.

Contract Effective January 2023

- Sole Source contract with OpenET

Budget, Funding Source(s), and Time Frame

- FY23 - FY26: $2,541,000
- FY23: $629,000
- FY24: $733,000
- One-time appropriation
- 2023 - 2026, majority of Management Plan 5-year duration

Key Partners

- OpenET (contractor)
- Utah Geological Survey (technical collaboration)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)

4 HYDROLOGY AND OPERATIONS

4.1 Short- and Mid-Term Operations Modeling

Description
Evaluating ongoing and proposed coordinated operations of Lakes Powell and Mead is necessary to determine whether their management is in accordance with agreements, legislation, and to inform Authority leadership of potential water supply impacts. Robust evaluation, considering a range of potential hydrologic conditions, is best accomplished using computer simulations and is an important element of the Authority's annual Work Plan.

The United States Bureau of Reclamation (Reclamation) models short- and mid-term operations of the Colorado River mainstem reservoirs using computer simulation that approximates system performance based on a variety of input factors and assumptions, including historic operations, maintenance, hydrology, etc. The computer simulation platform, called RiverWare, allows Reclamation to determine the likelihood of different system conditions occurring for up to five years. Reclamation's short-term model, projecting conditions from zero to two years, is called the 24-month study and its mid-term model is called the Colorado River Mid-term Modeling System (CRMMS), which projects system conditions for the subsequent five years. The 24-month study is driven by direct operational inputs provided by Reclamation staff, precluding the model from being run by any organization other than Reclamation. CRMMS, on the other hand, is rule-based and is made publicly available by Reclamation. CRMMS also provides the ability to evaluate probabilistic system conditions, informing operators and stakeholders of the risk of certain conditions occurring, given projected forecasts and initial conditions.

The Authority uses CRMMS to evaluate operating proposals under the 2007 Interim Guidelines (which govern the coordinated operations of Lake Powell and Lake Mead), the effectiveness of proposed operations under the Drought Response Operations Agreement (DROA), and other operations related to the 2019 Drought Contingency Plans (DCP) and/or emergency actions taken in response to river conditions in the short to mid-term.

FY23 Progress
The need to protect critical elevations in Lake Powell resulted in a variety of unique operational changes in FY23, and effects of similar operational changes from FY22 persisted into FY23. Upstream Colorado River Project (CRSP) reservoirs, in particular Flaming Gorge, were also impacted due to ongoing implementation of DROA. Throughout FY23 the Authority has been monitoring and evaluating the impact of these changes monthly to ascertain the effectiveness of the changes.

As poor hydrologic conditions lingered through the summer of 2022, Reclamation determined it was necessary to pursue authority for additional operational flexibility at Lake Powell and

Lake Mead, including reducing releases below the 2007 Interim Guideline limits, in order to protect critical elevations through 2026 (expiration of the 2007 Interim Guidelines). In the fall of 2022, Reclamation released a Notice of Intent (NOI) to complete a Supplemental Environmental Impact Statement (SEIS). The issuance of the NOI triggered related activities, including development and consideration of scenarios for expanded Federal flexibility to protect critical elevations at these reservoirs. Modeling activities were critical to inform Authority management of the benefits and impacts of proposed operational alterations. The SEIS process continued from fall 2022 through the duration of FY23.

FY24 Work Plan

Short- and mid-term modeling activities are driven by real-time reaction to hydrologic and system storage conditions. Monitoring and evaluation performed in FY22 and FY23 will continue in FY24, including tracking DROA recovery operations and potential injury to the Upper Basin States from the mining of Lake Powell storage and Reclamation's inclusion of DROA water in balancing calculations. Further modeling activity is planned to support ongoing SEIS activities. Reclamation plans to complete the SEIS by the end of calendar year 2023 with the issuance of a Final Environmental Impact Statement (FEIS) and Record of Decision (ROD).

Pre-existing Contract

- Multi-year contract with Precision Water Resources Engineering established through a competitive procurement process

Budget, Funding Source(s), and Time Frame

- FY23 – FY26: $500,000
- FY23: $150,000
- FY24: $200,000
- Work under this activity is provided through in-kind contributions
- Work under this activity is variable and driven by the actual condition of the river system

Key Partners

- Precision Water Resources Engineering (contractor)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- United States Bureau of Reclamation (technical collaboration)
- Central Utah Water Conservancy District (in-kind contributions)

4.2 Long Term Operations Modeling

Description

The 2007 Interim Guidelines, which govern the coordinated operations of Lakes Powell and Mead, will expire December 31, 2025. This operating policy has a significant bearing on system conditions, second only to hydrology. Similar to short- and mid-term operational evaluation,

long-term planning and operating policy performance evaluation is completed using RiverWare modeling. Reclamation has developed, and made public, its Colorado River Simulation System (CRSS) model to evaluate long-term operating policy. This work includes evaluating system performance under a variety of hydrologic conditions and water use demands when using 2007 Interim Guidelines, variation of the 2007 Interim Guidelines, and other alternative coordinated operations of Lake Powell and Lake Mead.

