

# Eastside Groundwater Use Measurement Project

## WaterSMART Applied Science Grant

Funding Opportunity Announcement No.



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# Technical Proposal and Evaluation Criteria

Date: Application due date: April 21, 2021

Applicant: Stockton East Water District  
Stockton, San Joaquin County, CA.

Project Title: Eastside Groundwater Use Measurement Project

## Executive Summary

April 21, 2021 – Stockton East Water District – Stockton, San Joaquin County, California

Stockton East Water District is a Category A applicant.

Stockton East Water District (SEWD), with the support of Eastern San Joaquin Groundwater Authority (GWA), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD), will develop groundwater pumping and recharge volumes using proven remotely sensed techniques based on evapotranspiration (ET) estimation from NASA's Landsat satellite imagery. The agencies involved in this project are part of the Groundwater Sustainability Agency (GSA) responsible for implementing California's Sustainable Groundwater Management Act (SGMA) in Eastern San Joaquin Groundwater Sub-Basin. The Eastern San Joaquin Groundwater Basin is defined as a high priority, critically over drafted groundwater basin by the California Department of Water Resources (DWR). The Eastern San Joaquin Groundwater Sustainability Plan (GSP) was submitted to the California DWR in January 2020. The GSP defines how the East San Joaquin groundwater sub basin and GSAs will achieve sustainability by the year 2040. The agencies must submit Groundwater Sustainability Plan (GSP's) Annual Reports to the California Department of Water Resources (DWR), with the next report due by April 1, 2022. To date, the GSA has not taken advantage of remote sensing tools for estimation of ET except for conducting a successful pilot project in the SEWD service area. SEWD conducted a successful pilot project in a small portion of the SEWD service area to demonstrate the use of remote sensing imagery to quantify ET and groundwater pumping. The GSA intends to expand the pilot project to cover the entire basin area under their management. The Eastside Groundwater Use Measurement Project is consistent with the GSP and will help the groundwater sub basin achieve sustainability, account for groundwater demand, manage available surface and groundwater resources, allocate costs and document benefits of proposed groundwater banking, storage and conjunctive use projects. For this project, the GSA has contracted with DCSE, Inc. for the implementation of Geospatial Resources of Water Management for Agricultural Systems (GROWMAS). GROWMAS is an automated portal that uses Landsat imagery and weather data to produce daily, monthly, and annual ET data. GROWMAS will publish GIS-based tabular and imagery results extracted from total monthly and annual ET images monthly. This data will be used to model the groundwater and identify the proper practices to restore the Eastern San Joaquin Groundwater Sub-Basin to sustain groundwater for agricultural and urban uses in years to come.

Approximate Length: One Year

Completion Date: March 31, 2022

Federal Facility: The SEWD is not a federal facility, but does receive Reclamation water.

### Technical Project Description

The purpose of this project is to estimate and produce spatial and temporal monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater (NTFGW) within the boundary of the three water agencies involved. Remotely sensed satellite data from NASA (Landsat) will be used in conjunction with a model referred to as Mapping Evapotranspiration at high Resolution using Internalized Calibration (METRIC™). METRIC™ is a satellite image processing model designed as an operational, engineering approach to model high-resolution ET images and was developed primarily for monitoring water consumption at field scales. Multispectral Imagery from Landsat 8 and Landsat 7 with 30 m spatial resolution (30 meters by 30 meters pixel sizes) are used for the METRIC™ process. METRIC™ uses a combination of hourly weather data, satellite imagery, and energy balance equations to calculate ET in agricultural fields. ET in METRIC™ is calculated using the surface energy balance, where total net radiation energy from the sun and sky represents total energy available at the surface to either warm the air (H), warm the ground (G), or transform liquid water into vapor (LE). LE (Latent heat flux) is converted into ET, expressed as a depth of water per time step. Figure 1 shows the Landsat image and the associated ET image. With the launch of Landsat 9 in 2021, we expect to have additional data available in the first quarter of 2022. The best quality Landsat images with minimal clouds are selected for processing.

