Developing a Westwide Tool to Support Water Conservation and Marketing Measures
Integrating the Western Water Rights Data Access and Analysis Tool (WestDAAT) and OpenET

Technical Proposal

October 17, 2023

Funding Opportunity No. R23AS00446

Applicant: Western States Water Council (WSWC)

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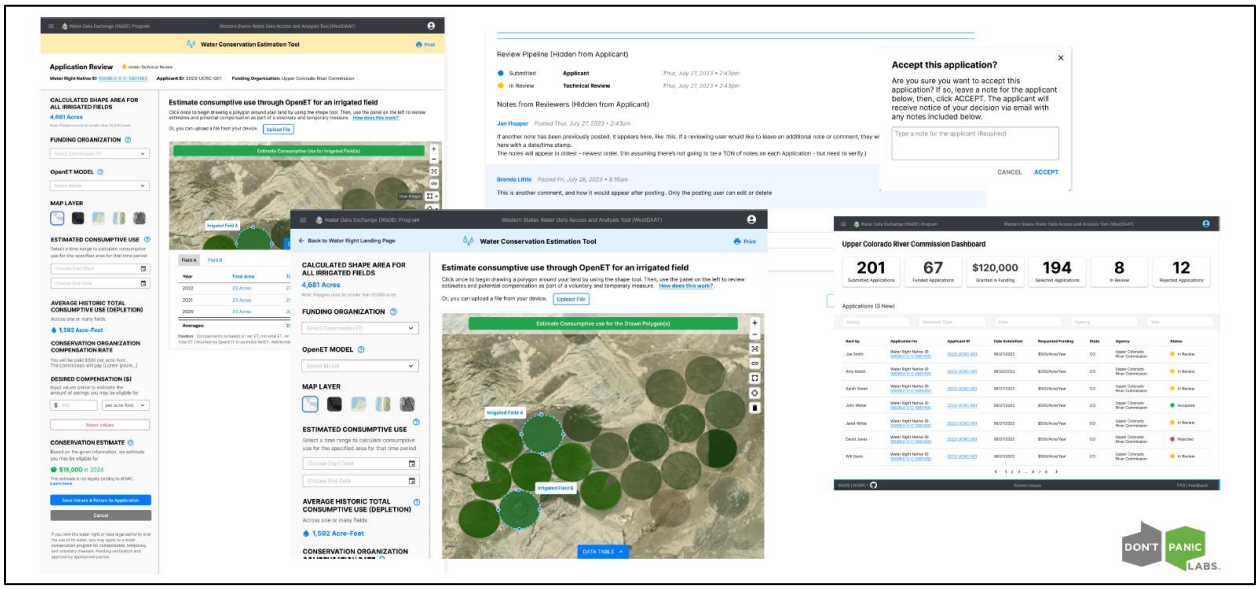

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WESTERN STATES WATER COUNCIL

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Western States Water Council (WSWC)
Murray City, Salt Lake County, Utah

October 17, 2023

Executive Summary

The Western States Water Council (WSWC), in collaboration with the Open Access Evapotranspiration (OpenET) team, the Upper Colorado River Commission (UCRC), and others, will develop a web-based Water Conservation Tool (Tool hereafter) for westwide use that streamlines applications for voluntary compensated water conservation measures, such as the Upper Colorado River Basin System Conservation Pilot Program (SCPP). Integrating WestDAAT with OpenET will support and streamline voluntary, temporary, in-state conservation applications and related compensation, promoting water conservation and efficiency, facilitating state water rights administration, enhancing water budgeting, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflow.

This proposal seeks $400,000 over a 2-year period, with a completion date of March 31, 2026. Given the significant potential environmental benefits from both temporary and permanent enhancement of instream flows for fish and wildlife, riparian wetlands, and related purposes, we would suggest a 35% cost-sharing match requirement ($280,000). However, we are prepared to meet a 50% match if necessary. None of the matching funds are federal funds.

The proposed project is not located in a federal facility.

1. Technical Project Description

Applicant Category

The WSWC is a "Category A" applicant, and qualifies as "State, regional, or local authorities, which include one or more organizations with water or power delivery authority as members." The WSWC is a government entity, an instrumentality of each of its eighteen participating western states (the seventeen Reclamation States and Alaska), with members consisting of representatives appointed by the governors of each State and including state engineers, natural resources departments, and water resources agency directors, water quality agency directors, and assistant attorneys general, all of which have water management or other water-related authorities within their respective States.

Project Eligibility

The Water Conservation Tool is an eligible "applied science" project (C.4)[1] because it is: (1) designed to be used by water managers across the West; (2) based on existing and operational technologies (WestDAAT and OpenET); and (3) supports one or more of the following water management objectives: water marketing activities, water supply reliability, drought

[1] WaterSMART-Applied Science Grants for Fiscal Year 202. NOFO No. R23AS00446

management activities, water rights administration, reduction of water supply and demand imbalances, conservation, and efficiency.

The Water Conservation Tool supports water management objectives under Type 3 of the eligible project types (C.4.2), which aims to "*improve access to and use of water resources data, or to develop new types of data to inform water management decisions*." The project intends to advance "*the development of a decision support tool that resource managers can use to query or analyze data for the purposes of improving water management."*

The WSWC's mission is to ensure that the West has an adequate, secure and sustainable supply of water of suitable quality to meet its diverse economic and environmental needs now and in the future.[2] Our principles recognize that all levels of government must prioritize the collection, analysis and open sharing of reliable data regarding water availability, quality, and usage given its importance to research for sound science and data-driven decision-making. The WSWC, Western Governors Association (WGA), and federal and state agencies and data managers have recognized water conservation and open water data and regional data sharing as a prerequisite to better water resources planning and management.[3] Efficient, effective, and innovative management of limited water resources should be a critical public policy priority, especially in this fast-growing and dry region of the United States.

Detailed Project Description and Goals

This proposed project will develop a new westwide Water Conservation Tool that leverages federal funding and integrates the WestDAAT[4] with OpenET[5] to aid farmers in their applications for future potential System Conservation Pilot Programs (SCPPs) and demand management activities, especially in the Colorado River Basin. It has the potential to promote water conservation and efficiency, facilitate state water rights administration, stretch scarce water supplies, promote in-state water marketing, improve drought management, and enhance environmental streamflow.

While western water law and water rights are based on reasonable beneficial use, most owners or managers irrigating lands in the West do not directly measure consumptive use, which is a critical element of water budgeting. Consumptive water use is a component of reasonable beneficial use, and includes evaporation, evapotranspiration, and other irrecoverable losses of water not available for immediate use. For our purposes, it does not include carriage losses or storage losses. Evapotranspiration (ET) from plants that consume water often serves as a useful proxy for consumptive water use on irrigated lands because it is easier to measure. Because water rights do not include natural precipitation, we subtract the effective precipitation from the total ET, resulting in a Net ET. The effective precipitation can be approximately calculated from the ET measurements of nearby non-irrigated land. For our purposes, Net ET will serve as a proxy for consumptive water use. OpenET has the ability to provide five-year historical estimates of ET for irrigated fields across the 17 Reclamation states.

[2] Western States Water Council: a vision on water: https://westernstateswater.org/mission/
[3] Water Transfers in the West: Projects, Trends, and Leading Practices in Voluntary Water Trading: http://www.westernstateswater.org/wp-content/uploads/2012/12/Water_Transfers_in_the_West_2012.pdf
[4] WestDAAT: https://westdaat.westernstateswater.org
[5] OpenET: https://openetdata.org/

Connecting water rights data with consumptive use estimates through WestDAAT and OpenET is expected to help promote federal, state, local, and regional water security and drought resilience activities that empower individual farmers to participate in conservation programs. The Tool will also allow communities to coordinate overall conservation savings and protect long-term farming activities in their districts, canal companies, or towns, as it will facilitate a review of different conservation scenarios that fit local needs by viewing water rights information in concert with water use data.

The Tool will be designed to support: (1) government entities and other public and private conservation organizations with programs to approve and fund conservation measures; (2) farmers, ranchers, and others evaluating potential conservation measurements and marketing opportunities, including submitting applications to various funding entities such as UCRC; and (3) technical reviewers verifying past water use and potential water savings. WSWC has already scoped the proposed tool development and created mockup designs that address users' experience and provide a basis for estimating costs.

The following paragraphs provide background information about WestDAAT and OpenET – the basis for the Water Conservation Tool.

WestDAAT

With the continuous support of the western states' governors, the Water Data Exchange (WaDE) Program at the WSWC has been a cornerstone of the Internet of Water Coalition[6] and has been transforming western water planning, management, and policy by sharing state water data since 2011.[7] The WaDE Program has been on a mission to assist WSWC member states in sharing water rights administration and water use data with each other, federal agencies, and the public.[8] Each state has a unique system and data management method. Thus, water rights data, metadata, points of diversion, and places of use vary across the states and within many state agencies. The term "water rights" is broadly applied to include state-granted rights to the use of public waters via public and private appropriations, permits, allocations, allotments, and reservations. State water rights in western states are predominantly administered under the Doctrine of Prior Appropriation, generally governed by priority date, "first in time, first in right," and limited to reasonable beneficial use.

A mix of philanthropic grants and an earlier WaterSMART grant funded the development of WestDAAT as a user-friendly web-based tool that streamlines access to about 2.5 million surface water and groundwater rights and permit data across the Western States. Each water right has a landing page with the common key metadata and a direct link to the state public water rights data, offering additional unique metadata and documents on that water right (Figure 1).

