

White Wolf Subbasin Groundwater Sustainability Agency

Regular Board Meeting of the Board of Directors

Agenda January 3, 2023 at 1:00 p.m.

In Person: Wheeler Ridge-Maricopa Water Storage District Headquarters
12109 Highway 166
Bakersfield, CA 93313

Or Virtual Option:
Go To Meeting: <https://meet.goto.com/911605181>
Call by Phone: (872) 240-3311 Access Code: 911-605-181

1. Call to order
2. Recognition of Guests
3. Approval of Minutes of the Regular Board Meeting of November 10, 2022
4. Report by Board Secretary (Angelica)
 - a. Financial Accounting
5. Updates on Actions Discussed or Authorized on November 10, 2022 (EKI)
 - a. Groundwater Sustainability Plan (GSP) Implementation Updates
 - i. Fall groundwater levels compared to Sustainable Management Criteria
 - b. Grant Solicitation Updates
 - i. Final SGMA Implementation Round 2 Application
 - ii. Round 2 Multibenefit Land Repurposing Program Grant Upcoming Solicitation – *Board Action Item*
 - c. Projects/Management Actions (P/MAs) Committee Initiation
6. Discuss and Consider Approval of EKI Budget Augmentation for Task Order #9 Water Year (WY) 2022 GSP Implementation Support – *Board Action Item*
7. Evapotranspiration Data Options to Support WY 2022 Annual Report (EKI/Angelica) – *Board Action Item*
8. Correspondence
 - a. State Water Resources Control Board letter “Groundwater Quality Considerations for High and Medium Priority Groundwater Basins” dated 22 November 2022

In compliance with the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services, please call Angelica Martin (661) 663-4262.

**White Wolf Subbasin Groundwater Sustainability Agency
Regular Board Meeting of the Board of Directors**

**Agenda
January 3, 2023 at 1:00 p.m.**

9. Public Comment

At this time, the public may address the Board on any item not appearing on the agenda that is within the subject matter jurisdiction of the Board. Comments will be limited to three minutes.

10. Consider and provide direction on future agenda items

11. Closed Session – Anticipated litigation (Government Code Section 54956.9(d)(2))—1 item.

12. Report Out of Closed Session

13. Adjourn

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**White Wolf Subbasin Groundwater Sustainability Agency
Wheeler Ridge-Maricopa Water Storage District
12109 Highway 166, Mettler, CA 93313**

MINUTES OF THE REGULAR BOARD OF DIRECTORS MEETING

Date of Meeting: Tuesday, November 1, 2022

Location: Remote and In-Person

Meeting Commenced at 1:03 p.m.

DIRECTORS PRESENT: Tito Martinez, George Cappello, Jeff Giumarra, Jeff Mettler, Allen Lyda

ALTERNATES: None

DIRECTORS ABSENT: Jon Reiter

PUBLIC AND STAFF: Robbin Smith from Wonderful Citrus, and Anona Dutton, Christina Lucero, and Sarah Gerenday, from EKI, Robert Velasquez with TRC, Tim Gobbler from Trinitas, Eric McDaris with WRMWSD, and Legal Counsel Alan Doud, were present.

President Martinez did a recognition of guests followed by the draft meeting minutes of the Regular Board Meeting of October 6, 2022, presented by Ms. Martin. On motion by Director Lyda and seconded by Director Cappello, the minutes were unanimously approved. The motion was carried upon roll call vote for approval.

Ms. Martin introduced Robert Velazquez who presented the financial report. Director Martinez asked if there could be a breakdown of professional services to show detail of expenses. There were no other questions. On motion by Director Cappello, and seconded by Director Giumarra, the financials were unanimously approved. The motion was carried upon roll call vote for approval.

Christina Lucero from EKI gave a presentation starting with an update on Groundwater Sustainability Plan (GSP) implementation tasks as well as fieldwork activities. She presented the October water levels in the basin as well as MT exceedances. She went on to talk about the Grant SGMA Implementation Round 2, and the priority order of projects as well as schedule to submit the application. She also wanted to make clear and confirm the Tiered P/MA Committee structure that had been chosen by the Board in our last meeting. She also was looking for volunteers to assign one director for each District to the Committee. Director Martinez volunteered for AEWSD, Director Lyda for TCWD, and Director Mettler for WRMWSD. Christina explained how the process was going to be to conduct outreach to the largest 25 landowners in the basin, but it would be open to anyone who would like to be part of the committee, including non-profits. It was noted by Director Lyda that it would be complicated to achieve results from the committee if it had over 25 members and asked if there would be a limit. Christina said that was already being discussed but the Technical Committee. She informed the board they could recommend a limit to how many members should form the committee.

Sheridan Nicholas talked about the process of imposing GSA administrative charges as a matter of initiating the conversation on the topic. Legal Counsel advised this should be an ongoing item of discussion.

Christina Lucero talked about Landowner Recharge Policy in the absence of Director Reiter who had requested this be an agenda item. To facilitate the discussion EKI compiled three

examples of how other GSAs have approached the idea of landowner recharge. No action was required. This is also an ongoing subject.

There was no correspondence to report.

There were no public comments.

Ms. Martin advised next meeting would be on December 6, 2022.

At 1:32 p.m. the board went to closed session.

There was nothing to report out of closed session. Open session began at 1:33 p.m.

The White Wolf GSA was adjourned at 1:34 p.m.