FY23 Progress

The Authority has been actively engaged in evaluating the effectiveness of the 2007 Interim Guidelines, including sensitivity analyses of various operating policy parameters, and consideration of an entirely new operating policy framework. Prior to development of the FY23 Work Plan, the Authority developed a model analysis tool that facilitates rapid comparison of operating policies. Using this tool, the Authority has gained a greatly enhanced understanding of system performance drivers and tradeoffs. Further, the Authority is able to evaluate factors that increase Colorado River supply risks as they pertain to the basin, and Utah. These modeling activities continued throughout FY23. Concurrent with the Authority's activities is a parallel UCRC process in which Utah participates. These activities are being completed in advance of a formal NEPA process to replace the 2007 Interim Guidelines that will begin in summer 2023.

FY24 Work Plan

The bulk of post-2026 operation policy development and negotiation is expected to occur in FY24. Modeling that was completed by the Authority in FY23 and earlier will support and form the technical foundation of Utah's engagement in this process. As the process advances, the Authority will leverage its technical insights and engage in opportunities to further a sound, defensible replacement of the 2007 Interim Guidelines, including advocating for a policy that produces a resilient, adaptable, implementable, sustainable, and equitable Colorado River System. Additionally, the Authority will independently analyze relevant alternate operating policies that may be proposed by the Federal government, or other Colorado River stakeholders. Modeling support in FY24 is anticipated to be ongoing throughout the year.

Pre-existing Contract

- Multi-year contract with Precisions Water Resources Engineering established through a competitive procurement process

Budget, Funding Source(s), and Time Frame

- FY23 – FY27: $2,000,000
- FY23: $600,000
- FY24: $613,000
- Work under this activity is provided through in-kind contributions
- Work under this activity is variable and driven by the actual condition of the river system

Key Partners

- Precision Water Resources Engineering (contractor)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- United States Bureau of Reclamation (collaborator)
- Upper Colorado River Commission and Upper Division States (interstate technical collaboration)
- Central Utah Water Conservancy District (in-kind contributions)

4.3 Climate and Hydrology Research

Description

Recognizing hydrologic research is often iterative and responsive to new discoveries and challenges, the Authority has a small and flexible budget item to support emerging research when opportunities arise that directly support the Management Plan. Two research projects are currently supported by this budget:

1 The Authority is financially supporting the operation and maintenance of 15 weather stations across the Colorado River Basin by the Utah Climate Center (UCC), housed under USU. Research conducted by the UCC using the 15 weather stations will improve our knowledge of variability and predictability of precipitation for forecasting. Precipitation forecasting research increases confidence in water supply and demand forecasts and remotely-sensed evapotranspiration data, supporting better measurement for hydrology and operations planning and drought mitigation implementation.

2 The Authority is financially supporting Phase II of an Upper Colorado River Basin consumptive use modeling study by Research Triangle Institute International (RTI). The project is managed by the Colorado River Climate and Hydrology Work Group, with the Authority and several other entities as funding partners. The first phase of the consumptive use modeling effort began in 2021 and compared the State of Colorado's StateCU and StateMod models with Colorado Basin River Forecast Center (CBRFC) models. The second phase began in 2023, runs through 2025, and will expand this comparison and development of models to New Mexico, Utah, and Wyoming and incorporate remotely-sensed evapotranspiration data. This research initiative will verify similar consumptive use models, ensuring consistency between states and enabling science-based drought mitigation strategies.

FY23 Progress
For the two existing Climate and Hydrology Research projects, progress was made as follows:

1 The funding support continued, and research was synthesized with UFN and OpenET data comparison efforts and other relevant Work Plan projects.

2 Funding support was committed.

FY24 Work Plan
The Authority remains committed to tracking and pursuing novel, developing, and best-available science, considering financial support for new research initiatives that support the Management Plan, and pursuing the two existing projects as follows:

1 Funding support will continue, and weather station data will be synthesized with UFN and OpenET comparison efforts and other relevant Work Plan projects.

2 Early study outcomes will be synthesized with UFN and OpenET data comparison efforts and other relevant Work Plan projects.