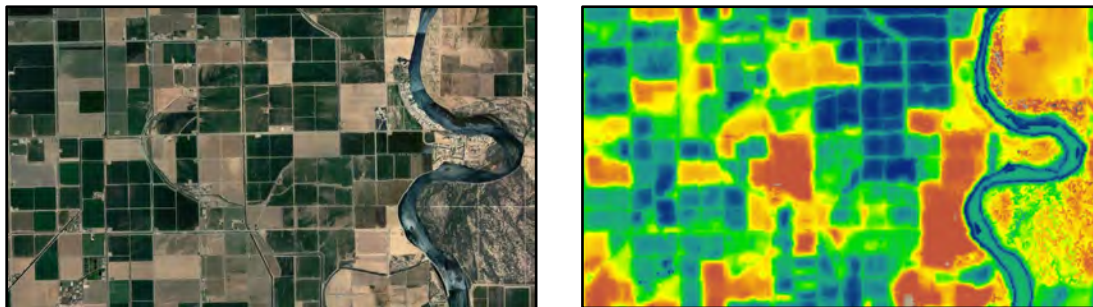


Figure 1 -Left: Landsat Image; Right: ET Calculated at instantaneous time of satellite overpass.

METRIC™ has been used in many studies conduct by the University of Idaho. It is also used by the following agencies as shown in Figure 2.



Figure 2 - METRIC™ Model Users

The following text are excerpts from a report prepared by UC DAVIS Center for Watershed Sciences on April 9, 2018 for California State Water Resources Control Board and California Department of Water Resources:

Remote sensing-based ET estimation methods appear to be a cost-effective way to help reduce self-reporting burdens and increase transparency, accuracy, timeliness, and consistency in ET quantification, especially for spatial heterogeneity and interannual variation. However, extrapolating ET estimates to quantify diversions requires additional data acquisition on localized conditions such as irrigation infrastructure, soils and drainage, and periodic comparison with field-based ET measurements. A consortium approach involving stakeholders, government agencies, water professionals, and academic institutions may help establish such a long-term consumptive use estimation program.

Reasonably accurate estimates and measurements of ET, particularly in crops, generally facilitates planning and management at the basin scale. The Sustainable Groundwater Management Act (SGMA) requires basins to reach long-term sustainability and will often require quantified local and regional water balances. Remote sensing ET approaches such as those presented in this study may be useful in such quantifications.

The findings of this report indicate that the approach proposed in this application is a viable and proven method to estimate ET using remote sensing.

The project area is covered by three different Landsat overpass scenes, as shown in Figure 3. Since the project boundary is not encompassed by one Landsat scene, additional processing will need to be conducted to synthesize ET calculations from different dates. Additionally, the urban areas will be masked out from the satellite imagery before calculating ET, as these areas' presence affects the calibration of the METRIC™ model.





Figure 3: Three Landsat Overpass Scenes that will be used to calculate METRIC for district boundary.

NTFGW is the Net contribution To or extraction From GroundWater. By comparing applied water (surface water delivery or groundwater), precipitation, runoff, and evapotranspiration, NTFGW can be estimated for a region, as shown in Figure 4.