[6] The Internet of Water Coalition: https://internetofwater.org/who-we-are
[7] Water Data Exchange (WaDE) Program https://westernstateswater.org/wade/
[8] Larsen, S. G. and D. Young, 2014. WaDE: An Interoperable Data Exchange Network for Sharing Water Planning and Use Data. *Journal of Contemporary Water Research & Education* 153:33-41.

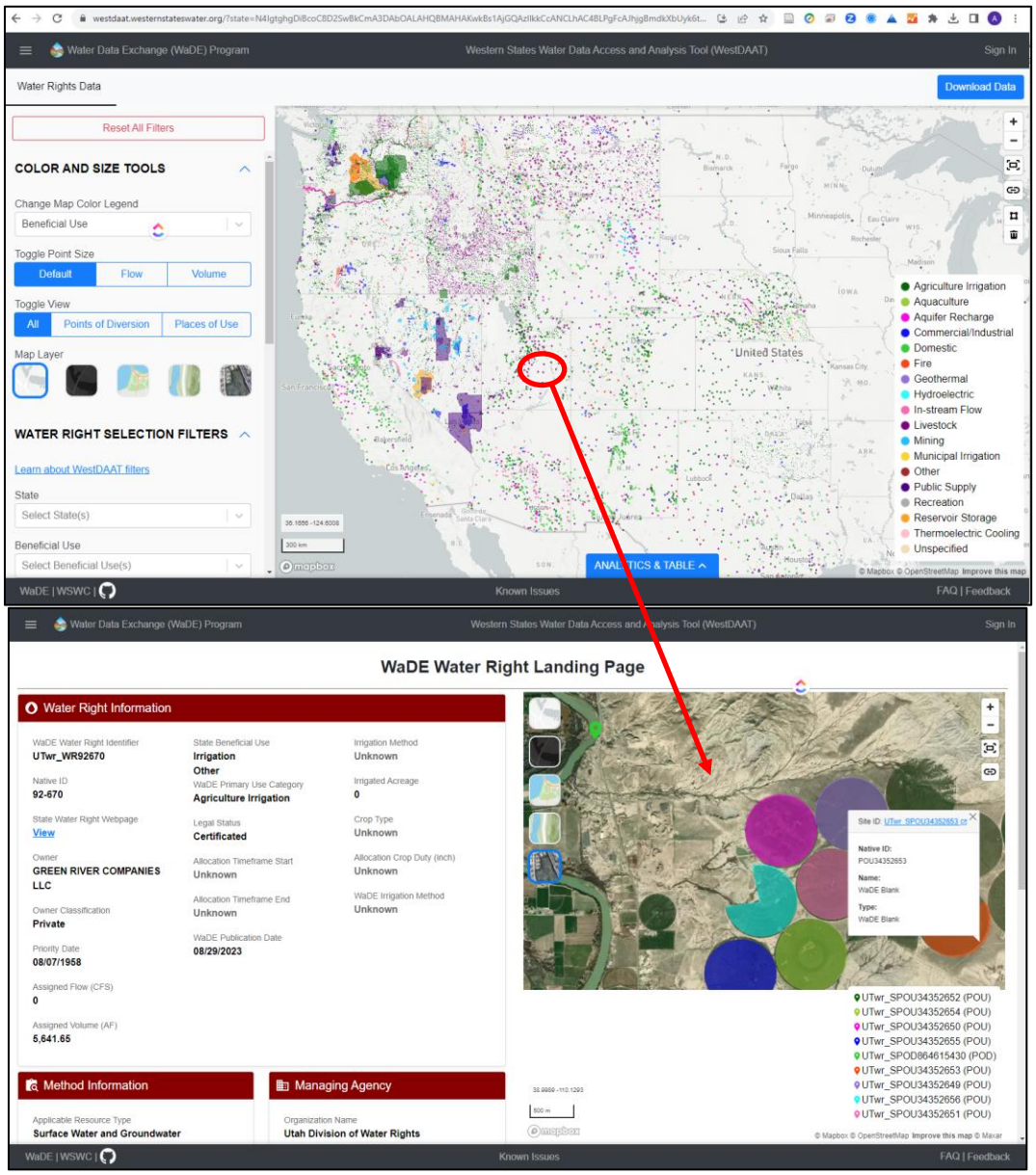


Figure 1: WestDAAT homepage https://westdaat.westernstateswater.org (above) and example water right landing page (below) as the starting point for a water conservation application. https://westdaat.westernstateswater.org/details/right/UTwr_WR92670

WestDAAT was publicly released in April 2023, drawing increased attention from users and has been visited by 1,500 unique users across the U.S., with 350 active and returning users. Among those returning visitors, there are 30 who created accounts that allow them to download data. These users came from Arizona, California, Colorado, Maryland, Nebraska, New Mexico, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Texas, Virginia, Washington, and West Virginia. They belong to broad categories of users that include cities, consulting firms, federal agencies, non-profit organizations, state agencies, and universities.[9] WestDAAT is unique because its data are supported by state governments in collaboration with federal agencies and is provided to researchers and decision-makers at no cost to improve water management

[9] WestDAAT Traffic Update: https://westernstateswater.org/wade/westdaat-users/

across the West. WestDAAT is a scalable and dynamic front-end application based on a relational database hosted in Microsoft Azure, a cloud computing platform.[10] The data is mapped and imported from each state's public data system and documented on GitHub.[11]

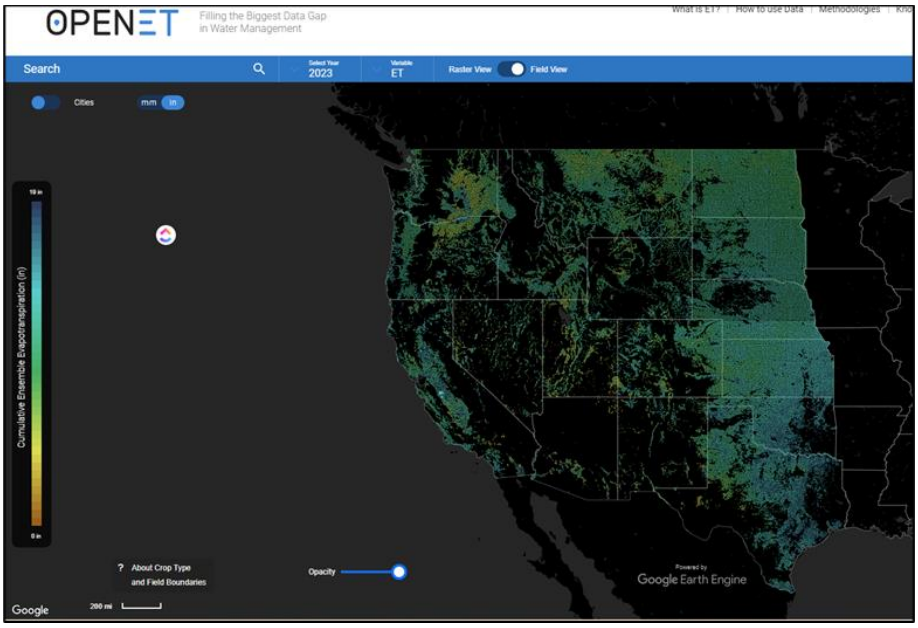


Figure 2: OpenET Data Explorer and a snapshot of estimated ET for a field in the Green River area, Utah.

OpenET

OpenET[12] provides a user-friendly satellite imagery-based computational estimate of the total amount of water that is transferred from vegetation and the land surface to the atmosphere through the process of evapotranspiration (ET). See Figure 2 above. OpenET provides a single "ensemble value" of ET from six satellite-driven models. All models currently use Landsat satellite data to produce ET data at a spatial resolution of 30 meters by 30 meters (0.22 acres per pixel). OpenET data is available through an Application Programming Interface (API) that allows programmatic access to ET data for any field or other prescribed boundary.[13]

After a nine-year study, in June 2022, the Upper Colorado River Commission[14] unanimously made one of six OpenET models the standard for measuring ET and agricultural consumptive water use in its four member states. The model is called Google Earth Engine implementation of the Mapping Evapotranspiration at high Resolution with Internalized

[10] Azure SQL Database: https://azure.microsoft.com/en-us/products/azure-sql/database
[11] Manage all code to map and import state's data into WaDE 2.0 https://github.com/WSWCWaterDataExchange/MappingStatesDataToWaDE2.0
[12] OPENET: https://openetdata.org
[13] OpenET Application Programming Interface (API) https://openetdata.org/api-info/
[14] OpenET: Upper Colorado River Commission and Bureau of Reclamation move to satellite-based ET for consistent consumptive water use measurements: http://www.ucrcommission.com/openet-upper-colorado-river-commission-and-bureau-of-reclamation-move-to-satellite-based-et-for-consistent-consumptive-water-use-measurements

Calibration model (eeMETRIC). UCRC thus has been using eeMETRIC to estimate historical consumptive use and verify savings for their SCPP applications.[15]

Water Conservation Tool Development

WSWC has coordinated with its IT contractor, Don't Panic Labs, for five months to scope and estimate the cost of building the Water Conservation Tool extension to WestDAAT. The scoping process helped narrow down critical design decisions, showcased how the user experience would operate, and provided 35 high-fidelity wireframe demonstrations (static drawings in Figma software)[16] to illustrate the expected appearance of the tool. The scoping effort also resulted in a detailed list of development tasks to build the tool, as well as cost and time estimates. The tool would extend WestDAAT's capabilities to support: (1) an integration with OpenET to estimate total historical water use for any selected field or other area boundary; (2) provide additional database tables and API endpoints to store and recall applications; and (3) enable multiple user access with secured user accounts. The tool will rely on Microsoft's state-of-the-art cloud security identity and access management.[17]

Water Conservation Tool: Users, User Decisions and Design Capabilities

WSWC identified three types of users that the Tool will support: (1) a program sponsor, designated in the mock up as the Conservation Organization, such as the Upper Colorado River Commission, but others might include state or federal agencies, municipalities, water districts, environmental organization, and others; (2) applicants would most likely be agricultural interests such as farmers and ranchers with irrigated acreage, but could also be municipal or other interests with substantial irrigated turf; and (3) technical reviewers, which may be in-house staff or outside consultants evaluating applications to ensure applicable criteria are met.