Angelica Martin, Secretary, White Wolf Subbasin GSA

Approved by: White Wolf Subbasin GSA Board of Directors Dated: January 3, 2023



White Wolf Groundwater Sustainability Agency

Arvin-Edison Water Storage District
Tejon-Castac Water District
Wheeler Ridge-Maricopa Water Storage District
Kern County

AGENDA MEMORANDUM

Date: 21 December 2022

To: Board of Directors, White Wolf Groundwater Sustainability Agency (GSA)

From: Angelica Martin, Secretary, White Wolf GSA

Item: 6. Discuss and consider approval of EKI Budget Augmentation for Task Order #9 Water Year (WY) 2022 Groundwater Sustainability Plan (GSP) Implementation Support

SUMMARY

Recommendation: Approve EKI Environment and Water, Inc. (EKI)'s Budget Augmentation for Task Order #9

Fiscal Impact: \$100,000 (\$33,333 per District)

BACKGROUND

The White Wolf GSA is required to conduct ongoing implementation once the GSP has been adopted and submitted. As the GSP was adopted on 25 January 2021, the GSA has been proceeding with GSP implementation. EKI's existing Task Order #9 included tasks for GSP implementation support through the end of WY 2022 (i.e., September 2022) with the WY 2022 Annual Report task extending through its submittal date of 1 April 2023. As such, ongoing GSP implementation support for WY 2023, such as processing and uploading seasonal water level data to DWR's portal, is not included under EKI's current contract. Furthermore, given the current state of the White Wolf Subbasin, the GSA has elected to increase water level monitoring and Board meeting frequencies as well as establish a new committee dedicated to Projects and/or Management Actions (P/MAs). Providing ongoing support for these unforeseen tasks are not included under EKI's current contract. Based on the above, EKI has prepared a scope of work for conducting WY 2023 GSP implementation support from Fourth Quarter 2022 (retroactively) through First Quarter 2023 (i.e., 31 March 2023) to enable a standard contractual end date aligned with the Annual Report due date.

Additionally, as recommended by the Technical Committee, EKI has included a task to support refinement and submittal of a grant application to the Department of Conservation's Multi-Benefit Land Repurposing Program Round 2 grant solicitation.

DISCUSSION

This Budget Augmentation will involve conducting WY 2023 GSP implementation support for Fourth Quarter 2022 through First Quarter 2023. Specific tasks include:

- Monthly data compilation, quality assurance/quality control, and Data Management System (DMS) updates for district-collected water level data from the Representative Monitoring Wells, and EKI-collected data logger data.
- Upload of Fall water level data to DWR's SGMA portal by 1 January 2023.
- Field work activities to download transducer water level data, stream data logger data, and temperature data.
- Review and processing of Airborne Electromagnetic (AEM) survey interpretation data produced by DWR.
- Support for and participation in monthly Board and Technical Committee meetings.
- Assist with P/MA Committee establishment, including development of outreach materials, background research, and meeting support for monthly Technical Advisory Committee meetings and quarterly Board ad-hoc meetings.
- As-needed support for implementation of the action plan to address Minimum Threshold (MT) exceedances as outlined in the GSP.
- Preparation of a Round 2 Multibenefit Land Repurposing Grant Application and an optional task for grant application interview support.

EKI will provide a new Task Order for the remaining WY 2023 GSP implementation support activities in March 2023 for GSA Board consideration.

Attached:

- EKI Budget Augmentation for Task Order #9 - White Wolf Subbasin Water Year (WY) 2022 Groundwater Sustainability Plan (GSP) Implementation

21 December 2022

Angelica Martin
Secretary of the Board
Tejon-Castac Water District on behalf of the
White Wolf Groundwater Sustainability Agency

Subject: Budget Augmentation for Task Order #9 – White Wolf Subbasin Water Year (WY) 2022
Groundwater Sustainability Plan (GSP) Implementation Support
White Wolf Subbasin, Kern County
(EKI C2-042)

Dear Ms. Martin:

EKI Environment and Water, Inc. (EKI) requests the following budget augmentation from Tejon-Castac Water District (TCWD, District, or Client) on behalf of the White Wolf Groundwater Sustainability Agency (GSA) to proceed with GSP implementation support activities for the White Wolf Subbasin (Basin) through First Quarter 2023.

BACKGROUND

The White Wolf GSA is required to conduct ongoing implementation once the GSP has been adopted and submitted. As the GSP was adopted on 25 January 2021, the GSA has been proceeding with GSP implementation. EKI's existing Task Order #9 included tasks for GSP implementation support through the end of WY 2022 (i.e., September 2022) with the WY 2022 Annual Report task extending through its submittal date of 1 April 2023. As such, ongoing GSP implementation support for WY 2023, such as processing and uploading seasonal water level data to DWR's portal, is not included under EKI's current contract. Furthermore, given the current state of the White Wolf Subbasin, the GSA has elected to increase water level monitoring and Board meeting frequencies as well as establish a new committee dedicated to Projects and/or Management Actions (P/MAs). Providing ongoing support for these unforeseen tasks are not included under EKI's current contract. Based on the above, EKI has prepared the scope of work outlined below for conducting WY 2023 GSP implementation support from Fourth Quarter 2022 (retroactively) through First Quarter 2023 (i.e., 31 March 2023) to enable a standard contractual end date aligned with the Annual Report due date.

Additionally, as recommended by the Technical Committee, EKI has included a task to support refinement and submittal of a grant application to the Department of Conservation's Multi-Benefit Land Repurposing Program Round 2 grant solicitation.

SCOPE OF WORK

Task 1 – GSP Implementation Support

Task 1 involves GSP implementation support including monitoring, data collection, data gap filling efforts, and stakeholder outreach and coordination, as outlined in the GSP implementation plan for Fourth Quarter 2022 through First Quarter 2023 (i.e., the beginning of WY 2023 through the WY 2022 Annual Report due date, or 1 October 2022 through 31 March 2023). Task 1 does not include preparation of the WY 2022 Annual Report.