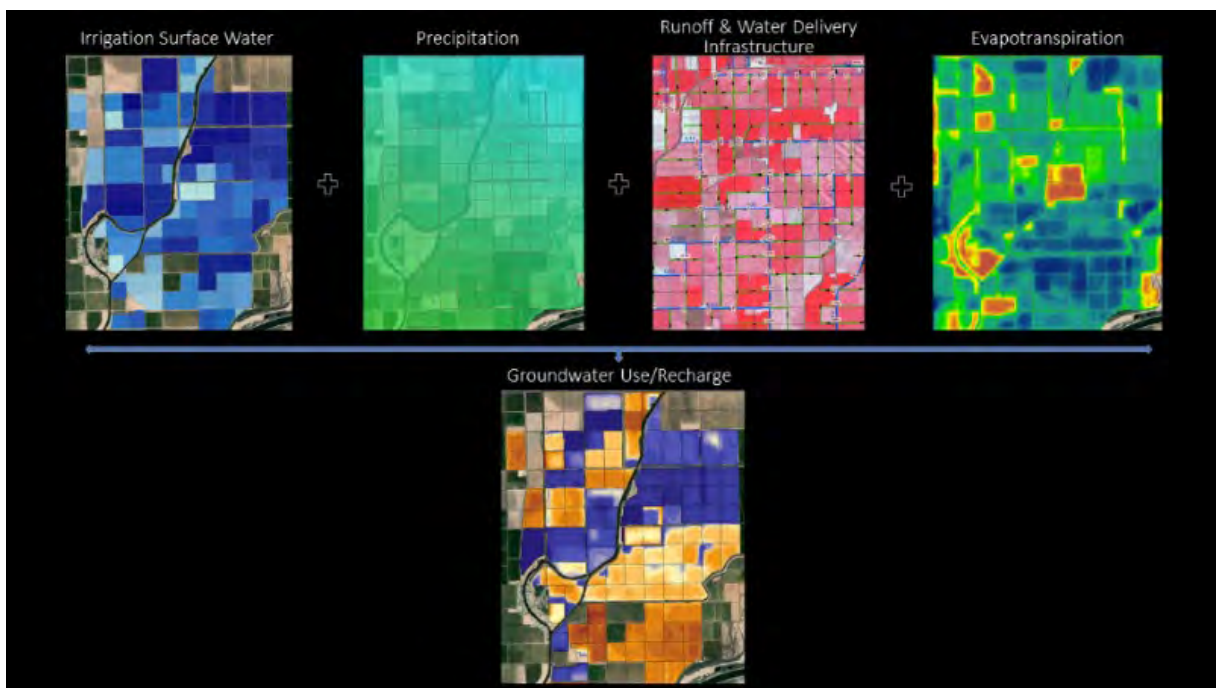


Figure 4 - NTFGW Components

In addition to actual ET, GROWMAS will compute NTFGW spatially throughout the three water districts. GROWMAS incorporates the monthly estimated ET values with monthly surface water delivery and pumping data (if available) and spatial precipitation in the region to assess NTFGW and create groundwater pumping and recharge maps for each month. Figure 5 shows the ET Imagery produced on the GROWMAS portal.

Figure 6 shows the status of the automated process of the Landsat images captured from the area. GROWMAS monitors, downloads, and processes the Landsat images of the target area to generate the ET and NTFGW for a given period.

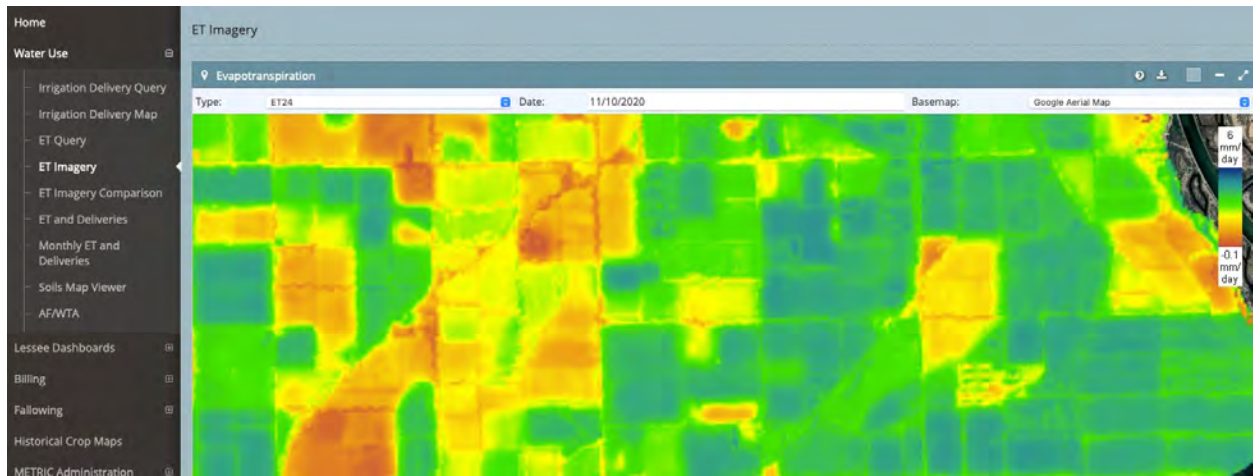


Figure 5 - ET24 Generated and Published on the GROWMAS Portal

| Landsat Overpass | Landsat Path | Landsat Image (T1) is Available on METRIC server | CIMIS Data is Available on METRIC server | ET Generated                    |
|------------------|--------------|--|--|---------------------------------|
| 11/18/2020       | 39           | -  | 12/12/2020                               | Yes                             |
| 11/03/2020       | 38           | -  | -  | No                              |
| 10/25/2020       | 39           | 11/07/2020                                       | 11/19/2020                               | Yes                             |
| 10/18/2020       | 38           | 11/06/2020                                       | 11/19/2020                               | Yes                             |
| 10/09/2020       | 39           | 10/16/2020                                       | 10/19/2020                               | Yes                             |
| 10/02/2020       | 38           | 10/19/2020                                       | 10/19/2020                               | Yes                             |
| 09/23/2020       | 39           | 10/08/2020                                       | 10/08/2020                               | Yes                             |
| 09/16/2020       | 38           | 10/08/2020                                       | 10/08/2020                               | Yes                             |
| 09/07/2020       | 39           | 09/18/2020                                       | 09/18/2020                               | No - Cloud Cover Limit Exceeded |
| 08/31/2020       | 38           | 09/06/2020                                       | 09/06/2020                               | Yes                             |

Figure 6 - Status of the Automated Processing of the Landsat Overpass Scenes

The data produced by GROWMAS will be used as a component of modeling the groundwater scenarios. This is a significant benefit to fill the data gap in areas where pumping of ground is not metered, and the groundwater metering is not economically feasible.