Users were identified from feedback from several sources, including UCRC staff, Willson Group LLC, a consulting firm (hired by UCRC to evaluate the SCPP applications), the OpenET development team, staff at the Colorado River Authority of Utah, and Trout Unlimited staff all of which helped 2022-2023 SCPP applicants.

WSWC also presented the proposed Tool to Brian Steed, appointed by Utah Governor Spencer Cox as the Great Salt Lake Commissioner to coordinate interagency efforts to protect lake levels, as well as Marcelle Shoop, Director of the Saline Lakes Program for the National Audubon Society. The Tool mockup was also presented to and discussed by WSWC members during our 2023 Fall Meetings in Anchorage, Alaska. Feedback from these stakeholders was critical in scoping the potential user experience for the proposed Tool (Figure 3).

[15] System Conservation Pilot Program (SCPP) in 2023 http://www.ucrcommission.com/system-conservation-pilot-program-for-2023/
[16] Figma: https://www.figma.com
[17] Microsoft Entra: Secure access for a connected world: https://www.microsoft.com/en-us/security/business/microsoft-entra

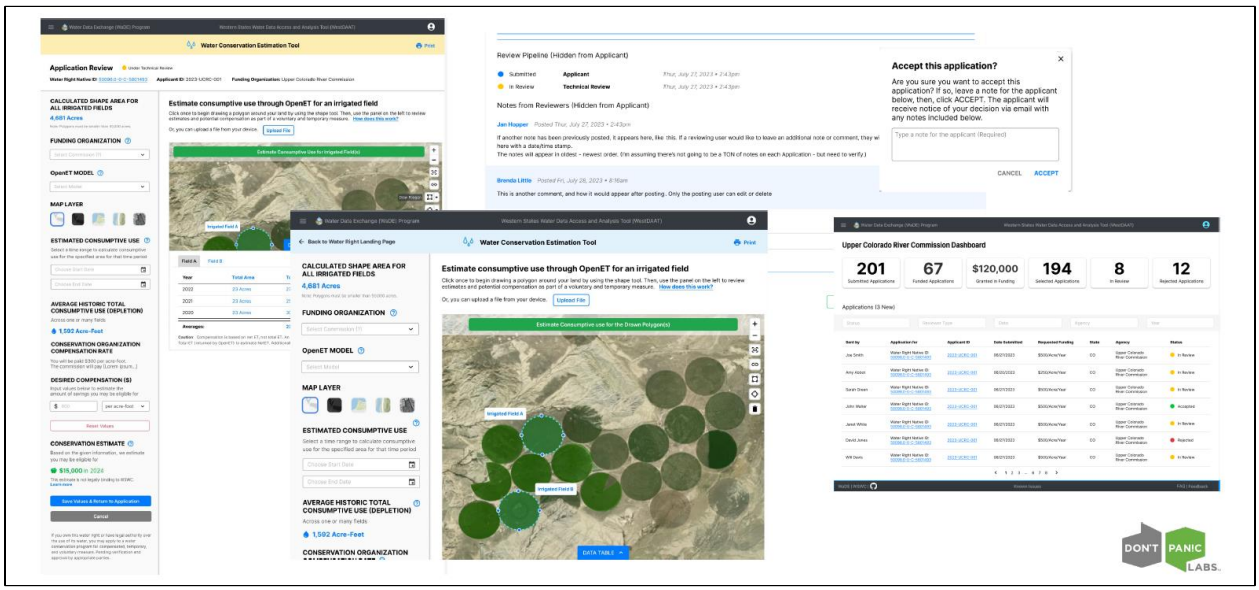


Figure 3: Different mockup views of the scoped Water Conservation Tool WestDAAT extension.

User #1: Conservation Organization

The Conservation Organization (or program sponsor) is any entity in the Western U.S. with a voluntary program to conserve or reduce water use, especially irrigated agricultural use, with funding to compensate water users for relinquishing or abstaining from the use of their state water right. The organization would have rules to evaluate an applicant's historical consumptive use. For example, the Conservation Organization would decide on the following parameters: (a) the OpenET consumptive use model(s) or ensemble to use; (b) the time period (i.e., number of years and start and end months) used to evaluate historical consumptive use; and (c) the compensation in U.S. dollars per acre or per acre-foot of conserved water offered a user. The Conservation Organization will have view-only access to all submitted application information and can add comments and change an application's status (e.g., in-review, accept, or reject). See Figure 4 below. The Tool will allow the Conservation Organization's staff to review and evaluate water conservation applications in a consistent and transparent manner, especially across interstate basins such as in the Upper Colorado River Basin.

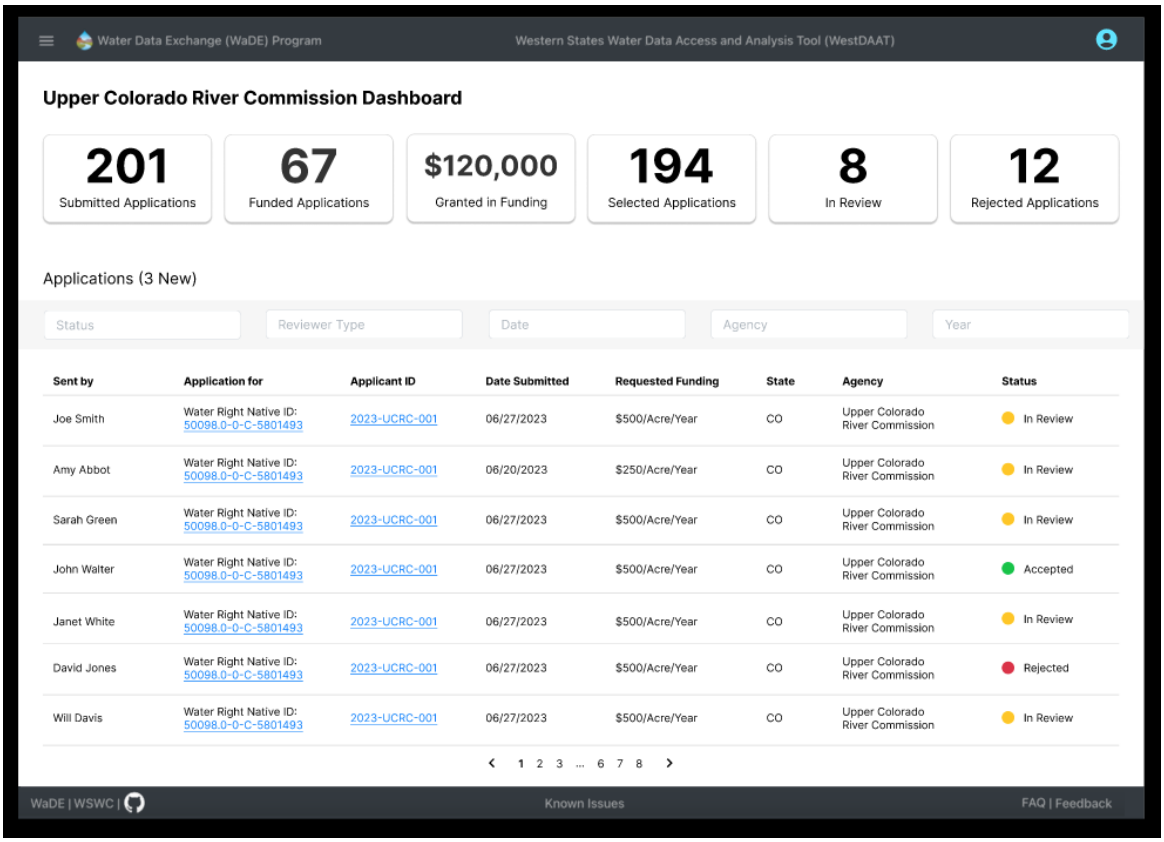


Figure 4: Mockup view of the Water Conservation Tool portal for the conservation applications

User #2: Applicant

The Applicant generally will be a farmer or rancher with a water right or a share in a canal company or irrigation district who desires to participate in a voluntary, temporary, and compensated conservation program through fallowing their land or switching to a different less water-intensive crop, or other water saving measures. The Applicant could also be a municipal or other interest with substantial irrigated turf. Ultimately, the conservation measures the Applicant chooses to implement will result in water savings returned to the system. The impact of those conservation measures will be compared with the historical water use again using OpenET estimates. Applications will be submitted via the proposed Tool and applicants will receive a confirmation email. The Tool will allow the Applicant to: (a) interact and experiment with different field boundaries or other areas irrigated; (b) view their own water rights details; (c) estimate total evapotranspiration using OpenET and related consumptive use or depletions; and (d) obtain the estimated compensation in dollars per acre or per acre-foot for conserved water (Figure 5). WestDAAT already has water rights information and geospatial data, including point of diversion and point of use data, needed to evaluate conservation applications for most western states. WestDAAT also has the capacity for users to draw boundaries around fields and other irrigated areas. Here are the following steps that an Applicant would follow:

- Find their water right through WestDAAT search filters.