Contractual Services

1 Funding agreement with USU for the UCC executed July 2022.

2 Funding agreement with Southern Nevada Water Authority (SNWA) as the project manager for the study conducted by RTI executed June 2023.

Budget, Funding Source(s), and Time Frame
- FY23 - FY27: $600,000
- FY23: $20,000 allocated to UCC (ongoing)
- FY23: $50,000 allocated to Climate and Hydrology Work Group upfront for two year project ($300,000 Total Project Budget: Authority: $25,000, CUWCD In-Kind Contribution: $25,000, Reclamation: $75,000, Colorado Water Conservation Board: $60,000, SNWA: $50,000, Six Agency Committee of California: $25,000, Central Arizona Water Conservation District (CAWCD): $20,000, Denver Water: $20,000)
- FY24: $30,000 allocated to UCC (ongoing)

Key Partners
- Utah Climate Center, Utah State University (contractor)
- Utah Geological Survey (technical collaboration)
- Upper Colorado River Commission (interstate technical collaboration)
- Colorado River Climate and Hydrology Work Group (other funding partners)
- Colorado Basin River Forecast Center (technical collaboration)
- Division of Water Rights (technical collaboration)

- Division of Water Resources (technical collaboration)
- Central Utah Water Conservancy District (in-kind contributions)
- Southern Nevada Water Authority (funding partner and project manager)
- Research Triangle Institute International (contractor)

4.4 Snowpack and Runoff Hydrology Research

Description

The Authority is pursuing a Reclamation Snow Water Supply Forecast Program grant. The proposed project would provide remotely-sensed snowpack data from Airborne Snow Observatory, Inc. (ASO) over a three-year pilot period. ASO results would be used to inform short- and long-term water management decisions, drought mitigation planning and implementation, flood control operations of federal facilities, and environmental protection measures. Accurate measurement of snowpack is necessary for short-term system operations and long-term planning. Snowpack telemetry (SNOTEL) data has been historically used to forecast the amount of water available to water users along Utah's Wasatch Front and the Duchesne River, a tributary to the Colorado River. SNOTEL sites only represent the area immediately adjacent to the monitoring equipment. In contrast, snowpack data collected by ASO covers a full surface area, capturing heterogeneity in snowpack across mountainous landscapes.

FY23 Progress

Reclamation's Snow Water Supply Forecast Program announced a funding opportunity for the deployment of emerging snow water supply forecasting technology in March of 2023. The Authority, as the lead applicant, partnered with CUWCD and DWRe as co-funders, and Horrocks Engineering as the grant preparation manager, to submit a proposal (Figure 2). ASO was identified as the best and only available contractor to meet the proposal's objectives. The Nature Conservancy, Jordan Valley Water Conservancy District, Duchesne County Water Conservancy District, and Utah's four US House of Representatives members provided letters of support for the project.