Subtask 1.1 - Monitoring, Data Compilation, and Data Gap Filling

As part of Subtask 1.1, GSA member districts will be required to collect and provide specific data including, monthly water level measurements and/or data downloads from data loggers from the SGMA Monitoring Network. Additionally, the GSA is required to upload groundwater elevation data from Representative Monitoring Wells (RMWs) to DWR's SGMA portal twice a year (seasonal low measurement to be submitted by January 1st).

Under Subtask 1.1, EKI will conduct the following technical work efforts:

- Monthly data compilation, quality assurance/quality control (QA/QC), and Data Management System (DMS) updates for:
 - District-collected water level data collected from the Representative Monitoring Wells (RMW-WLs and RMW-ISWs) and supplemental monitoring sites (MW-WL and MW-ISW);
 - EKI-collected high-frequency water level data from transducer data loggers; and
 - EKI-collected El Paso Creek streamflow data from the stream data logger.
- Semi-annual upload of seasonal (Fall) water level data to DWR's SGMA portal by January 1st.
- Conduct the following field work activities:
 - Coordination of site access and permits;
 - Download high-frequency water level data from three transducers in the shallow RMW-ISWs and one transducer in the Principal Aquifer;
 - Download data from stream data logger in El Paso Creek; and
 - Download temperature data from data loggers on production wells.
- Review and processing of Airborne Electromagnetic (AEM) survey interpretation data and final report produced by DWR, anticipated to become available during the First Quarter 2023.

Subtask 1.2 - Stakeholder Outreach and Coordination

Subtask 1.2 involves facilitating stakeholder engagement and coordination efforts during Fourth Quarter 2022 through First Quarter 2023. Specifically, EKI will:

- Assist with developing meeting agendas and board packets and participate in up to four (4) monthly GSA Board meetings (November, January, February, and March). EKI has assumed virtual attendance to all GSA Board meetings, and that these meetings will be two hours in length.
- Facilitate data collection and intra-basin coordination efforts, including participation in up to six (6) monthly ad-hoc Technical Committee meetings. EKI has assumed virtual attendance to all Technical Committee meetings, that these meetings will be one-hour in length, and will include discussion of key technical matters.
- Conduct routine website maintenance for meeting noticing requirements.

Task 2 – Project and Management Action (P/MA) Committee Establishment

Task 2 involves work efforts associated with P/MA committee(s) establishment. EKI will:

- Assist the Technical Committee with establishment of the Technical Advisory Committee (TAC), including developing outreach materials.
- Conduct background research on other GSA policies to bring forth to the TAC for consideration and discussion.
- Provide support for up to four (4) meetings including developing meeting agendas, presentations, and packets as applicable for:
 - Three (3) monthly Technical Advisory Committee meetings; and
 - One (1) quarterly Board ad-hoc meeting.

Task 3 – As-Needed Support for Action Plan for Minimum Threshold (MT) Exceedances

Two RMW-WLs exceeded their MT during Fall 2022. Task 3 involves support for implementation of the MT exceedances action plan. EKI will provide technical assistance on an as-needed basis to follow the action plan steps identified in the GSP, including:

- Identify Exceedance and Investigate the RMS Area;
- Evaluate Outside Contributing Factors;
- Consider the Need for Increased or Expanded Monitoring;
- Consider Initiating Projects and/or Management Actions (P/MAs);
- Evaluate Whether GSP Implementation is Causing or Exacerbating MT Exceedance for Water Quality and/or Interconnected Surface Water; and
- Consider Enforcement Action.

Task 4 – Multibenefit Land Repurposing Grant Application

Task 4 involves preparing a Multibenefit Land Repurposing Program Grant Application on behalf of the White Wolf GSA. Task 4 includes two subtasks.

Subtask 4.1 - Multibenefit Land Repurposing Grant Application Preparation

EKI will work closely with the Technical Committee and GSA to modify and refine the White Wolf GSA's 2022 multi-benefit land repurposing grant application to establish a multi-benefit land repurposing plan and program in the Basin for re-submittal to the Round 2 grant solicitation. The GSA will be required to provide supporting documentation, as requested by EKI. Additionally, the GSA will be required to obtain letters of commitments from project partners and collaborators which outlines contributions to the proposed work. The application will include, but is not limited to, the following:

- GSA Eligibility and Capacity;
- Basin description;
- Proposal summary detailing the Scope of Work, which will include development of a Multibenefit Agricultural Land Repurposing Plan, project development and permitting, land repurposing project implementation, support of partners' capacity needs, outreach, education, and training, and monitoring;
- Community Engagement;
- Partnerships and Collaboration including letter of commitments;
- Policy and project expertise ;
- Budget Summary using the table template;
- Project Map(s); and
- Authorizing Resolution from the GSA, designating an authorized representative to submit the application, enter into a grant agreement, and execute the grant agreement on behalf of the White Wolf GSA.

All materials will be compiled and submitted in draft form for White Wolf GSA review, and then submitted in final form to Department of Conservation (DOC) via email to mlrp@conservation.ca.gov by 15 March 2023.

Subtask 4.2 - Multibenefit Land Repurposing Grant Interview

Based on the Round 1 process, the White Wolf GSA participated in an interview with DOC to present the GSA's application and multi-benefit land repurposing vision. Subtask 4.2 is an optional task in the instance DOC requests an interview. EKI will assist the GSA with preparation of interview materials and participating in the interview.