- Select their water right from the water right landing page.
- Either select an existing Place of Use polygon or, using drawing tools, draw boundaries around one or many fields to estimate their consumptive use through OpenET.
- Click the "Estimate Consumptive Use" button.
- Based on the results, determine whether or not they may be interested in exploring further.
- If so, log in and create a WestDAAT user account.
- Select a supported Conservation Organization in the Tool which will automatically define the organization's selected OpenET model, desired start and end dates, and established compensation rate. These are pre-populated based on the organization's preferences.
- Select the compensation rate either in $ per acre-ft or $ per acre.

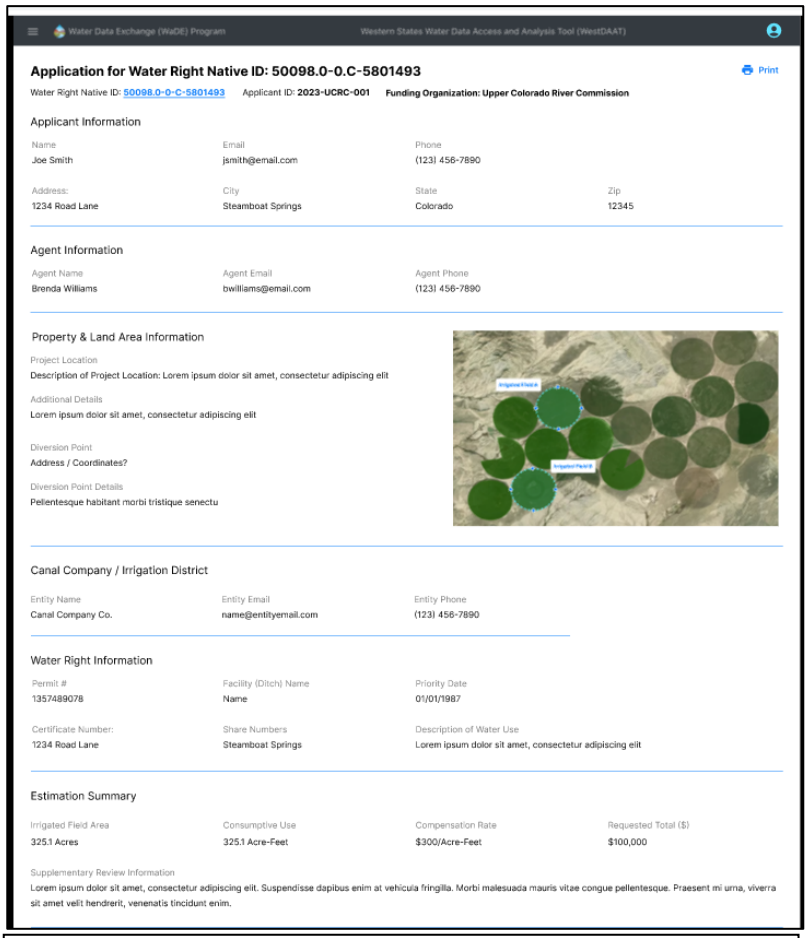


Figure 5: Mockup view of an application preview (see drawn two fields)

- If satisfied with the results, click on the "Apply for Conservation Benefits" button.
- Include contact information and their conservation plan that includes details on fallowing or crop switching.
- Review drawn boundaries, total ET estimates, and application details.
- If satisfied, click "Complete & Submit." The Applicant gets a confirmation message and can see the status of their application over time.
- Applications cannot be edited by the Applicant once submitted.
  Once an application is submitted, the Tool will send email notifications with links to the submitted application to the Applicant (with view-only access), the WestDAAT administrator, the Conservation Organization, and the designated Technical Reviewer.

User #3: Technical Reviewer

The Conservation Organization may use an internal Technical Reviewer or may hire a third-party contractor/consultant to perform this function. Using a multi-tier user access in WestDAAT, the Conservation Organization will grant access to the Technical Reviewer for their applications. They can perform the following tasks:

- Review all applications, add comments, and change the application status (e.g., under review, recommend, reject).
- Communicate with the state water rights administration agency and the canal company (if applicable) to verify the Applicant owns the water right or a share in the canal company and may enter into an agreement with the Conservation Organization. There may be some conservation goals that require state consent and cooperation, such as protecting instreamflow. If needed, they can edit applications for accuracy, especially the drawn field boundaries.
- The Technical Reviewer will also add a non-irrigated reference area and estimate its consumptive use as a proxy for effective precipitation (Figure 6). Total ET less effective precipitation equals net ET as a surrogate for crop consumptive use or depletion.

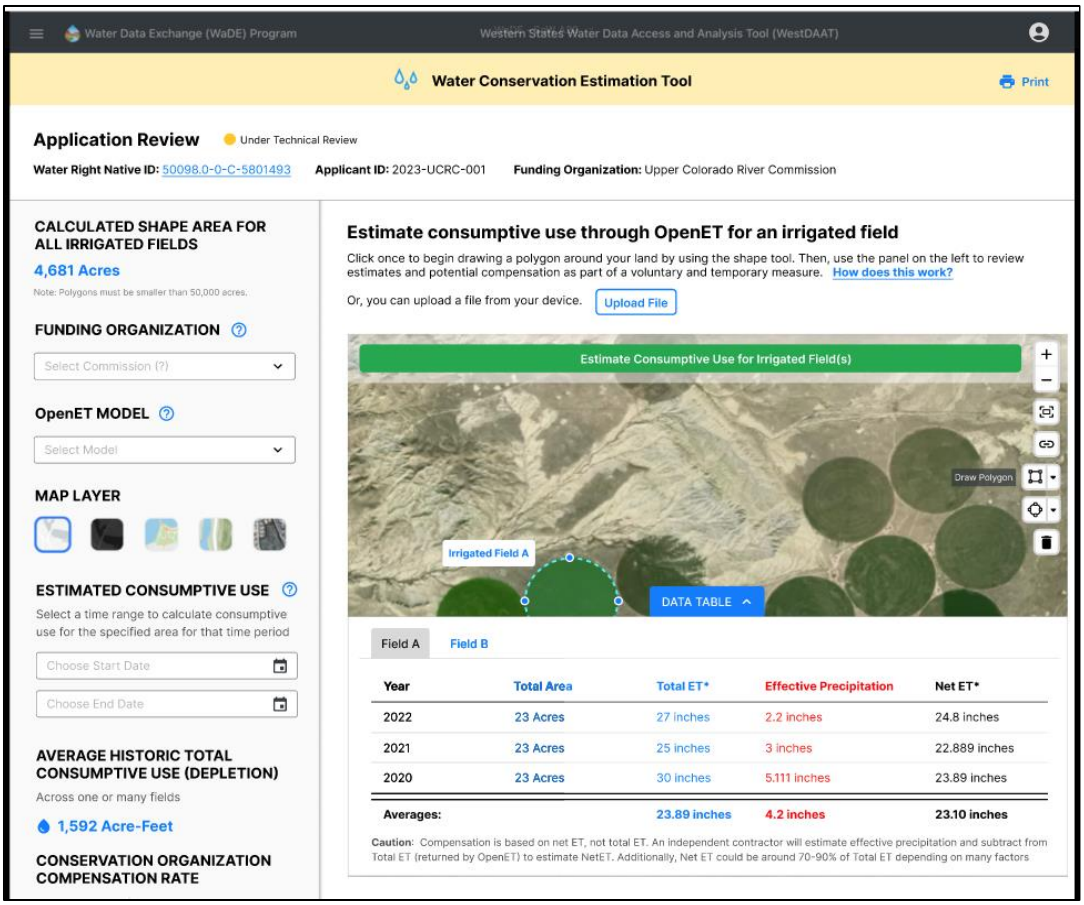


Figure 6: Mockup view showing how the technical reviewer can add a non-irrigated area boundary to estimate effective precipitation.

Development Tasks and Tool Features

The following are the major tasks necessary to create the Water Conservation Tool:

- Collaborate with the OpenET team to set up an efficient and dedicated connection with their Application Programming Interface (API).
- Coordinate with and offer support to water conservation organizations potentially using the Tool, such as UCRC in the Colorado River Basin and Great Salt Lake Commissioner.
- Engage stakeholders in testing a beta version of the Water Conservation Tool.

- Revise the Water Conservation Tool to address any user experience issues reported in testing the beta version of the tool.
- Maintain, update, and revise existing water rights data as the basis for the tool for 18 states and import new datasets when they become available in machine-readable formats.
- Report metrics on organizations, users, and applications engaging with the Tool across the West. Organize virtual meetings and participate in conferences and outreach activities to share information and gather input.

The current WestDAAT IT Contractor provided a detailed list tool features that developers can work on to deploy the tool as part of WestDAAT (Table 1).

Table 1: Major features for developing the Water Conservation Tool.