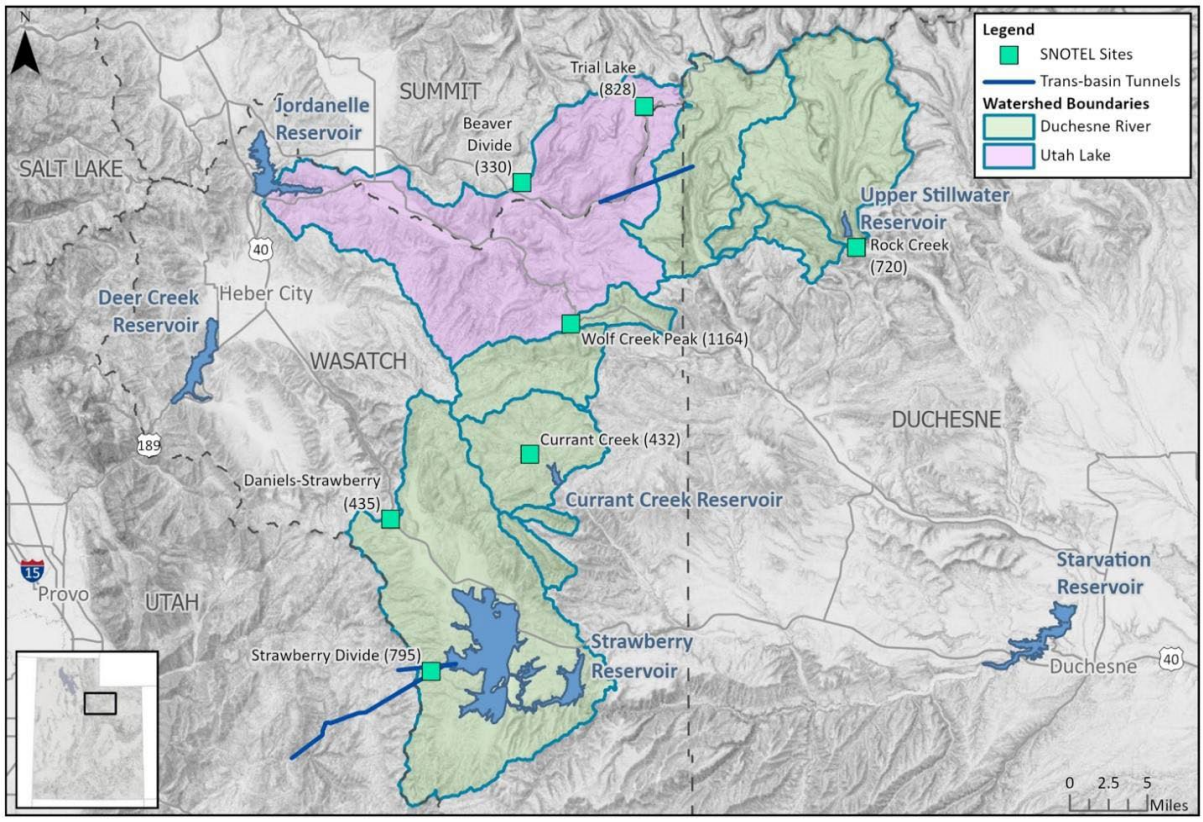

Figure 2. Proposed project location and key infrastructure.

FY24 Work Plan

Pending project selection, the Authority would first establish a contract with ASO for a snow-free flight, two snow-on flights for three water years, and data analysis and comparison. Finally, the Authority would coordinate implementation of the snow data collection and analysis, including potential competitive procurement of a contractor to support grant coordination and reporting.

Potential Contractual Services

- Pending Proposal Selection by Reclamation
- Sole Source contract with Airborne Snow Observatories, Inc.
- Competitive procurement process for grant management contract

Budget, Funding Source(s), and Time Frame

- FY24 - FY26: $2,000,000 Proposed
- FY24: $650,000 Proposed
- Reclamation Funding Proposed: $1,000,000
- Matching Contributions Proposed: Authority $650,000; CUWCD $250,000; DWRe $100,000
- One-time appropriation
- 2024 - 2027, majority of Management Plan 5-year duration

5 DROUGHT MITIGATION

5.1 Agricultural Water Resiliency Study

Description
The Authority is evaluating risks and opportunities for Agricultural Water Resiliency through an existing study by Jacobs Engineering (Jacobs). This study initially investigated the potential for conservation of consumptive use within CUWCD's boundaries through four analysis steps: Water Resource Inventory, Water Demand Analysis, Quantify the Possible, and Develop Prioritization Criteria (Task Order 1). The study was expanded to include the entire Colorado River Basin in Utah, and a fifth analysis step was added: Assess Economic Impacts (Task Order 2). Outcomes from the study will inform the feasibility of drought mitigation programs and support prioritization of the various drought mitigation strategies.

FY23 Progress
Task Order 1 was completed, with draft reports written and reviewed for each of the four analysis steps. Collaboration with key partners occurred during initial review of the draft reports. Task Order 2 was initiated in spring 2023 by beginning to evaluate the entire Colorado River Basin in Utah. Additionally, a subcontract was executed between Jacobs and M.Cubed for completion of the economic analysis scoped in Task Order 2.

FY24 Work Plan
Task Order 2 is anticipated to be complete in December of 2023. Results from the study will be used to inform development of agricultural resiliency pilots.

Contract Executed June 2022, Amended February 2023

- Task Order 1: Agreement between CUWCD and Jacobs following a competitive procurement process
- Task Order 2: Amended Agreement between CUWCD and Jacobs

Budget, Funding Source(s), and Time Frame

- FY23 - FY24: $700,000
- FY23: $300,000
- FY24: $400,000
- All funding is provided through in-kind contributions from CUWCD

Key Partners

- Jacobs Engineering (contractor)
- M.Cubed (subcontractor)
- Central Utah Water Conservancy District (in-kind contributions, project management, technical collaboration)
- Utah State University Extension (technical collaboration)

- Division of Water Resources (technical collaboration)
- Division of Water Rights (technical collaboration)
- OpenET (technical collaboration)

5.2 Agricultural Water Optimization Investigations

5.2.1 USU Agricultural Water Optimization Project

Description
The Authority is contributing to the "Optimizing Water Use in Agriculture by Stacking Conservation Practices" research project that is being conducted by USU. This research investigates the impacts of various water conservation strategies while aiming to maintain yields. Data-based information on how to best use the full suite of available water conservation strategies will inform how the Authority develops and allocates resources to agricultural resiliency pilot programs.