PERSONNEL

EKI's staff members who will lead this project include Anona Dutton, P.G., C.Hg. (Officer), Christina Lucero, P.G. (Associate 2) and Sarah Gerenday, Ph.D. (Grade 2); grades in parentheses are for purposes of billing in accordance with the attached Schedule of Charges (see Attachment A). Other EKI staff members will be assigned to assist with the performance of the tasks as required to meet project commitments.

TERMS AND CONDITIONS

All work performed by EKI under this Task Order will be performed pursuant to the Terms and Conditions of our existing Agreement with Tejon-Castac Water District. EKI will review the application guidelines and instructions contained within PSP.

COMPENSATION

Inasmuch as the exact level of effort required to complete the above Scope of Work cannot be known precisely, EKI proposes to perform the work on a time and materials expense reimbursement basis in accordance with our current Schedule of Charges (Attachment A). The estimated budget for this scope of work including optional tasks is \$101,000 (see also Table 1) and we will inform you if the level of effort exceeds this anticipated amount.

Table 1. Estimated Budget

TASK	Cost Estimate
Task 1 – GSP Implementation Support	\$50,000
Task 2 – Project and Management Action (P/MA) Committee Establishment	\$25,000
Task 3 – As-Needed Support for Action Plan for Minimum Threshold (MT) Exceedances	\$10,000
Task 4 – Multibenefit Land Repurposing Grant Application	\$10,000
Optional Task 4.1 - Multibenefit Land Repurposing Grant Interview	\$5,000
Subtotal	\$95,000
Optional subtotal	\$5,000
TOTAL:	\$100,000

SCHEDULE

EKI is prepared to start work on the above Scope of Work immediately. Tasks 1 and 2 will cover work efforts conducted since 1 October 2022 and will continue through 31 March 2023, to enable a consistent contractual end date among tasks in EKI’s existing Task Order #9 and aligned with the Annual Report due date. Task 3 will begin upon authorization and continue on an as-needed, as-directed basis. Task 4 will begin upon the grant solicitation opening on 16 January 2023 and continue through the submission of the grant application on 15 March 2023. Optional Subtask 4.1 is anticipated to occur between 15 March 2023 and 15 May 2023.

EKI will provide a new Task Order for the remaining WY 2023 GSP implementation support activities in March 2023 for GSA consideration. EKI will inform the GSA of any issues that arise that may affect the schedule for completion or impact the anticipated level of effort.

Angelica Martin
Tejon-Castac Water District on behalf of the
White Wolf Groundwater Sustainability Agency
21 December 2022
Page 6 of 6



We are happy to discuss the proposed approach and anticipated level of effort for this task and subtasks in more detail with you and look forward to working with you on this important project. If this Task Order meets with your approval, please sign where noted below and return a fully executed copy to our office to confirm authorization to proceed. Please call if you have any questions or wish to discuss this proposal in greater detail.

Very truly yours,

EKI ENVIRONMENT & WATER, INC.

A handwritten signature in blue ink, appearing to read 'Anona L. Dutton', followed by a horizontal line extending to the right.

Anona L. Dutton, P.G., C.Hg.
Vice President / Principal-In-Charge

AUTHORIZATION
TEJON-CASTAC WATER DISTRICT (CLIENT)

By _____

Title _____

Date _____

Attachments

Attachment A. 2022 Schedule of Charges

Proposal/Agreement Date: **21 December 2022**

EKI Proposal/Project # **C2-042**

SCHEDULE OF CHARGES FOR EKI ENVIRONMENT & WATER, INC.

1 January 2022

<u>Personnel Classification</u>	<u>Hourly Rate</u>
Officer and Chief Engineer-Scientist	307
Principal Engineer-Scientist	296
Supervising I, Engineer-Scientist	286
Supervising II, Engineer-Scientist	276
Senior I, Engineer-Scientist	265
Senior II, Engineer-Scientist	255
Associate I, Engineer-Scientist	244
Associate II, Engineer-Scientist	230
Engineer-Scientist, Grade 1	214
Engineer-Scientist, Grade 2	202
Engineer-Scientist, Grade 3	185
Engineer-Scientist, Grade 4	165
Engineer-Scientist, Grade 5	145
Engineer-Scientist, Grade 6	128
Technician	116
Senior GIS Analyst	150
CADD Operator / GIS Analyst	133
Senior Administrative Assistant	147
Administrative Assistant	115
Secretary	96

Direct Expenses

Reimbursement for direct expenses, as listed below, incurred in connection with the work will be at cost plus fifteen percent (15%) for items such as:

- a. Maps, photographs, reproductions, printing, equipment rental, and special supplies related to the work.
- b. Consultants, soils engineers, surveyors, drillers, laboratories, and contractors.
- c. Rented vehicles, local public transportation and taxis, travel and subsistence.
- d. Special fees, insurance, permits, and licenses applicable to the work.
- e. Outside computer processing, computation, and proprietary programs purchased for the work.

A Communication charge for e-mail access, web conferencing, cellphone calls, messaging and data access, file sharing, local and long distance telephone calls and conferences, facsimile transmittals, standard delivery U.S. postage, and incidental in-house copying will be charged at a rate of 4% of labor charges. Large volume copying of project documents, e.g., bound reports for distribution or project-specific reference files, will be charged as a project expense as described above.

Reimbursement for company-owned automobiles, except trucks and four-wheel drive vehicles, used in connection with the work will be at the rate of sixty cents (\$0.60) per mile. The rate for company-owned trucks and four-wheel drive vehicles will be seventy-five cents (\$0.75) per mile. There will be an additional charge of thirty dollars (\$30.00) per day for vehicles used for field work. Reimbursement for use of personal vehicles will be at the federally allowed rate plus fifteen percent (15%).