#	Feature	Notes
1	OpenET integration	API: Setup integration with OpenET
2	Database setup	API: Design initial schema for additional D.B. tables, create DbUp script, and a new DbContext
3	Solution setup	U.I.: Add the menu items and routes for the new features to be added in this project
4	Navigation	
5	Authentication and Authorization	API: Add authentication to the API to validate requests and add an API endpoint for the Azure B2C API connector retrieve custom claims
6	Custom login experience	U.I.: Setup custom domains for the Azure B2C login and WestDAAT (login.westdaat.westernstateswater.org)
7	Add Google logins	U.I.: Add Google logins to the signup/sign in process
8	Multi-factor authentication, User Self Sign-up	UI: Add two-factor authentication to all WestDAAT logins
9	Predefined Shapes	Circle and square drawing tools for Mapbox.
10	Water Consumption Estimates	Tool for estimating E.T. and compensation amount of fields.
11	Help Tip	Animation explaining how to use the estimation tool.
12	Upload Boundary	GeoJSON file field boundaries.
13	Print Estimation Tool	Printer-friendly version of the data from the estimation tool.
14	New Application	Water user creating and submitting a water conservation application.
15	Document Upload	Attaching supporting documents to an application.
16	Print Application	Printer-friendly version of the application.
17	User Profile	User's profile screens.
18	Change Password	Functionality for users change their own passwords.
19	Water User Dashboard	Dashboard that shows a water user their own applications.
20	Water User Statistics	Statistics for a water user about their own applications.
21	Document Download	Download for viewing the supporting documents on an application.

22	Organization Dashboard	Dashboard for an organization to view a list of their applications and statistics.
23	Application Review	Adding reviewer notes and the final review process.
24	Re-estimate ET	Ability to review a past application in the estimation tool and get updated estimates.
25	Technical Review	Editing an application, adding control polygons, and submitting an application for final review.
26	Public Conservation Dashboard	Dashboard of public data about conservation applications and statistics.
27	User List	Administrative screens for viewing all the users in the system.
28	Organization List	Screen for Global admins to see a list of all organizations in the system.
29	Organization Management	Administrative screens for managing users and their roles within an organization.
30	Email Notifications	Adding email notifications to all points in the application process where an email is required.
31	U.I. Analytics	Microsoft Clarity integration for improved user activity analytics.
32	UX Design for Remaining Refinement	UX Design for remaining Modals / Microcopy, Status Assignment for Dashboards and Table Column Labels / Filtering Options by user, Public Transparency Page.

Further details are available if needed.

2. Project Location

The project covers the seventeen western states, including the eight major Bureau of Reclamation river basins identified in the SECURE Water Act. The proposed Tool is broadly applicable to assist with various water conservation programs. The initial outreach is focused on the Colorado River and Great Basins, and ongoing efforts to supplement system river flows and raise Great Salt Lake levels.[18]

Data Management Practices

The Water Conservation Tool source code will be publicly available via Open Source on GitHub at https://github.com/WSWCWaterDataExchange. Water rights data with their geospatial points of diversion and place of use polygons are available for download through Comma-separated values (CSV) formats and can be used to generate shapefiles or GeoJSON structures. The Conservation Organizations will determine whether to make funding applications publicly available through WestDAAT. The WaDE goal is to make water rights and water use information more Findable, Accessible, Interoperable, and Reusable (FAIR), consistent with Internet of Water standards.

Environmental and Cultural Resources Compliance

Not applicable. This project will not include any ground-disturbing activities.

Required Permits or Approvals

Not applicable. No permits or approvals are required.

[18] Great Salt Lake Trust: https://www.gslwatertrust.org/

Overlap or Duplication of Effort Statement

WestDAAT development was funded in part by an earlier WaterSmart Grant #R22AP00242 during the period of May 2021-April 2024. There is no overlap between the existing grant activities and the proposed project. The existing grant will close by April 30, 2024. According to Section "B.3. Expected Award Funding and Anticipated Dates," the anticipated award date for this Notice of Funding Opportunity is April 1, 2024. Although there may a one-month overlap in the timing of the two grants, there is no overlap in the scope of the agreements.

3. Evaluation Criteria

A. Water Management Challenge(s)

1. Describe the water management challenge(s).

The Western U.S. needs to adapt its increased water use to reduced supplies through adaptive strategies such as water conservation and marketing, but there are data gaps that make these efforts difficult to accomplish effectively. Water conservation programs such as SCPP have faced challenges related to soliciting, evaluating, and managing applications given the fluid nature of proposed operational savings from fallowing different parcels to changing crops. The process requires sharing water rights data and geospatial information, estimating the existing consumptive water use and potential savings using OpenET, and determining fair compensation. The Upper Colorado River Commission (UCRC) recently published "Lessons Learned" from the 2023 SCPP.[19] The lessons included the need for "consistent and clear messaging, clarity on Conserved Consumptive Use (CCU) calculations, and greater transparency and clarity regarding approach, purpose, and review process." As part of WestDAAT's engagement efforts, the UCRC suggested that WestDAAT could be helpful if integrated with OpenET to facilitate their SCPP applications.

2. Describe the concerns or outcomes if this water management challenge is not addressed?

Water resources in the West are becoming increasingly scarce, and conservation measures need to be more accessible and agile. As an example, the ongoing 22-year drought in the Colorado River Basin coupled with increased water demand has depleted reservoir storage in Leak Mead and Lake Powell. The seven states have agreed on a water conservation plan[20] that will protect the Colorado River System and hydropower production which are threatened due to the historic lower elevations of Lake Mead and Lake Powel.[21] As another example, the Great Salt Lake has reached a record low in 2022, which threatens an ecologic, economic, and environmental disaster.[22]

3. Explain how your project will address the water management issues and provide support for your response

The proposed tool will address all these challenges through a consistent, transparent, and clear approach to connecting water rights data with OpenET consumptive use estimates and managing applications. Connecting water rights data with consumptive use estimates by integrating WestDAAT and OpenET is expected to help promote federal, state, local, and regional water security and drought resilience activities that empower individual farmers to participate in conservation programs. The Tool will also allow communities to coordinate overall

[19] 2023 SCPP Lessons Learned Summary http://www.ucrcommission.com/wp-content/uploads/2023/09/2023-System-Conservation-Pilot-Program-Lessons-Learned-Report-Public-Summary.pdf
[20] Colorado River Basin Seven States Letter: https://doi.gov/sites/doi.gov/files/seven-states-letter-5-22-2023.pdf
[21] https://www.doi.gov/pressreleases/interior-department-announces-next-steps-protect-stability-and-sustainability-colorado
[22] The Great Salt Lake Strike Team: https://gardner.utah.edu/great-salt-lake-strike-team

conservation savings and protect long-term farming activities in their districts, canal companies, or towns, as it will facilitate a review of different conservation scenarios that fit local needs by viewing water rights information in concert with water use data. The WSWC is uniquely positioned to leverage WestDAAT as the basis for the Water Conservation Tool as we are a trusted state forum for discussion and innovation among our 18 Member States. We were created by and advise Western Governors on water policies and challenges, and we have a working relationship with numerous federal agencies that may benefit from the Tool through our Western Federal Agency Support Team. Also, the WSWC played a critical role in ensuring that Landsat 8 and 9, launched by the National Atmospheric and Space Administration (NASA) and operated by the U.S. Geological Survey (USGS), included thermal infrared sensors that make the OpenET-satellite-based estimates possible.[23] Moreover, the WSWC has worked closely with NASA's Western Water Applications Office in Pasadena, California, to operationalize remote sensing data.

B. Project Benefits

1. Describe how the need for the project was identified

As part of WestDAAT's engagement efforts, the UCRC suggested that WestDAAT could be helpful if integrated with OpenET to facilitate their SCPP applications. Integrating WestDAAT with OpenET will support and streamline voluntary, temporary, in-state, and compensated water conservation applications across the West to support drought resilience and water conservation activities.

2. Describe how the tool, method, or information will be applied and *when* will it be applied. Will the tool or information be used immediately or will additional work need to be done before the tool will be used?

The Water Conservation Tool will be ready to use immediately after it is developed. It will be available first through a beta version for testing and then in production online through WestDAAT individual water rights landing pages https://westdaat.westernstateswater.org Initial deployment of the tool could be expected by the spring or summer of 2024, with full application possible by the fall of 2024, with expanded operations into 2025.

3. Describe, in detail, the extent of benefits that can be expected to occur upon implementation of the project, and provide support for your responses

The tool benefits will include supporting and sustaining short and long-term implementation of and management of conservation programs across the West.

- Famers can use the tool to evaluate different conservation scenarios and see which fits their needs. Applicants can see the status of their application over time.
- The technical reviewer can quickly verify and edit the field boundaries, reproduce the OpenET estimates, select a nearby non-irrigated area as a proxy for effective precipitation, and estimate NetET.
- The conservation organization can quickly view all applications across states (if applicable), see their status in the technical review process, and see the total request compensation and potential saved water volume.

[23] Landsat Thermal Infrared Imagery and Western Water: Management https://onlinelibrary.wiley.com/doi/10.1111/j.1936-704X.2014.03178.x

4. **Who will use the tool or data developed under this proposal and how will they benefit from the project?**
   Conservation organizations, initially the Upper Colorado River Commission, the Great Salt Lake Commission, and WaterCard organization (see support letters).

5. **How will the project improve water management decisions?**
   The project will result in a decision-support tool that will streamline and facilitate voluntary, compensated, in-state, and temporary water conservation applications for programs across the West. The new tool will integrate two foundational data of water conservation: water rights through WestDAAT and consumptive use estimates through OpenET. The tool and integration will improve water management decisions by providing "consistent and clear messaging, clarity on Conserved Consumptive Use (CCU) calculations, and greater transparency and clarity regarding approach, purpose, and review process."

6. **Describe if the results of your project will be applicable elsewhere. What additional work would need to be done to make the project results transferable to others?**
   The Water Conservation Tool will be applicable westwide (17 states). We scoped it to be generic to multiple conservation organizations, and it is based on OpenET and WestDAAT which covers the entire West. The application content (fields) can be adjusted to address potential new unique application requirements.