FY23 Progress
Funding support continued.

FY24 Work Plan
Study outcomes will be considered in relation to agricultural optimization investigations and agricultural resiliency pilots under the Work Plan.

Pre-Existing Contract
- Agreement between USU and CUWCD

Budget, Funding Source(s), and Time Frame
- FY23 - FY23: $39,000
- FY23: $39,000
- FY24: No further funding planned at this time
- All funding is provided through in-kind contributions from CUWCD
- June 2026 Target Completion Date

Key Partners
- Utah State University Extension (contractor)
- Central Utah Water Conservancy District (in-kind contributions)
- Water Users (research participation)

5.2.2 NDrip Irrigation Project

Description
The Authority is a contributing party supporting research on NDrip, a gravity precision micro-irrigation technology, through a coalition of water suppliers in the Upper and Lower Divisions. NDrip is currently being piloted in Arizona, with Central Arizona Water Conservation District (CAWCD) managing the contract with NDrip and landowners. If successful, NDrip will allow for the benefits of traditional drip irrigation without the significant energy and filtration costs of conventional drip irrigation and will inform data-based decision making as the Authority invests in resilient agricultural practices.

FY23 Progress
Funding support continued.

FY24 Work Plan
The pilot project is anticipated to be completed in September of 2023. Results will be considered in future drought mitigation research and implementation efforts.

Pre-Existing Contract

- Agreement between CUWCD, SNWA, CAWCD, and Metropolitan Water District of Southern California

Budget, Funding Source(s), and Time Frame

- FY23 - FY27: $60,000
- FY23: $60,000
- FY24: No further funding planned at this time
- All funding is provided through in-kind contributions from CUWCD
- September 2023 Target Completion Date

Key Partners

- NDrip (irrigation supplier and service provider)
- Central Utah Water Conservancy District (in-kind contributions)
- Fellow Basin States: Colorado, Arizona, Nevada, California (funding partners)
- Participating Water Users (Ndrip pilot implementation host)

5.3 Agricultural Water Resiliency Initiatives

5.3.1 System Conservation Pilot Program (SCPP) for 2023

Description
The UCRC is administering the 2023 SCPP and the Authority has helped to facilitate the program in Utah. SCPP provides municipal, industrial, and agricultural water users an opportunity to

conserve consumptively used water through temporary, voluntary, and compensated projects. The Authority is closely evaluating attributes of the 2023 SCPP for relevance and application in a potential long-term demand management program that would involve shepherding of conserved water to storage locations.

FY23 Progress

The UCRC reauthorized SCPP for 2023 only and released a Request for Proposals on December 14th, 2022. Federal reauthorization of SCPP was granted for up to two years as part of the 2023 Omnibus Appropriations Bill, and $125 million in federal funding from the Inflation Reduction Act of 2022 was granted to the UCRC from Reclamation. A fixed-firm price of $150 per acre-foot of conserved water was set by the UCRC, with the option for participants to propose and justify a higher per-acre-foot price.

Proposals for SCPP projects were due March 1, 2023. The UCRC received 88 proposals from the four Upper Basin States combined (24 in Utah). The UCRC selected 72 projects (21 in Utah, Table 4) based on criteria outlined in the UCRC-Reclamation SCPP Funding Agreement Facilitation Exhibit. System Conservation Implementation Agreements were executed by the UCRC and the participants for selected projects, and implementation and verification began at the outset of the 2023 irrigation season.

During project selection and review, an initial compensation ceiling of $650 per acre-foot was established by the UCRC based on justifications provided by project proponents and current market analyses for farm budgets and commodity pricing. Reclamation later decided to lower the ceiling for each state, in Utah to $595 per acre-foot for commodity alfalfa projects, and $621 per acre-foot for calf-cow operations. The state of Utah opted to "fill the gap" for 2023 in alignment with the Management Plan objectives and corresponding state appropriations in order to keep Utah participants whole. The Authority only committed to fill the funding gap for the Utah SCPP 2023 projects.

Table 4. Summary of SCPP 2023 projects for all Upper Colorado River Basin states and Utah as of June 30 2023.