A successful pilot study to measure the Mean NTFGW was performed in the SEWD area on 20 parcels, as shown in Figure 7.

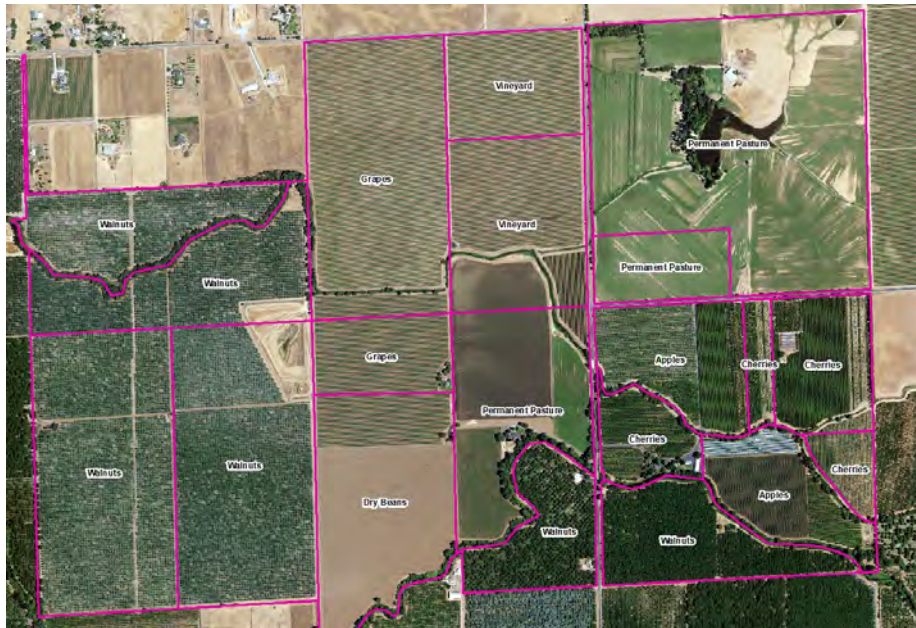


Figure 7 - Pilot Area Parcels

The SEWD, CSJWCD, and NSJWCD (Districts) all collectively manage groundwater through conjunctive use. The Districts include about 197,000 acres of irrigated agriculture largely reliant on groundwater for irrigation needs. The area included parcels of different crops, including vineyards, grapes, walnuts, cherries, permanent pasture, dry beans, and apples. The results NTFGW values for 2018 are shown in Figure 8. Positive values (Blue theme) indicate groundwater recharge, while negative values (Orange theme) indicate net groundwater pumping by field and crop type.



Figure 8 - Estimated Groundwater Use/Recharge (NTFGW) - 2018

This project will extend the pilot study to the proposed areas.



## Project Location

The project area consists of three water districts within the Eastern San Joaquin Sub Basin, Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD). Stockton East Water District is located on the San Joaquin Valley floor in San Joaquin County, California, with the City of Stockton lying at its western end. Central San Joaquin Water Conservation District is located south of Stockton East Water District. North San Joaquin Water Conservation District is located north of Stockton to the San Joaquin County boundary. The project area is shown in Figures 7 and 8.