7. **To what extent will the project address the water management challenges described in A?**
   The Water Conservation Tool will address the need for a streamlined online, user-friendly application processing tool that allows farmers to participate in conservation programs while giving communities the ability to coordinate overall conservation and protect long-term farming in their districts, canal companies, or towns. It will help them easily try different conservation scenarios that fit their needs in concert with OpenET. The tool and integration will improve water management decisions and address the challenges by providing "consistent and clear messaging, clarity on Conserved Consumptive Use (CCU) calculations, and greater transparency and clarity regarding approach, purpose, and review process."

8. **Explain how your project complements other similar efforts in the area where the project is located**.
   WestDAAT and OpenET are currently the only public tools that exist at the scale of the Western U.S. Integrating them to support conservation applications is the first effort of this scale in this regard. The Water Conservation Tool scoping benefited from smaller scale similar efforts, including the Water Accounting and Trading Platform,[24] which is for groundwater management which "facilitate effective accounting and management of available water resources, enabling water managers and landowners to make informed water supply and land use decisions" and the California Delta Alternative Compliance Plan (DACP),[25] which "allows diverters to easily measure and report water use under Water Code sections 5104 and 1840 using satellite-based E.T. estimates." We also believe that the Water Conservation Tool will be useful to conservation efforts Westside, especially in the Colorado River Basin and the Great Salt Lake Basin.

[24] Water Accounting and Trading Platform https://waterplatform.edf.org
[25] Delta Alternative Compliance Plan (DACP)https://www.deltaacp.com/

C. Project Implementation

1. Briefly describe and provide support for the approach and methodology that will be used to meet the objectives of the project.

The presented approach in this proposal has worked well for WaDE during WestDAAT development and outreach with diverse users. The WaDE team has experience in working with the IT Contactor through an Agile iterative process. WSWC invested in the scoping and mockup designs because they are very critical to the development phase. We will launch a beta version as a minimum viable product in the staging environment for testing purposes and make any improvements and updates in the production environment.

2. Describe the work plan for implementing the proposed scope of work

The proposed work will be completed within two years. Table 2 lists the major tasks and their estimated timelines.

Table 2: Project Tasks and Schedule of Completion within two years.

#	Task	Months
1	Coordinate with stakeholders, state and federal agencies, and I.T. contractors on the development	0-24
2	Collaborate with the OpenET team to set an efficient and dedicated connection with their Application Programming Interface (API).	0-6
3	Hire an IT Contractor and oversee the development of the Water Conservation Tool based on WestDAAT infrastructure, the scoped mockups, and the desired user experience.	0-12
4	Launch the beta version of the Water Conservation Tool and test it with identified user groups for feedback. Test user authentication and multi-factor authentication as part of the user management system	6-12
5	Maintain, update, and revise existing water rights data as the basis for the tool for 18 states and import new datasets when they become available in machine-readable formats.	0-24
6	Revise the Water Conservation Tool to address any user experience issues. Then launch the production version of the tool with public announcements and outreach	12-16
7	Organize virtual meetings and participate in conferences and outreach activities to share information and gather input.	0-24
8	Report metrics on organizations, users, and applications engaging with the Tool across the West	12-24
9	Compliance with project reporting requirements including the final report	0-24

3. Provide a summary description of the *products* that are anticipated to result from the project.

Anticipated products include (1) a publicly available web-based Water Conservation Tool part of WestDAAT;[26] (2) source code of the Water Conservation Tool published on GitHub;[27] and (3) documentation of the tool design and how to use it.[28]

4. Who will be involved in the project as project partners? What will each partner or stakeholder's role in the project be?

WSWC will be the sole organization responsible for the project. WSWC will collaborate with the OpenET team to use their API. WSWC will coordinate with the Upper Colorado River Commission and Great Salt Lake Commission as the first potential uses of the tool.

[26] https://westdaat.westernstateswater.org
[27] https://github.com/WSWCWaterDataExchange
[28] https://westernstateswater.org/wade

5. **Identify staff with appropriate credentials and experience and describe their qualifications.** WSWC employs all staff working on this project and there are no plans to fill new positions or request technical assistance from Reclamation. We are currently working with a contractor, Don't Panic Labs, to build out the tool. We have budgeted $400,000 for this work.

   Adel Abdallah, PhD – Project Manager – Adel is the WaDE Program Manager at the WSWC. He has six years of experience working on WaDE and has a Ph.D. in Water Resources Engineering with an emphasis on Hydroinformatics and data modeling from Utah State University. Adel is the lead architect of the WaDE 2.0 data system and coordinates its development.

   Ryan James, MS - Technical Lead – Ryan has been the Hydroinformatics Specialist and Analyst for the WaDE program for about four years. Ryan has an M.S. in Water Resources Engineering from Utah State University. Ryan is an experienced programmer and works on importing and documenting states' data into the WaDE data system. Ryan also has experience in developing and testing RShiny applications to visualize WaDE data.

   Tony Willardson, **MS** - WSWC Executive Director – Tony has been the Executive Director of WSWC since 2009. Formerly the Deputy Director, Tony joined the Council in 1979. He holds a B.A. in political science from Brigham Young University, and an M.S. in public administration from the University of Utah. Tony is one of the principal authors of WGA's Water Needs and Strategies for a Sustainable Future Report (2006) and the subsequent Next Steps Report (2008). He also was a contributing editor to WGA's Report on Water Transfers in the West: Projects, Trends, and Leading Practices in Voluntary Water Trading (2012). Further, he oversees the Council's Water Data Exchange (WaDE) Program and its development.

   Michelle Bushman, BS, MS, JD - Assistant Director and General Counsel – Michelle has eight years of experience at WSWC. Michelle's expertise includes policy issues such as interstate compacts, Indian water rights settlements, droughts, seasonal-to-subseasonal water data and predictive capabilities, cooperative federalism and collaborative state-federal relationships, and other topics impacting the quality, quantity, and careful management of water throughout the West. Michelle has B.S. and M.S. degrees in geology from Brigham Young University and a J.D. from the J. Reuben Clark Law School, where she studied water law, natural resources, and environmental law.

   Elysse Campbell, BS - Policy Analyst – Elysse Ostlund Campbell was hired recently by WSWC as a Policy Analyst. Her previous positions include working as a paralegal at Woodward Law LLC; an intern at the Bureau of Indian Affairs (BIA), Office of Indian Gaming, reviewing NEPA documentation, as a field technician for the United States Forest Service and with SWCA Environmental Consultants. She holds a B.S. in Environmental Science from Brigham Young University.

   Have the project team members accomplished projects similar in scope to the proposed project in the past either as a lead or team member?
   All project team members except the Policy Analyst have been very involved and experienced in the development of WaDE and WestDAAT. They will carry on the same responsibilities in completing this project.

Is the project team capable of proceeding with tasks within the proposed project immediately upon entering into a financial assistance agreement? If not, please explain the reason for any anticipated delay.
Yes. As described in Section 1, WestDAAT is well established and has a growing number of visitors and users. We have detailed plans to build the Water Conservation Tool based on mockups for the desired functionalities of water conservation applications. We can start immediately upon entering into a financial assistance agreement.

D. Dissemination of Results

Describe how the tools, frameworks, or analyses developed under the proposed scope of work will be disseminated, communicated, or made available to water resources managers who may be interested in the results.
The following activities will be forums in which the Water Conservation Tool will be presented, demonstrated, and discussed:

- Western States Water Council Meetings, held three times per year. WSWC members are usually part of leadership within state water agencies whom the Governors of their states appoint.
- Upper Colorado River Commission and Great Salt Lake Commission constituents.
- Present webinar for members of the Western States Federal Agency Support Team (WestFAST),[29] comprised of 12 federal agencies with some water jurisdiction.
- Present at a regional or national water resources conference such as the American Water Resources Association (AWRA).

E. Presidential and Department of the Interior Priorities

Climate Change

The tool will address climatic change impacts on reduced water supply, especially in the Colorado River Basin, by "Expanding information sharing," "increasing water management flexibility," and facilitating water conservation as an adaptive strategy through water markets (compensated, temporary, and voluntary) conservation measures.

Disadvantaged or Underserved Communities

During WestDAAT's engagement with the Family Farm Alliance Famers stakeholders, they suggested that farmers and ranchers are at a disadvantage compared to big cities that have more purchase power to "take their water." Through a user-friendly webpage, the Water Conservation Tool will empower farmers and communities to participate in conservation programs while allowing rural communities to coordinate overall conservation and protect long-term farming in their districts, canal companies, or towns. It will help them quickly try different conservation scenarios that fit their needs in concert with OpenET.

Tribal Benefits

About 2,850 water rights in WestDAAT across the West are recognized by states as tribal water rights. The Tool is scalable and will be available through a web browser, which the tribes can use for educational purposes.

[29] WestFAST: https://westernstateswater.org/westfast

WESTERN STATES WATER COUNCIL

682 East Vine Street, Suite 7 / Murray, Utah 84107 / (801) 685-2555 / FAX (801) 685-2559

Web Page: www.westernstateswater.org

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Financial Commitment, WaterSMART Funding Opportunity R23AS00446

To Whom It May Concern:

The Western States Water Council (WSWC) is a state government entity and instrumentality of each of the seventeen Reclamation States. As a Category A entity, in response to the Bureau of Reclamation's Applied Science Grants Notice of Funding Opportunity (NOFO), the WSWC is submitting the accompanying grant proposal for development of a Water Conservation Tool integrating water rights data, including place of use, from the WSWC's Water Data Exchange and Western Water Data Access and Analysis Tool (WestDAAT) with OpenET data to evaluate on-farm conservation measures base on beneficial consumptive use. Our grant award application requests $400,000 over the next two years.