Total:	**4-State**	**Utah**
Selected Projects	65	21 (32% of total)
Project Types	Ag, Municipal, Industrial	Ag, Municipal, Industrial
Estimated Conserved Volume (Acre-Feet)	38,221	15,462 (40% of total)
Total Expense	$16,218,888	$5,681,065 (35% of total)
Price Per Acre-Foot	$424 Weighted	$367 Weighted
Price Per Acre-Foot Range	$150 - $631 (Reclamation)	$150 - $650 (with Utah "gap fill")

FY24 Work Plan
The Authority will support facilitation of SCPP projects through the end of calendar year 2023 by participating in verification efforts and communications between program participants and the UCRC.

Contract Executed June 2023

- Funding Agreement between UCRC and Authority

Budget, Funding Source(s), and Time Frame

- FY23 - FY27: $105,000
- FY24: $105,000
- The United States Bureau of Reclamation will provide a total of $16,383,000 to the four Upper Basin States, through the UCRC

Key Partners

- Upper Colorado River Commission (program administrator)
- Wilson Water Group (program support contracted with UCRC)
- Upper Basin States Agencies: Colorado Water Conservation Board, Wyoming State Engineer's Office, New Mexico Interstate Stream Commission (program facilitation in respective states)
- Trout Unlimited (support for program participants)
- Division of Water Rights (technical collaboration, local knowledge)
- Utah Program Participants (20 water user entities)
- United States Bureau of Reclamation (funding source)

5.3.2 Agricultural Demonstration, Research, and Implementation Pilot Program (AgDRIP)

Description
The Authority strives to balance proactive water conservation measures with the best available science and the needs of agricultural communities. Water conservation programs already exist under SCPP 2023, UDAF's Agricultural Water Optimization Program, and similar federal and non-government efforts. More opportunities will become available through Authority-specific pilot projects and ongoing Basinwide initiatives. Given the need to balance meaningful water conservation, sustaining agriculture, and the variety of water conservation strategies and opportunities available, the Authority and CUWCD have partnered with USU Extension to implement the Agricultural Water Demonstration, Research, and Implementation Pilot Program (AgDRIP). AgDRIP will engage agricultural water users and irrigation companies by developing Irrigation Management Plans (IMPs) that are tailored to their unique operations while considering the full suite of water conservation methods and funding mechanisms available. Participants will be incentivized to implement their IMP and report water use. Finally, AgDRIP will validate the success of efforts by helping water users collect and evaluate data, and make adjustments where needed.

FY23 Progress

In FY23, AgDRIP was developed through collaboration with USU Extension, CUWCD, Jacobs, and the Authority. Program development was informed by the experience of all the collaborators, early results from USU's Optimizing Water Use in Agriculture by Stacking Conservations Practices Project, and the Jacobs Agricultural Water Resiliency Study under the FY23 Work Plan. AgDRIP was established through funding agreements between USU Extension, the Authority, and CUWCD. Early outreach efforts began through news articles and announcements in relevant conferences and committees.

FY24 Work Plan

Each year for five years, USU Extension will identify up to 25 farms and 10 irrigation companies to consult with for potential development of IMPs. Training, networking resources, and educational materials will be developed and disseminated throughout the first year, and into the following years. Early investment in on-farm operational and monitoring changes may be made. The foundations for program evaluation will be set as relationships are built, instrumentation is installed, and initial engagement and conservation data is collected.

Contract Executed May 2023

- Funding agreement between USU and the Authority
- Funding agreement between USU and CUWCD for in-kind contributions

Budget, Funding Source(s), and Time Frame

- FY23 - FY27: $5,000,000 ($2,500,000 Authority, $2,500,000 CUWCD in-kind contribution)
- FY23: $1,000,000 ($500,000 Authority, $500,000 CUWCD in-kind contribution)
- FY24: $1,000,000 ($500,000 Authority, $500,000 CUWCD in-kind contribution)

Key Partners

- Utah State University Extension (contractor, program management)
- Central Utah Water Conservancy District (in-kind contributions, joint program oversight with the Authority, technical collaboration)
- Jacobs Engineering (technical collaboration)
- Utah Department of Agriculture and Food (inter-program coordination)
- Utah Agricultural Water Optimization Task Force / Committee (inter-program coordination)
- Water Users and Irrigation Companies (to be identified - program participants, local knowledge)
- Utah Farm Bureau (program coordination and outreach)

5.3.3 Demand Management Pilots

Description

During the 2023 Legislative Session, the Utah Legislature appropriated $5 million in one-time funds to the Authority for Agricultural Resiliency Pilot Projects. The Authority will use these appropriations to implement pilot projects that include temporary, voluntary, and compensated reductions in consumptive water use through a variety of mechanisms. Pilot projects will be specifically aimed at establishing defensible measurement of conserved consumptive use, shepherding of conserved water to target locations ("demand management"), evaluating market drivers, and testing adequacy of existing water right statutes for purposes of developing scalable drought mitigation programs. Projects may investigate the potential application of Utah 2023 Session Senate Bill 144, which empowers the State Engineer to authorize and distribute conserved water in a qualifying program as confirmed by the Authority. The Authority is committed to using each project to learn about drought mitigation best practices, and to synergize pilot projects with other programs such as AgDRIP to maximize the use of resources and minimize duplication of efforts.