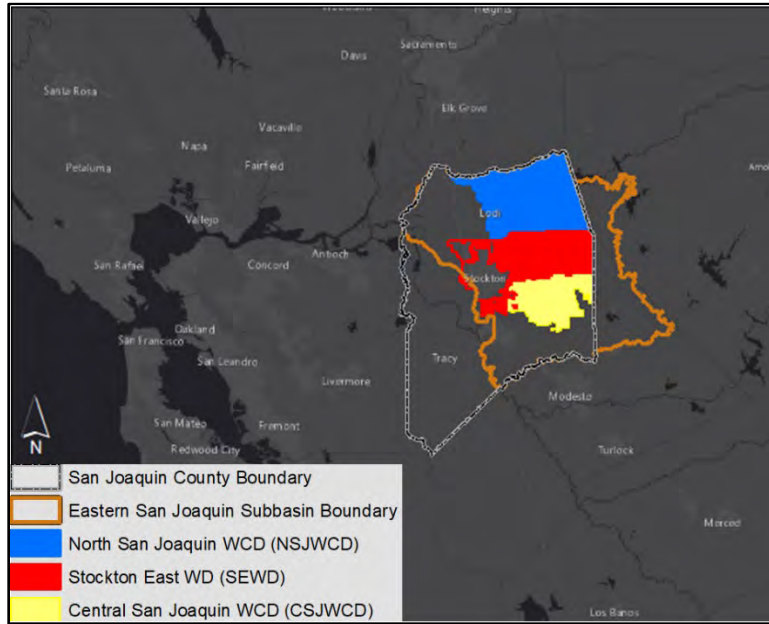


Figure 7. Location of three Water Districts within San Joaquin County, and Eastern San Joaquin Subbasin.

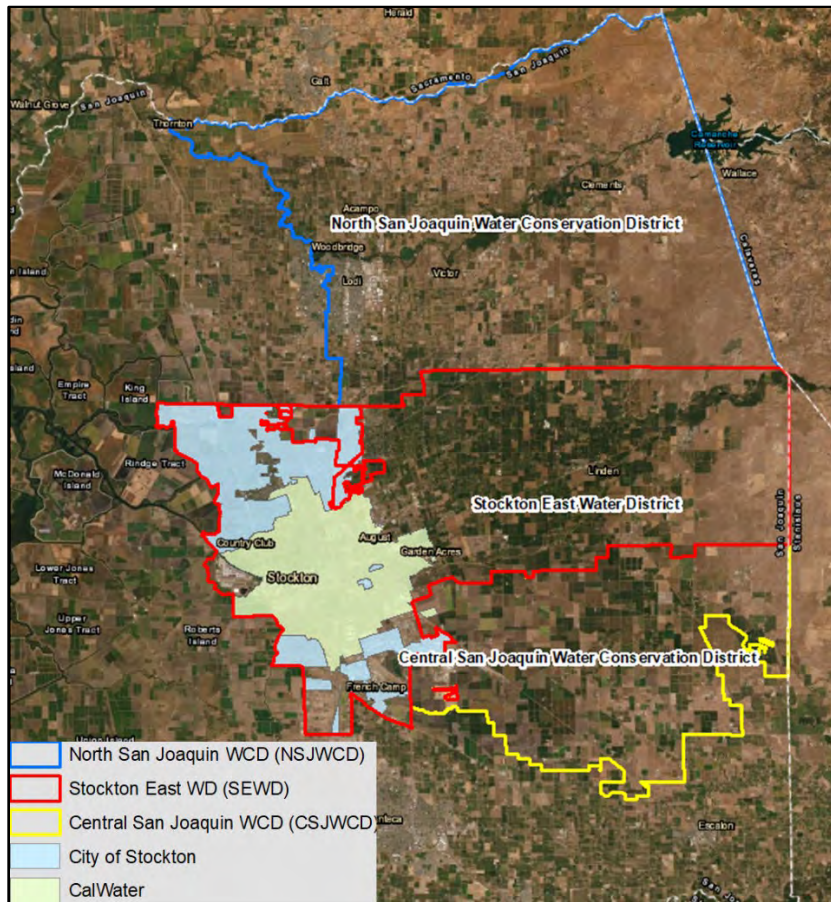


Figure 8. Stockton East WD (SEWD), North San Joaquin WCD (NSJWCD), and Central San Joaquin WCD (CSJWCD).

Note that the California Water Service (Cal Water) and City of Stockton service areas, shown as solid areas in Figure 2, are excluded from estimations.

## Evaluation Criteria

### *E.1.1 Evaluation Criterion (A) – Benefits to Water Supply Reliability*

**1. Describe the water management issue(s) that your project will address.**

The East San Joaquin Groundwater Subbasin is a high priority, critically overdrafted basin as designated by DWR. Overdraft is in the range of 80 KAFY. This result in competition and potential for conflicts over the available supply, uncertainty regarding future water availability, and limited drought response capabilities. Due to capital and ongoing maintenance costs, the Districts do not volumetrically meter individual agricultural groundwater wells. Groundwater use within the Districts is estimated using customer reported irrigated acreages charged a flat rate acre-foot per acre assessment and flat rate per acre groundwater assessments, depending on the district. SEWD determined during the Mean NTFGW pilot study the combination of self-reporting and fixed assessment can result in great error. Additionally, the estimated groundwater use from the Districts is used in the GWA's Integrated Water Flow Model (IWFM) to determine the health of and progress towards sustainability, and to quantify impacts and benefits for the Eastern San Joaquin Groundwater Sub-basin. Uncertainty in groundwater extraction and ET reduce the reliability and confidence in the IWFM output.