As part of this project, WSWC will partner with the Upper Colorado Commission (UCRC) to demonstrate the use of the tool to assist them in evaluating future potential System Conservation Pilot Program (SCPP) projects and related demand management activities. The tool will support voluntary, in-state, compensated water conservation measures, which state and federal agencies have highlighted as a means of addressing drought-related low flows in the Colorado River System. However, the tool has potential applications westwide for both economic and environmental purposes.

Given the substantial potential environmental benefits related to enhancing instreamflows, with the development and use of this tool by conservation organization and government agencies, many of which are providing letters of support accompanying this application, we would ask that Reclamation consider reducing the matching requirement from 50% to 25% or from $400,000 to $200,000 for a total project cost of $600,000. However, this letter provides a firm commitment that the WSWC and its members states and philanthropic partners are prepared to meet any non-federal matching requirement.

Under current WSWC agreements, the Water Foundation has funded IT support for the development and maintenance of our WestDAAT tool, including over $50,000 spent to scope the feasibility and cost of development of this Water Conservation Tool. Roughly another $100,000 remains available. The WSWC has a commitment from the BHP Foundation, through Duke University's Nicholas Institute for Energy, Environment and Sustainability, for another $150,000 over the next two years. The WSWC already has reserve funds sufficient to cover the remaining $150,000 if needed. Further, our member states make a substantial in-kind contribution in the form of staff time and data necessary for this project.

We appreciate your consideration of our application and look forward to working with the Bureau of Reclamation to improve water conservation programs across the West.

Sincerely,

Tony Willardson

Tony Willardson
Executive Director

SUSIE LEE
3rd District, Nevada

Washington Office
365 Cannon House Office Building
Washington, DC 20515
(202) 225-3252

District Office
7785 W. Sahara Ave, Suite 203
Las Vegas, NV 89117
(702) 963-9336

Congress of the United States
House of Representatives
Washington, DC 20515-2803

House Committee on
Appropriations

Subcommittees on
Energy & Water Development,
& Related Agencies
Military Construction,
Veterans Affairs, & Related Agencies

House Committee on
Natural Resources

Subcommittees on
Energy & Mineral Resources
Oversight & Investigations

October 17, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

Commissioner Touton,

I am writing to express my support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) for the development of a water conservation tool.

Nevada provides water data to the WaDE program and expends resources to ensure that the data is accurate and up to date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring outdoor consumptive use. OpenET uses the best available science to map and provide easily accessible satellite-based ET data that, when coupled with water rights data, has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

Under this proposal, WaDE and WestDAAT would offer a platform for states to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

For these reasons, please give the Western States Water Council's application your full and fair consideration. Please contact myself, or my staff, if you have any further questions.

Sincerely,

Rep. Susie Lee (NV-03)

WESTERN GOVERNORS' ASSOCIATION

MARK GORDON
GOVERNOR OF WYOMING
CHAIR

MICHELLE LUJAN GRISHAM
GOVERNOR OF NEW MEXICO
VICE CHAIR

JACK WALDORF
EXECUTIVE DIRECTOR

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

To Whom it May Concern:

On behalf of the Western Governors' Association (WGA), I am writing in support of the Western States Water Council's (WSWC) WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its Water Conservation Tool. WGA represents the Governors of the 22 westernmost states and territories and is an instrument of the Governors for bipartisan policy development, information exchange, and collective action on issues of critical importance to the western United States. WGA and WSWC collaboratively developed WaDE to improve regional water planning efforts, helping secure initial funding and defining the objectives of the tool. For nearly a decade now, WaDE has had an important role in providing water rights data across the West to inform regional planning and Governors' drought and water management efforts.

The Western Water Data Access and Analysis Tool (WestDAAT) provides unprecedented, streamlined access to 2.5 million water rights across 18 western states with a direct link to each state's public water rights database. OpenET provides current and historical estimates of consumptive use for irrigated fields and other outdoor uses across the 17 Reclamation states. Integrating WestDAAT with OpenET would support voluntary, temporary, in-state, and compensated water conservation measures across the West.

Basic information on water status, trends, and availability is essential to sound water management. WSWC has made this easier through a common platform for use by both the public and private sectors. WGA's policy recognizes the value WaDE has brought to our states, and encourages further integration to promote more effective and informed water management decision making.

Thank you for your consideration of WSWC's WaDE proposal for WaterSMART grant funding. WGA strongly supports their application.

Sincerely,

Jack Waldorf
Executive Director

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources
DIVISION OF MINING, LAND & WATER
Water Resources Section

550 West 7th Avenue, Suite 1020
Anchorage, Alaska 99501-3579
Main: 907.269.8600
TTY: 711 or 800-770-8973
Fax: 907.269.8904

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Alaska to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental stream flows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Tom Barrett

Tom Barrett, CPG
Water Section Chief
Department of Natural Resources (DNR), Division of Mining, Land and Water

Cc: Emma Pokon, Commissioner of Department of Environmental Conservation (DEC)
Randy Bates, Director of Division of Water, DEC
Christy Colles, Director of Division of Mining, Land, and Water, DNR
Julie Pack, Assistant Attorney General, Department of Law
Tony Willard, Executive Director, Western States Water Council

IDAHO DEPARTMENT OF
WATER RESOURCES

322 E Front Street, Suite 648, Boise ID 83702 • PO Box 83720, Boise ID 83720-0098
Phone: 208-287-4800 • Fax: 208-287-6700 • Email: idwrinfo@idwr.idaho.gov • Website: idwr.idaho.gov

Governor Brad Little **Director Mathew Weaver**

October 15, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Idaho to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years to support and further develop the Council's Water Data Exchange (WaDE) and to initiate the development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses the best available science to map and provide easily accessible satellite-based ET data that, when coupled with water rights data, has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and to learn from each other while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Respectfully,

Mathew Weaver
Director

900 SW Jackson Street, Suite 404
Topeka, KS 66612

Kansas Water Office

Phone: (785)-296-3185
Fax: (785)-296-0878
www.kwo.ks.gov

Connie Owen, Director

Laura Kelly, Governor

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

October 16, 2023

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Kansas (Kansas Water Office, Kansas Department of Health and Environment, and Kansas Department of Agriculture Division of Water Resources) to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Director, Kansas Water Office

NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

Jim Pillen, Governor

October 17, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Water Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Nebraska to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

Thomas E. Riley, P.E., Director
Department of Natural Resources
245 Fallbrook Blvd., Suite 201 OFFICE 402-471-2363
Lincoln, Nebraska 68521 FAX 402-471-2900
dnr.nebraska.gov

We strongly support this grant application.

Sincerely,

Thomas E. Riley

Thomas E. Riley, Director
Department of Natural Resources

Nevada Division of
WATER RESOURCES

STATE OF NEVADA
Department of Conservation and Natural Resources
Joe Lombardo, *Governor*
James A. Settelmeyer, *Director*
Adam Sullivan, P.E., *State Engineer*

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

On behalf of the Nevada Division of Water Resources, I wish to express support for the Western States Water Council's application for a WaterSMART grant through the Bureau of Reclamation's Applied Sciences Program. This grant, amounting to $400,000 to be disbursed over a two-year period, is intended to further develop the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

WSWC's proposal to integrate OpenET data on evapotranspiration (ET) into Western Water Data Access and Analysis Tool (WestDAAT) is a significant advancement in supporting water conservation efforts. OpenET enables production of consistent, reproducible, and accessible ET data using best available science. When coupled with water rights data OpenET has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, and improving drought management.

WaDE and WestDAAT present a collaborative platform to develop vital water conservation applications, fostering mutual learning and growth, while promoting state and federal water management and conservation objectives.

This initiative holds immense promise for the responsible management of our valuable water resources, and we look forward to the potential positive impact it may have on our region.

Sincerely,

Adam Sullivan, P.E.
Nevada State Engineer

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

CONCHA ORTIZ Y PINO BUILDING, 130 SOUTH CAPITOL, SANTA FE, NM 87501
TELEPHONE: (505) 827-6091

MIKE A. HAMMAN, P.E.
STATE ENGINEER

Mailing Address:
P.O. Box 25102
Santa Fe, NM 87504-5102

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of New Mexico Office of the State Engineer to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Mike A. Hamman, P.E
New Mexico State Engineer

MAH/kme

cc: Tony Willardson, Executive Director WSWS
Tanya Trujillo, Deputy State Engineer, NM Office of the State Engineer

JULIE CUNNINGHAM
EXECUTIVE DIRECTOR

KEVIN STITT
GOVERNOR

OKLAHOMA
Water Resources Board

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the Oklahoma Water Resources Board (OWRB) to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Julie Cunningham
Julie Cunningham (Oct 13, 2023 16:04 CDT)

Julie Cunningham
Executive Director

Oregon
Tina Kotek, Governor

Water Resources Department
725 Summer St NE, Suite A
Salem, OR 97301
(503) 986-0900
Fax (503) 986-0904
www.Oregon.gov/OWRD

October 17, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Oregon to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years to support the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data are accurate and up-to-date. This proposal to integrate open-source satellite-based evapotranspiration (ET) data into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. This project will use satellite based open-source evapotranspiration data that uses best available science to map and provide easily accessible data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Doug Woodcock, Acting Director

State of Utah

SPENCER J. COX
Governor

DEIDRE M. HENDERSON
Lieutenant Governor

Department of Natural Resources

JOEL FERRY
Executive Director

Division of Water Resources

CANDICE A. HASENYAGER
Division Director

October 16, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the State of Utah to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Candice Hasenyager
Director, Utah Division of Water Resources

1594 West North Temple, Suite 310, PO Box 146201, Salt Lake City, UT 84114-6201
telephone (801) 538-7230 · TTY (801) 538-7458 · *www.water.utah.gov*

State Engineer's Office

HERSCHLER BUILDING, 2 WEST
CHEYENNE, WYOMING 82002
(307) 777-6150

MARK GORDON
GOVERNOR

BRANDON GEBHART, P.E.
STATE ENGINEER

October 17, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: Western States Water Council (WSWC) WaterSMART Grant Application, R23AS00446

To Whom It May Concern:

I'm writing on behalf of the Wyoming State Engineer's Office to express support for the Western States Water Council's application for a WaterSMART grant under the Bureau of Reclamation's Applied Sciences Program for $400,000 over two years for the Water Data Exchange (WaDE) and to initiate development of a water conservation tool.