FY23 Progress

Funds appropriated to the Authority in 2023 will become available in FY24 (July 1, 2023). The Authority has begun researching criteria for pilot projects and coordinating with entities running similar programs such as UDAF and UCRC.

FY24 Work Plan

The Authority will build on existing coordination and collaboration with entities running similar water conservation projects and will expand collaboration through outreach to local water users, water managers, and environmental organizations. The Authority will consult closely with DWRi to ensure defensible water conservation measurement and credit, while maintaining water users' water rights. A consultant may be sought through a competitive procurement process to facilitate project management and implementation. The Authority will establish project selection criteria and will accept and consider project proposals. The Authority will work to implement water conservation efforts that support agricultural resiliency for the 2024 growing season and following years.

Potential Contractual Services

- Competitively procured agreement for a project management and technical consultant
- Agreements with water right holders participating in pilot projects
- Interlocal agreements with relevant agencies

Budget, Funding Source(s), and Time Frame

- FY24 - FY27: $5,000,000
- FY23: Funds appropriated
- FY24: Pending project proposals and selection

Key Partners

- Agricultural Water Managers and Water Users (project proponents)
- Division of Water Rights (technical and legal support, possible administration support)
- Environmental Non-Government Organizations Trout Unlimited and The Nature Conservancy (local knowledge, support for project proponents)
- OpenET (technical collaboration)
- Utah Department of Agriculture and Food (program coordination)
- Central Utah Water Conservancy District (program coordination)
- Utah State University Extension (program coordination)
- Upper Colorado River Commission (program coordination)

5.4 Utah Colorado River Accounting and Forecasting Model (UCRAF)

5.4.1 Duchesne River Drainage Pilot

Description

The Authority is pursuing a pilot project in the Duchesne River Basin for development of a multi-year, multi-phase Colorado River Accounting and Forecasting (UCRAF) model. The UCRAF model is consumptive use-based and models supply according to priority using a rule-based and accounting RiverWare model. This effort will help develop a comprehensive understanding of current water rights and water usage (Phase 1) and will ultimately be used as a planning tool to evaluate how drought mitigation measures (e.g., crop types, irrigation methods, water reduction methods, water right transfer, curtailment, etc.) affect water availability and water rights (Phase 2). The Duchesne UCRAF Pilot will help support drought mitigation efforts in the Duchesne Basin and will inform the development of subsequent UCRAF models for other regions within the Colorado River Basin in Utah.

FY23 Progress

FY23 efforts primarily focused on data collection and organization and Phase 1 model development. The project team coordinated with the agencies producing data used in the UCRAF model, including OpenET (eeMetric consumptive use data), DWRi (diversion data, water rights data, Water Right Distribution Network), and DWRe (Water Related Land Use data). This data was compiled into a geodatabase and formatted for use in the UCRAF model. Progress occurred simultaneously on Phase 1 model components, including a consumptive use-runoff calculator and RiverWare model. The consumptive use calculator was tested on the Upper and Lower Duchesne River regions and is able to replicate observed canal diversions in many of the simulated canals. Because UCRAF relies on OpenET data, the model will continue to improve as OpenET data is verified through other efforts in the FY24 Work Plan. Although Phase 2 is slated to begin later in the contract, the project team began developing capabilities within the Phase 1 model components to allow for eventual Phase 2 explorations.

Throughout FY23, the project remained ahead of schedule and adhered to the project scope.

Based on the favorable progress and outcomes of the Duchesne UCRAF Pilot, the Authority and project team began exploring expansion of the UCRAF model to other regions in the Colorado River Basin (Section 5.4.2).

FY24 Work Plan

Work on the Duchesne UCRAF Pilot in FY24 will continue as outlined under the pre-existing contract, which will be amended in early FY24 to also include the development of verification capabilities within the Duchesne model (to be completed within the original budget/schedule) and the expansion of the UCRAF model to other regions (see Section 5.4.2). Work on the Duchesne Pilot includes the completion of Phase 1, which will lead to a baseline model characterizing the water budget and water rights within the Duchesne Basin. A report describing the development process and results of Phase 1 will also be prepared. Work on Phase 2 will begin midway through FY24 and will continue into FY25. Close coordination will continue with DWRi, OpenET, and DWRe on technical and data-related issues.