CADD Computer time will be charged at twenty dollars (\$20.00) per hour. In-house material and equipment charges will be in accordance with the current rate schedule or special quotation. Excise taxes, if any, will be added as a direct expense.

Rate for professional staff for legal proceedings or as expert witnesses will be at a rate of one and one-half times the Hourly Rates specified above.

The foregoing Schedule of Charges is incorporated into the Agreement for the Services of EKI Environment & Water, Inc. and may be updated annually.



White Wolf Groundwater Sustainability Agency

Arvin-Edison Water Storage District
Tejon-Castac Water District
Wheeler Ridge-Maricopa Water Storage District
Kern County

AGENDA MEMORANDUM

Date: 30 December 2022

To: Board of Directors, White Wolf Groundwater Sustainability Agency (GSA)

From: Angelica Martin, Secretary, White Wolf GSA

Item: 7. Evapotranspiration Data Options to Support WY 2022 Annual Report

SUMMARY

Fiscal Impact: ITRC-METRIC: \$11,500 (\$3,833 per District); or
Land IQ: \$49,668 (breakdown by District varies, see proposal Table 2)

BACKGROUND

The Water Year 2022 Annual Report is required to include a summary of the Basin's groundwater extraction data by water use sector. Unmetered agricultural pumping has historically been estimated by the Basin's Soil Moisture Budget (SMB) Accounting model and input into the White Wolf Groundwater Flow Model (WWGFM). The SMB requires parcel-based crop evapotranspiration (ET_c) estimates to calculate the agricultural demands. The SMB then estimates groundwater pumping by satisfying any unmet agricultural demand, after precipitation and applied surface water, and with consideration for irrigation efficiency. Agricultural pumping is also used in the WWGFM to estimate changes in storage.

For the GSP and the Water Year 2021 Annual Report, parcel-based satellite ET_c data was obtained from the Irrigation Training and Research Center (ITRC) at Cal Poly State University, San Luis Obispo ("ITRC-METRIC").

DISCUSSION

To facilitate Water Year 2022 estimates of unmetered agricultural pumping in the Basin, the GSA will need to obtain monthly ET_c data for October 2021 through September 2022. The Technical Committee obtained two quotes for Board consideration: (1) ITRC-METRIC and (2) Land IQ.

Attached:

- Proposal for ITRC-METRIC evapotranspiration for White Wolf Subbasin; and
- Scope of Work Proposal Land IQ Data Driven Method (LDDM) for Evapotranspiration, Precipitation, and Crop Type at the Field Level – White Wolf Subbasin

Date: 11/29/2022

To: Angelica Martin
White Wolf GSA, 4436 Lebec Rd., Lebec, CA 93243
amartin@tejonranch.com

From: Dan Howes, Ph.D., P.E.
Irrigation Training and Research Center, San Luis Obispo, CA 93407
Cell: 805-215-5318
djhowes@calpoly.edu

Subject: Proposal for ITRC-METRIC evapotranspiration for White Wolf Subbasin

This proposal is being submitted to White Wolf Subbasin GSA by the Irrigation Training and Research Center (ITRC) at Cal Poly State University, San Luis Obispo. This proposal is for ETc and precipitation data to White Wolf Subbasin GSA (WWSGSA) from 2021-2022.

Scope of Work

ITRC-METRIC for 2021-2022

ITRC will provide monthly and annual ITRC-METRIC actual crop evapotranspiration (ETc) for the White Wolf Subbasin. The following items will be completed:

1. Data will be provided for the entire subbasin boundary, each water agency within the subbasin, and by irrigated field boundaries for the dates shown for each option. This data will be summarized tabularly and provided in GIS format (for fields larger than 5 acres).
2. Data will be provided tabularly (in EXCEL)
3. Monthly ETc images will be provided in GIS format.
4. Short report discussing the general process and overall results will be provided.

Option 1. Oct. 2021-Sept. 2022 - Cost: \$11,500

Option 2. Jan. 2021-Sept. 2022 - Cost: \$13,500

Deliverables

ETc data in tabular (MS EXCEL) and other formats (such as images) provided on a flash drive or via file transfer service. Report summarizing results.

Timeline for Project

The report and data will be provided within 1.5 months from the time the agreement is signed.

Contract

The person responsible for technical aspects of this contract will be:

Dan Howes
Project Manager, Irrigation Training and Research Center
Cal Poly
San Luis Obispo, CA 93401-0730
djhowes@calpoly.edu

IRRIGATION TRAINING & RESEARCH CENTER

California Polytechnic State University
San Luis Obispo, CA 93407-0730
Phone: 805.756.2434 FAX: 805.756.2433 www.itrc.org

The contract will be administered by:
Cal Poly Corporation
Building #15
One Grand Avenue
San Luis Obispo, CA 93407

Note: Dr. Howes should be the contact person.

Budget

The total budget is a fixed price Fee for Service. The 50% of the full amount will be invoiced when the agreement is signed, the remaining 50% when the draft results are transmitted to White Wolf Subbasin GSA. The Cal Poly Corporation requests that a WWSGSA representative agree to the Standard Terms and Conditions, which are attached to this proposal. The signed approval can be scanned and submitted via e-mail to Dan Howes.

Invoicing and Payment

ITRC will submit to WWGSA (Angelica Martin) an invoice of the full fixed cost when transmitting the draft results.