**2. Explain how your project will address the water management issues identified. Explain how your project will contribute to one or more of the Reclamation water management objectives and provide support for your response:**

In California, as a part of SGMA, there has been a large push for groundwater sustainability. Since Agriculture in the San Joaquin County mainly relies on the groundwater, being able to get accurate groundwater data is crucial in water supply reliability, management of water deliveries, drought management, conjunctive use of ground and surface water, and efficient use of water for agriculture. The project outputs will help to optimize water deliveries, and support conjunctive use of available groundwater and surface from the Mokelumne, Calaveras and Stanislaus River, including federal contract supplies. The Eastern San Joaquin Groundwater Authority adopted the GSP in order to meet the state regulations for SGMA and make plans for the agricultural use of water in the future. The Eastside Groundwater Use Measurement Project will result in accurate data of the groundwater deficiencies or surplus in SEWD, CSJWCD, and NSJWCD. This data will give the GWA the evidence necessary to make appropriate actions to improve water supply reliability, optimize surface and groundwater supplies, respond to drought, support planning of additional conjunctive use facilities and plan direct, in-lieu and floodwater spreading operations. This project is a long-term effort to provide supporting data for developing a sustainable groundwater basin in the project area without extensive and costly metering and monitoring programs. The project results combined with the basin modeling effort will identify the impact of the drought and the groundwater pumping under different climate conditions. Applying the corrective measures, combined with groundwater monitoring, will result in the basin's long-term resiliency to future drought conditions. The project results can also be used to identify potential situations in which better irrigation practices can result in more efficient use of groundwater

supplies and to tie groundwater and surface water pricing together to generate revenue for capital projects and for maintenance and operational costs.

**3. *Describe to what extent your project will benefit one of the water management objectives listed in the preceding bullets. In other words, describe the significance or magnitude of the benefits of your project, either quantitatively or qualitatively, in meeting one or more of the listed objectives.***

Quantifying agricultural groundwater demands will help size needed conjunctive use infrastructure, document benefits of projects and establish equitable assessments. Use of the proposed technology will increase the accuracy of the water budget, improve basin accounting and create accountability at the water district and at the farm level. Since the involved Districts deliver water to their patrons by volume, the new data will provide accurate quantitative information. The project will quantify the amount of annual water deficit or surplus within the ground water system. This information will allow the involved districts to distribute surface water, monitor groundwater use, and manage water deliveries sustainably throughout the districts; also helping set prices based on actual groundwater pumping and use and allowing for comparison with surface water rates. Grower acceptance of this technology for extraction reporting and groundwater assessments would save millions of dollars in meter installation costs and maintenance, and related public service costs for gathering and managing the pumping data.

Getting the quantitative data from this project will allow the involved Districts to make appropriate decisions to maintain their groundwater supplies for the future. This will improve water reliability, help prioritize capital project development, and support equitable pricing by helping quantify benefits of conjunctive use operations. Accurate information on groundwater extraction and use will help establish funding and financing frameworks to build and maintain needed facilities; document benefits and achieve support for project development.

This project provides the groundwater pumping and recharges data in agricultural fields, which is a fundamental element of assessing the groundwater availability during extended drought periods. Severe reduction in groundwater level and depletion of this resource, resulting from severe droughts, have been the fundamental force behind California legislation to find a sustainable use of this invaluable resource. With volumetric data of the depletion of the aquifer the GWA can quantitatively make a plan to use more surface water. This allows the Districts to prepare for water situations that could occur in the future. Therefore, this project would improve the conjunctive use of ground and surface water and drought management.