Our State provides water data to the WaDE program and expends resources to ensure that the data is accurate and up-to-date. This proposal to integrate OpenET data on evapotranspiration into the Western Water Data Access and Analysis Tool (WestDAAT) will facilitate voluntary, temporary, in-state, water conservation measures. Publicly released in April 2023, WestDAAT provides data and metadata for over two million water rights across the West, including ownership, purpose of use, point of diversion, place of use, and permitted flow or volume.

Western water rights are based on reasonable and beneficial consumptive use, but there has been no uniform application for measuring agricultural and other outdoor consumptive uses. OpenET uses best available science to map and provide easily accessible satellite-based ET data that when coupled with water rights data has the potential for promoting water conservation and efficiency, facilitating state water rights administration, stretching scarce water supplies, promoting in-state water marketing, improving drought management, and enhancing environmental streamflows.

WaDE and WestDAAT offer a platform for States to build increasingly critical water conservation applications and learn from each other, while promoting state and federal water management and conservation goals.

We strongly support this grant application.

Sincerely,

Brandon Gebhart, PE
Wyoming State Engineer

UPPER COLORADO
RIVER COMMISSION
50 S. 600 E. Ste #100 • Salt Lake City, UT 84102 • 801-531-1150 • www.ucrcommission.com

October 17, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

To Whom it May Concern:

I am writing to provide support for the Western States Water Council's WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its development of a westwide tool to support streamlining applications for water conservation measures by integrating the Western Water Data Access and Analysis Tool (WestDAAT) with OpenET. WestDAAT already provides access to water rights data across western states. OpenET provides historical estimates of evapotranspiration (ET) for irrigated fields across the western states.

The Upper Colorado River Commission (UCRC) currently operates a water conservation program – the System Conservation Pilot Program (SCPP) – that utilizes the OpenET platform for estimating ET and Conserved Consumptive Use (CCU) for potential SCPP agricultural projects. The UCRC is interested in supporting water users' access to ET and CCU information and tools that streamline water conservation application processing. The UCRC supports continued investigation and refinement of data access and processing tools that may help to achieve those goals. The WSWC's WestDAAT and OpenET interface shows potential for assisting with such access and processing. While the timing for utilizing such tools for SCPP in 2024 is not optimal, they may serve as the basis for investigations and application submissions for water conservation programs in the future.

We thank you for your consideration of WSWC's WaDE proposal for WaterSMART grant funding. We support their application.

Sincerely,

Chuck Cullom
Executive Director
Upper Colorado River Commission

OPENET

FILLING THE BIGGEST DATA GAP IN WATER MANAGEMENT

304 S. Jones Blvd STE 1332
Las Vegas, NV 89107

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

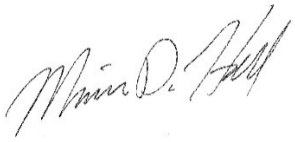
To Whom it May Concern:

I am writing to provide support for the Western States Water Council's WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its development of a Westwide Tool to support applications for water conservation measures by integrating the Western Water Data Access and Analysis Tool (WestDAAT) with OpenET. WestDAAT already provides unprecedented, streamlined access to 2.5 million water rights across its eighteen member states with a direct link to each state's public water rights database. OpenET provides historical estimates of consumptive use for irrigated fields across the 17 Western States.

The Western States Water Council has long supported the use of remote sensing technologies and data from Landsat missions to improve the measurement and monitoring of consumptive water use through a partnership between the National Atmospheric and Space Administration (NASA) and U.S. Geological Survey (USGS). We at OpenET are ready to work with the WaDE Program to support the integration of OpenET Application Programming Interface (API) with WestDAAT. The Water Conservation Tool will empower farmers and growers to use OpenET to their advantage to evaluate voluntary, compensated, in-state, and temporary conservation measures.

We enthusiastically support the WaDE Program, and are happy to support their WaterSMART proposal. Thank you for your consideration.

Sincerely,



Maurice D. Hall, PhD, PE
Interim Director, OpenET Inc.

The Nature Conservancy
2424 Spruce Street
Boulder, CO 80302
nature.org/coriver

October 13, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

To Whom it May Concern:

I am writing to provide support for the Western States Water Council's WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its development of a Westwide Tool to support applications for water conservation measures by integrating the Western Water Data Access and Analysis Tool (WestDAAT) with OpenET. WestDAAT already provides unprecedented, streamlined access to 2.5 million water rights across its eighteen member states with a direct link to each state's public water rights database. OpenET provides historical estimates of consumptive use for irrigated fields across the 17 Western States.

The Nature Conservancy's Colorado River Program has long had an interest in western water conservation, with the goals of increasing instream flows for fisheries and recreation while working with farmers to improve water conservation without negatively impacting their livelihoods. We have a strong commitment to environmental conservation that also benefits the people that rely on the landscapes and waterways we are working to protect. WSWC's WaDE Program and this tool will also help conservation efforts for Great Salt Lake Watershed Enhancement Program which we co-manage with the National Audubon Society (Audubon).

We enthusiastically support the WaDE Program and are happy to support their WaterSMART proposal. Thank you for your consideration.

Sincerely,

Taylor Hawes
The Nature Conservancy
Colorado River Program Director

Janet Quinney Lawson
Institute for Land, Water & Air
UtahStateUniversity

October 13, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

To Whom it May Concern:

I am writing to provide support for the Western States Water Council's WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its development of a Westwide Tool to support applications for water conservation measures by integrating the Western Water Data Access and Analysis Tool (WestDAAT) with OpenET. WestDAAT already provides unprecedented, streamlined access to 2.5 million water rights across its eighteen member states with a direct link to each state's public water rights database. OpenET provides historical estimates of consumptive use for irrigated fields across the 17 Western States.

As the Great Salt Lake Commissioner, I appreciate the Western States Water Council's WaDE Program and their WestDAAT which offer regional water data for the Great Salt Lake Basin. The Water Conservation Tool will be very valuable to our efforts to restore the Great Salt Lake because it empowers the agricultural community to evaluate voluntary, compensated, and temporary conservation and efficiency measures.

We enthusiastically support the WaDE Program and are happy to support their WaterSMART proposal. Thank you for your consideration.

Sincerely,

Brian Steed
Great Salt Lake Commissioner &
Executive Director, Janet Quinney Lawson Institute for Land, Water & Air,
Utah State University

Sherman & Howard L.L.C.
675 Fifteenth Street, Suite 2300
Denver, Colorado 80202
Telephone: 303.297.2900

shermanhoward.com

James Eklund
Direct Dial Number: 303.299.8088
E-mail: jeklund@shermanhoward.com

October 12, 2023

Bureau of Reclamation
Financial Assistance Support Section
Attn: Applied Science NOFO
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Re: WSWC WaterSMART Application – Funding Opportunity R23AS00446

To Whom it May Concern:

I am writing to provide support for the Western States Water Council's WaterSMART applied science proposal to fund the Water Data Exchange (WaDE) Program and its development of a West wide Tool to support streamlining applications for water conservation measures by integrating the Western Water Data Access and Analysis Tool (WestDAAT) with OpenET. WestDAAT already provides unprecedented, streamlined access to 2.5 million paper water rights across the Western eighteen States with a direct link to each state's public water rights database. OpenET provides historical estimates of consumptive use for irrigated fields across the Western seventeen States.

WaterCard is a newly formed organization that solicits donations from corporate companies looking to offset their water footprint and meet their sustainability requirements. WaterCard then pays farmers and ranchers for conserving Colorado River water. Water is then left in a stream, river, or watershed in the Colorado River Basin that would otherwise have been consumed. WaterCard is water reimagined for the climate-impacted, water-scarce reality of today. The purchaser, in addition to rewarding water conservation at a time when it is needed most, is also offsetting their water footprint by a specific amount of water. Each purchaser receives a digital WaterCard detailing the amount of conserved water and specifying the tributary or reach of river the conserved water benefited. Water conservation and regenerative agriculture are key solutions to mitigate the effects of climate change while safeguarding food production.

Integrating WestDAAT with OpenET will streamline voluntary, temporary, in-state, and compensated water conservation application measures and agriculture optimization activities across the West. WaterCard will encourage farmers and ranchers to use the Water Conservation Tool once developed.

I am myself a rancher, water lawyer, and advocate who participated in the Upper Basin System Conservation Pilot Program (SCPP) last year. We at WaterCard enthusiastically support the WSWC's WaDE Program and their WaterSMART proposal.

Thank you for your consideration.

Sincerely,

James Eklund
Founder
WaterCard
https://www.watercard.org/