Payment should be made payable to "Cal Poly Corporation" and sent to:

Dr. Dan Howes
Irrigation Training and Research Center (ITRC)
One Grand Ave
Bldg 8A
California Polytechnic State University
San Luis Obispo, CA 93407-0730

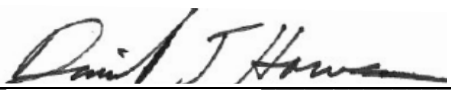
Please Circle the Option you choose:

Option 1. Oct. 2021-Sept. 2022 - Cost: \$11,500

Option 2. Jan. 2021-Sept. 2022 - Cost: \$13,500

Authorization/Approval

Name of authorized ITRC representative: Daniel Howes



Signature of ITRC representative

11/29/2022
date

Named of authorized White Wolf Subbasin GSA representative: Angelica Martin

Signature of the representative:

date

Irrigation Training & Research Center (ITRC)
Standard Terms and Conditions

THIS AGREEMENT is between the **White Wolf Subbasin GSA (“Client”)** and the Cal Poly Corporation, a separate non-profit auxiliary organization for the California Polytechnic State University, hereinafter referred to as “ITRC.”

- 1) **Ordering:** Clients may order services (specify a “Scope of Work”) by submitting a written purchase order, a written request for services, by sending confirming e-mail, or by placing a telephone order. The Client must subsequently confirm all telephone orders in writing or via e-mail confirmation prior to commencement of work.
- 2) **Change Orders:** A Client may request additions or changes to an Order, but must be confirmed by written notice. Email is an acceptable form of writing. The Client will remain responsible for all work performed under the original agreement up until the time ITRC is officially notified of the change.
- 3) **Suspending or Stopping ITRC’s Performance:** The Client may direct ITRC to suspend a portion or all of the work to be performed. In such case, the Client will remain responsible for all work performed up until the time ITRC became aware of Client’s desire to discontinue the services. Any uncompleted services in progress at the time of discontinuation will be billed on a prorated basis, as determined by ITRC.
- 4) **Confidentiality:** ITRC shall keep documents and information identified by Client as confidential to the extent permitted by law, and will not disclose any such information to third parties. ITRC may publish announcements and summaries containing *non-confidential information* about this project in campus newsletters and annual report and other published documents on campus.
- 5) **Warranties:** Client understands that ITRC performs services only as specified by Client in the Services Agreement accepted by ITRC. ITRC does not make any express or implied warranties or guarantees of any kind to the Client. By their very nature, technical services, testing, analysis and other ITRC services are limited to expected measurement variability. ITRC represents that the Services shall be performed within the limits agreed with Client, and in a manner consistent with the level of care and skill ordinarily exercised by other providers of similar services under similar circumstances.
- 6) **Ownership of Data:** Data or information provided to ITRC by the Client shall remain the Client’s property. Upon full payment to ITRC for all services provided by ITRC, data or information generated by ITRC for the Client shall become the Client’s property. ITRC will retain exclusive ownership of any and all analytical methods, Quality Assurance/Quality Control protocols, and equipment developed by ITRC for performance of work by ITRC. ITRC Reports are for the exclusive use of the Client to whom they are addressed. The name of ITRC, Cal Poly Corporation, or California Polytechnic State University, or any symbols of them are not to be used by Client without prior written approval by the appropriate authorized representative.
- 7) **Indemnification:** Client and ITRC agree that by performing services hereunder, ITRC does not assume, shorten, cancel or undertake to discharge any duty or responsibility of Client to any other party or parties. No one other than Client shall have any right to rely on any Report or other representation or conduct of ITRC, and ITRC disclaims any obligations of any nature whatsoever with respect to such person. Client and ITRC agree, in consideration of ITRC under-taking to perform the ordered service(s) to protect, defend, indemnify, same harmless and exonerate each other from any and all claims, damages, expenses, either direct or consequential for injuries to persons or property arising out of or in consequence of the performance of the services hereunder unless caused by the sole negligence of the other party.
- 8) **Insurance:** Cal Poly Corporation maintains insurance coverage for its employees to perform professional services. If Client seeks greater protection than is provided by Cal Poly Corporation insurance, Client should obtain appropriate protection from suppliers or insurers.
- 9) **Limitation of Liability:** If ITRC should be found liable for any losses or damages attributable to the services hereunder in any respect, its liability shall in no event exceed the amount of the fee paid by Client for such services and Client’s sole remedy at law or in equity shall be the right to recover up to such amount.
- 10) **Force Majeure:** Whenever performance by either party is delayed or prevented by an extraordinary event beyond the control of Client or ITRC, such delay or prevention shall be excused and the time of performance extended for the duration of the causative factor. In no event shall the occurrence of any such conditions excuse the Client of its obligations hereunder if services have been performed by ITRC.
- 11) **Payment of Invoices:** Client agrees to pay all invoices to ITRC within 30 days of invoice date, and if payment is not timely received, the Client agrees to pay a late payment charge on the unpaid balance at the maximum allowed by law.
- 12) **Governing Law:** This Agreement shall be governed in accordance with the laws of the State of California.

LAND IQ DATA DRIVEN METHOD (LDDM) FOR EVAPOTRANSPIRATION, PRECIPITATION, AND CROP TYPE AT THE FIELD LEVEL – WHITE WOLF SUBBASIN

TO: Angelica Martin/Tejon Castac Water District
Jeevan Muhar/Arvin Edison Water Storage District
Sheridan Nicholas/Wheeler Ridge Maricopa Water Storage District
Christina Lucero/EKI

FROM: Joel Kimmelshue/Land IQ
Casey Gudel/Land IQ

DATE: December 29, 2022

INTRODUCTION

This scope of work proposal was developed at the request of the stakeholder entities for the purpose of developing a monthly field by field estimate of actual evapotranspiration (ET) occurring within the White Wolf Subbasin. Included in the deliverables will also be field by field precipitation, and twice-yearly field by field crop mapping and permanent crop age. A web tool will be used to relay the results each month.