**4. *Explain how your project complements other similar applicable to the area where the project is located.***

The Eastside Groundwater Use Management Project not only helps SEWD, CSJWCD, and NSJWCD, but will also help the GWA as a whole. The GWA is composed of 16 Groundwater Sustainability Agencies: Central Delta Water Agency (CDWA), Central San Joaquin Water Conservation District (CSJWCD), City of Lodi, City of Manteca, City of Stockton, Eastside San Joaquin GSA (Eastside GSA) (composed of Calaveras County Water District [CCWD], Stanislaus County, and Rock Creek Water District), Linden County Water District (LCWD), Lockeford Community Services District (LCSD), North San Joaquin Water Conservation District



(NSJWCD), Oakdale Irrigation District (OID), San Joaquin County No. 1, San Joaquin County No. 2 (with participation from California Water Service Company Stockton District [Cal Water]), South Delta Water Agency (SDWA), South San Joaquin GSA (composed of South San Joaquin Irrigation District [SSJID] including Woodward Reservoir, City of Ripon, and City of Escalon), Stockton East Water District (SEWD), and Woodbridge Irrigation District (WID). Once this project is complete the information and data will be shared with the rest of the 13 Groundwater Sustainability Agencies in order to improve the groundwater sustainability efforts and the other ongoing projects within the GWA. Some projects that the Eastside Groundwater Use Management Project will complement are SEWD Surface Water Implementation Expansion, Farmington Dam Repurpose Project, City of Lodi Surface Water Facility Expansion & Delivery Pipeline, Long-term Water Transfer to SEWD and CSJWCD, and Lake Grupe In-lieu Recharge. All of these projects are to create more infrastructure for surface water use or to recharge the groundwater basin. The Eastside Groundwater Use Measurement Project will provide more quantitative facts for the purposes of these projects. The more data that the GWA can collect to prove the necessity of these projects, the more support and involvement they will receive from the communities. Furthermore, the benefits of the projects will be conveyed throughout the groundwater basins of San Joaquin County and Stanislaus County. Municipal and agricultural well water users will benefit by attaining the knowledge to sustain the groundwater basin. Having reliable ground water is crucial for the future of agriculture and the sustainability of the environment. Money saved as compared to a metering program can be redirected to capital projects to further conjunctive use objectives and build facilities.

#### *E. 1.2. Evaluation Criterion (B) – Need for Project and Applicability of Project Results*

*Explain how your project will result in readily useful applied science tools that meet an existing need:*

The GROWMAS tool allows for identifications with over or underutilization of surface water supplies and evaluation of crop specific irrigation efficiencies. Through satellite imagery the Districts will collect data on how much the GSA's and growers are contributing to or extracting from the aquifer at any given time. The Districts can then make policy decisions that will benefit surface and ground water supply through modified best management practices (BMP's). Finally, this project will meet and exceed measurement and reporting requirements of SGMA which requires total water use, change in groundwater storage, and surface water used or available for recharge. Once applied to the three large irrigation districts, the GWA will evaluate roll out and use of the technology for annual reporting, cost distribution and developing a funding and financing framework for the basin.

**1. Will the project result in an applied science tool(s) or information that is readily applicable, and highly likely to be used by water resource managers in the West?**

**a. Explain who has expressed the need and describe how and where the need for the project was identified (even if the applicant is the primary beneficiary of the project).**

The need for improved accounting of pumping and ET was recognized during calibration of the Integrated Water Flow Model (IWFM) and sensitivity analysis regarding pumping. Improvements to measuring or quantifying the agricultural extraction and ET are a means of improving the IWFM, and for achieving greater accuracy in the water budgets produced in the model and used

to evaluate projects impacts, quantify benefits of capital projects and on-farm water conservation. The Districts and the GWA are missing accurate, representational data of the groundwater condition including uncertainty in groundwater pumping and ET. Therefore the Eastside Groundwater Use Measurement Project is needed to provide quantitative proof of the groundwater deficit within the basin for SEWD, CSJWCD, and NSJWCD; and the variance in the groundwater budgets and relative impacts to overdraft throughout the region.

***b. Will the results of your project inform water resource management actions and decisions immediately upon completion of the project, or will additional work be required?***

Upon completion of the Eastside Groundwater Use Measurement Project, the Districts and the GWA will have data that immediately informs actions and decision related to the water budgets, basin accounting, and a cost distribution framework. Actions will be able to be justified with the data from the conclusion of the project. It is anticipated that the project would change the way annual reporting is prepared, benefits and impacts of pumping and recharge operations quantified and how costs are distributed.

***c. If applicable, will the results of your project be transferrable to other users and locations? Note: not all water management solutions are transferrable.***

Results of this project will be transferrable to all users within the groundwater basin. The groundwater data will inform all 16 of the agencies within the GWA of the condition of the basin. This project will help provide accurate input to assess the alternatives to achieve sustainable groundwater, resulting in improved water supply reliability to both agricultural and urban users.