Contract Executed July 2022

- Pre-existing multi-year contract established through a competitive procurement process
- A sole source contract was issued to build on and maintain the continuity of previously completed work

Budget, Funding Source(s), and Time Frame

- FY23 – FY25: $943,000
- FY23: $300,000
- FY24: $389,000
- One-time appropriations
- The Duchesne pilot project is expected to take three years (FY23–FY25). The outcome of the pilot project will inform subsequent UCRAF activities.

Key Partners

- Precision Water Resources Engineering (contractor)
- Follum Hydrologic Solutions (subcontractor)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- OpenET (technical collaboration)

5.4.2 San Rafael and Price River Drainages

Description

Following successful progress on the UCRAF pilot in the Duchesne Basin, the Authority is pursuing an expansion of the UCRAF model to the San Rafael and Price River Basins. Model development will follow a similar process as the Duchesne Pilot, which includes data collection and organization, development of a baseline model to characterize the current system (Phase 1),

and development of capabilities within the Phase 1 model to explore the impact of drought mitigation measures (Phase 2). Because many of the tools and modeling approaches have already been developed under the Duchesne UCRAF Pilot, the development of the San Rafael/Price UCRAF model will be expedited and will conclude in the same timeframe as the Duchesne Pilot (FY25). Model development will also capitalize on an existing San Rafael RiverWare model developed by DWRe and will benefit from favorable data coverage in this region (diversion data, water right data, EC tower data). The San Rafael/Price UCRAF model will help facilitate drought mitigation planning efforts and is important given the current level of conservation engagement in this region (e.g., SCPP, Price River Water Bank Pilot, etc.).

FY24 Work Plan

Work on the San Rafael/Price UCRAF model in FY24 will occur as outlined under the amended pre-existing UCRAF contract. The majority of FY24 tasks will relate to Phase 1 model development, including collection and organizing of existing data, application of the consumptive use-runoff calculator to the San Rafael/Price area, and RiverWare model development (modifying the existing San Rafael RiverWare model and creating an independent Price Basin model). Work on the geodatabase and internet/web service component of Phase 2 will also occur in FY24 and will be completed concurrent with Phase 1.

Pre-Existing Contract

- Amendment to a sole-source, pre-existing, multi-year contract

Budget, Funding Source(s), and Time Frame

- FY24 – FY25: $710,000
- FY24: $362,000
- One-time appropriations
- The San Rafael and Price UCRAF model will be developed concurrent with the Duchesne URCAF pilot and is expected to take two years (FY24- FY25).

Key Partners

- Precision Water Resources Engineering (contractor)
- Follum Hydrologic Solutions (subcontractor)
- Division of Water Rights (technical collaboration)
- Division of Water Resources (technical collaboration)
- OpenET (technical collaboration)

6 ADVISORY COUNCILS

Description
UCA 63M-14-209 authorizes the Authority to create Advisory Councils to provide *"data, information, and input… relevant to the mission and objectives of the authority."* On December 2, 2021, the Authority Board adopted an Advisory Council rule to help guide council operations. The rule instructed the councils to focus on two broad objectives:

1 *Hear broad input, including recommendations, data and information regarding all matters affecting Utah's Colorado River system water; and*.

2 *Make recommendations to the Authority Board in an advisory capacity*.

FY23 Progress
In May of 2022, three geographic-based (Northern, Central, and Southern) Advisory Councils were authorized by the Authority Board. Through both appointment and application, the Advisory Councils were created and began to meet in June 2022.

The three councils are composed of a diverse set of engaged citizens, stakeholders, water users, and both area and topical experts. The councils provide an ongoing public forum for participants to share varied points of view, data, and possible scenarios to address Colorado River challenges. They also build trust and understanding between the Authority, stakeholders, and the public. Over the past year, the Advisory Councils have held dozens of meetings where council members shared, discussed, and developed ideas related to the challenges facing the Colorado River Basin. The three councils each provided written recommendations to the Authority Board in January of 2023.

FY24 Work Plan
While the Advisory Councils are not vested with authority to make decisions regarding public business, council perspectives will continue to provide important viewpoints and insights that can help inform the Utah Colorado River Commissioner, the Authority Board, and other officials.

Contractual Services
- Advisory Council Management and Staffing
- Travel and Accommodations
- Venue Reservations and Equipment

Budget, Funding Source(s), and Time Frame
- FY23 – FY27: $1,405,000
- FY23: $281,000 FY23
- FY24: $281,000 FY24