Calculation of ET can be performed accurately using weighing lysimeters and eddy correlation monitoring techniques. These methods are limited, however, because they provide point values of ET for a specific location and fail to provide the ET on a regional scale. This limitation has motivated the development of using remotely sensed (RS) data from satellites to evaluate ET over large areas. Satellite data are well suited for deriving spatially continuous ET surfaces that can be sometimes pared down to the field scale because of their temporal and spatial characteristics. However, the most accurate use of RS models require calibration to actual surface measurements and work from the field level originally. The approach proposed for the tasks in this scope of work includes a combination of high-density, specific ground measurements and remotely sensed modeling, calibrated with those field measurements.

STAFFING RESOURCES AND PROJECT COOPERATORS

Staff expected to work on this project from Land IQ have been involved in various aspects of evapotranspiration modeling, agricultural remote sensing, and regulatory support for the last 4 to 26 years, and are listed below. Other appropriately qualified staff may also participate to facilitate completion of any tasks approved by the Agencies as a part of this proposed scope of work.

- Principal In Charge and Principal Agricultural Scientist – Joel Kimmelshue, PhD
- Project Manager/Client Relations – Casey Gudel, MS
- Senior Remote Sensing Analyst – Diya Chowdhury, MS

- Remote Sensing Analyst – Juan Geng, MS
- Remote Sensing Analyst – Zhehan Tang, PhD
- Biometeorologist – Frank Anderson, MS
- Agricultural Scientist – Seth Mulder, MS
- GIS Analyst – Justin Sitton, BS
- Agricultural Scientist/Field Technician – JB Buller, BS
- Support Staff – Various as needed

Land IQ also welcomes input and collaboration with the associated stakeholders (Districts, Ranches, etc) staff and intends on integrating staff into continued instrumentation efforts, data collection, and monitoring programs as the on-the-ground, local component of the team, if desired and feasible for the stakeholders. This is not a requirement of the work efforts, however.

TASKS

This scope of work has been developed based on individual task discussions and requests from the stakeholders. These tasks include:

- **Task 1** – Monthly Field by Field ET, Precipitation, and Semiannual Crop Mapping
- **Task 2** – Monthly Reporting Via a Web-Based Tool
- **Task 3** – Station Management and Maintenance
- **Task 4** – Outreach

Each of these tasks is discussed in detail below and includes schedule and deliverables. A cost summary for all work is provided.

TASK 1. MONTHLY FIELD BY FIELD ET, PRECIPITATION, AND SEMIANNUAL CROP MAPPING

Scope of Work: The Land IQ Data Driven Method (LDDM) (ground truthing, remote sensing, and rigorous QA/QC) will be used. It was developed and is currently used for approximately 30 GSAs/Irrigation Districts beginning in 2016. The LDDM is used to interpret image data and leverages robust and repeated ground station data to be implemented within the Agencies as well as a more direct image analysis. The approach yields more accurate results when repeated and representative ground calibration data are available as compared to RS ET estimates without ground truthing.

Because the LDDM establishes calibration and validation data at the field-level and also analyzes at the field-level, the result is field-level consumed water which can then be rolled up to any regional area desired. This is unique to the LDDM RS method as compared to other RS approaches and models.

This method does, however, require robust ground truthing data, which is proposed as part of this work effort for the Agencies. This effort will employ Landsat 8, Landsat 9, Sentinel 2, and purchased high resolution satellite imagery (contracted by Land IQ and included in the overall cost). Satellite data will be screened for cloud cover and terrain corrected. Ground measurements from monitored eddy covariance (EC), surface renewal (SR), Land IQ stations, and precipitation stations will be used to generate hourly ET data correlated to the satellite image overpasses and then used as a dependent variable in the modeling process.

Scope Confidentiality: This scope of work is considered confidential in nature and is intended for review and consideration only by the addressees or direct representatives of the organization in the "Prepared For" line.

Deliverables: None

Schedule: Individual analyses will be completed monthly, and results delivered (Task 2) to the the Agencies within approximately 30 days from the end of the previous month.

TASK 2. MONTHLY REPORTING VIA A WEB-BASED TOOL

Scope of Work: Monthly reports will be developed. The first of the 12 monthly reports will begin on the 1st of the month following completion of recording of 30 days of climatic data and will be delivered within approximately 30 days of the end of the previous month. Results will be delivered in both report and web-based format. The web tool will contain all fields, field boundaries, current crop mapping, coverages of field-by-field ET and precipitation as well as a download link for all results and reports. The web-based tool is designed to be used at the GSA level. The tool is not currently designed for individual grower access, however, can be developed at additional cost not included in this scope of work.

Deliverables: Monthly results will be delivered in both shape file and report formats.

In addition to ET, Land IQ will provide field by field crop type mapping for the Agencies in electronic and summary form at least 2 times per year. These data will be the same crop mapping detail that are provided to the State of California, Department of Water Resources as Land IQ is the contractor for that dataset, however this is a special request product and some very slight differences may occur. The delivery of the crop mapping will be approximately July and November of each year and may be modified based on crop rotations and timing. Field-by-field precipitation will also be delivered as spatially interpolated from rain gauges on Land IQ climatic stations and other publicly available and reliable gauges (e.g. CIMIS stations, airports, municipalities, etc). Land IQ will also deliver 2x/year, permanent crop age, with the crop mapping deliverable.

The four deliverables include:

- Monthly field-by-field ET
- Monthly field-by-field precipitation
- Field-by-field crop mapping (2 times per year)
- Permanent crop age

All electronic vector and raster GIS files are available upon request.

Schedule: Individual analyses and reporting will be completed monthly, and results delivered within approximately 30 days of the end of the previous month being analyzed. Crop mapping data will be delivered on or about July and November of each year.

TASK 3. STATION MANAGEMENT AND MAINTENANCE

Scope of Work: This effort installs, manages, and continuously maintains ground truthing climatic stations of eddy covariance and/or surface renewal approaches to collect instantaneous ET ground data at select locations representing crop production within the Agencies. At times, and depending on crop type/location shift, it should be expected that some stations may need to be moved. However, with some permanent crops within the Agencies, some stations will stay within those permanent crops and are not expected to be moved. Regardless, all costs are included in the overall cost. Participating grower cooperation is required for station siting.

The data collected by these stations will be used to calibrate the LDDM RS models for ET and create ET estimates across all fields within the Agencies to get a complete estimate of Agencies-wide ET and ET by

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crop type by field. Data stations are fully telemetered by cellular communication systems to Land IQ servers. The system incorporates data flagging protocols to identify any inconsistencies in collection or outages. Land IQ will conduct approximately monthly site visits in coordination with stakeholder personnel (if desired) to verify proper functionality and perform any necessary or seasonal adjustments.

Deliverables: None

Schedule: Continuous

TASK 4. OUTREACH AND PRESENTATIONS

Scope of Work: This task accounts for up to four meetings per year to assist with or participate in outreach meetings with growers and/or stakeholder representatives.

Deliverables: Presentation materials

Schedule: As needed or directed by the stakeholder entities.

TOTAL COST AND PAYMENT TERMS

According to records developed through the stakeholders (and verified by Land IQ) land use mapping the cropped and non-cropped acreage within the White Wolf Subbasin are summarized (Table 1). Urban areas are excluded from this analysis.

Table 1 shows the cost per acre expected for each subbasin. The per acre charge includes all equipment, labor, expenses, supplies, project management, and all other associated costs. These costs are consistent with the Kern Subbasin grant costs for the 2023, 2024, and 2025 water years.

Table 1. Cost Per Acre

Area	Cropped Acreage	Non-Cropped Acreage
White Wolf Subbasin	\$0.63/acre/year	\$0.38/acre/year

Table 2 shows the acreages, per acre/year costs, and overall costs by stakeholder entity.

Table 2. Acreage and cost summary for White Wolf area only.

Entity/Entities	Cropped Acres	Non-Cropped Acres	Urban Acres	Total Acres	Cropped Cost	Non-Irrigated Cost	Total Cost
Tejon Ranch	0	21,480		21,480	\$ -	\$ 8,162	\$ 8,162
Wheeler Ridge-Maricopa WSD	9,287	9,573	19	18,879	\$ 5,851	\$ 3,638	\$ 9,489
Arvin-Edison WSD	7,060	726		7,786	\$ 4,448	\$ 276	\$ 4,724
Tejon-Castaic Water District		7		7	\$ -	\$ 3	\$ 3
Intersection: Wheeler Ridge-Maricopa WSD & Arvin-Edison WSD	13,778	1,000		14,778	\$ 8,680	\$ 380	\$ 9,060
Intersection: Wheeler Ridge-Maricopa WSD & Tejon-Castaic WD & Tejon Ranch	4,867	8,958	350	14,175	\$ 3,066	\$ 3,404	\$ 6,470
Intersection: Wheeler Ridge-Maricopa WSD & Tejon Ranch	1,185	8,052	72	9,309	\$ 747	\$ 3,060	\$ 3,806
Intersection: Tejon Ranch & Tejon-Castaic WD	65	5,827		5,892	\$ 41	\$ 2,214	\$ 2,255
Intersection: Arvin-Edison WSD & Tejon Ranch		888		888	\$ -	\$ 338	\$ 338
Intersection: Wheeler Ridge-Maricopa WSD & Tejon-Castaic WD	59	54	274	387	\$ 37	\$ 20	\$ 57
Intersection: Wheeler Ridge-Maricopa WSD & Arvin-Edison WSD & Tejon Ranch	11	4		16	\$ 7	\$ 2	\$ 9
Other Areas in White Wolf Groundwater Basin	0	13,934		13,934	\$ -	\$ 5,295	\$ 5,295
Total Area	36,313	70,503	716	107,532	\$ 22,877	\$ 26,791	\$ 49,668

Intersections Proportioned Out Evenly							
Entity/Entities	Cropped Acres	Non-Cropped Acres	Urban Acres	Total Acres	Cropped Cost	Non-Irrigated Cost	Total Cost
Tejon Ranch	2,252	31,851	153	34,255	\$ 1,418	\$ 12,103	\$ 13,522
Wheeler Ridge-Maricopa WSD	18,424	17,113	309	35,847	\$ 11,607	\$ 6,503	\$ 18,110
Arvin-Edison WSD	13,953	1,671	-	15,624	\$ 8,790	\$ 635	\$ 9,425
Tejon-Castaic Water District	1,684	5,933	254	7,872	\$ 1,061	\$ 2,255	\$ 3,316
Other Areas in White Wolf Groundwater Basin	0	13,934	-	13,934	\$ -	\$ 5,295	\$ 5,295
Total	36,313	70,503	716	107,532	\$ 22,877	\$ 26,791	\$ 49,668

Projection: NAD 1983 StatePlane California V FIPS 0405 Feet

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A three-year contract commitment is required. It should be noted that costs are estimates at this time and unforeseen variables and/or efficiencies may occur which may alter costs up or down. Also, annual escalations (e.g. 1-5%) to account for increases in labor costs may or may not be implemented at the beginning of each calendar year.