### *E. 1.3. Evaluation Criterion (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 objective of this project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET), and estimation of Net-to-From Groundwater (NTFGW) within the boundaries of Stockton East Water District, Central San Joaquin Water Conservation District (CSJWCD), and North San Joaquin Water Conservation District (NSJWCD). The approach to meet the objectives are as follows.

1. Identify the Area and coverage of the Landsat Scene.
2. Identify and select the weather stations covering the area.
3. Set up server for implementation of GROWMAS for the three water agencies.
4. Run the METRIC™ model for ET estimation.
  - Download and process several model inputs, such as, imagery and weather data.
  - Conduct METRIC™ model calibration process near the primary weather station within the images.
  - Run METRIC™ numerous sub-models, resulting in instantaneous actual ET estimation for every pixel within Landsat image at the time the satellite image is taken.
  - Run Interpolation tools to estimate the actual ET between dates that satellite images are available, and create daily ET raster files.

- Generate total monthly and annual ET images.
- 5. Apply GROWMAS to analyze spatial images and data.
  - Extract information from ET images, and estimate ET per crop type at the ag parcel level and summarize by water agency boundary.
  - Statistical data analyses and QC.
- 6. Capture and upload the water delivery data.
- 7. Capture and assess Runoff Data.
- 8. Configure model to calculate NTFGW.
  - Process applied water (surface water delivery or groundwater) from the agency, and precipitation for each region.
  - Calculate Net To/From Groundwater values and generate groundwater images.
- 9. Configure dashboard and reports.
- 10. Monitor the GROWMAS Portal and produce reports
  - Publish GIS-based tabular and imagery results on a monthly basis.

**2. Describe the work plan for the project. Include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.**

July, 2021: Successful notification of award from the Bureau.

Sept, 2021: Sign contract with the Bureau.

Oct, 2021: Initiate Environmental Compliance with local Bureau office.

Oct, 2021: SEWD will complete contract with DCSE for GROWMAS.

Nov, 2021: GROWMAS will be installed.

Dec, 2021: Data will be obtained, quality controlled, and loaded into GROWMAS.

Jan, 2022: ET engine will be configured to produce ET estimates and Net To/From Groundwater data for the area.

Mar 2022: Districts will receive the first year's data from GROWMAS.

Mar 2022: Prepare Final Project Report for Bureau.

April-August 2022: Districts will create new goals and BMPs for the San Joaquin Groundwater Basin based on the new and more accurate data for 2022.

September-December 2022: Districts will share and implement the new BMPs to benefit the groundwater basin.

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

As a result of this project the following data will be available:

| <b>Item Number</b> | <b>Deliverables</b>              | <b>Description</b>  |
|--------------------|----------------------------------|---|
| 1                  | ET Imagery                       | Total monthly and annual ET images.   |
| 2                  | ET per Crop Type per Parcel      | Identify crop types using ET at the ag parcel level and summarize by water agency boundary. |
| 3                  | Net To/From Groundwater Imagery  | Generated groundwater images, monthly and annually.   |
| 4                  | Net To/From Groundwater Raw Data | Calculated Net To/From Groundwater values.  |

The local GROWMAS application will be used annually for production of the SGMA annual report.

4. *Identify staff with appropriate credentials and experience and describe their qualifications.*

- a. *Have the project team members accomplished projects similar in scope to the proposed project in the past either as a lead or team member?*

This project is contracted to DCSE Inc. for the implementation of GROWMAS and completion of the project's objectives. DCSE Inc. successfully completed a pilot project for SEWD and similar in scope project for Metropolitan Water District of Southern California for estimation of ET and water use in southern California. Existing engineering staff at NSJWCD, CSJWCD, SJC, and SEWD will provide data to DSCE to populate the project database and GROWMAS. All staff participated in the previous pilot project. The SEWD Project Manager has over 13 years of experience managing projects, including multiple grant funded projects, and an engineering support staff of four to ensure successful completion of the project.

- b. *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.*

SEWD and the DCSE Inc. team, with support from the SJC Water Resources staff, are capable of proceeding with tasks within the proposed project immediately upon entering into a financial assistance agreement. It is not expected that Reclamation staff support is required.

*E. 1.4. Evaluation Criterion (D) – Dissemination of Results*

1. *Describe how the tools, frameworks, or analyses being developed will be disseminated, communicated, or made available to water resources managers who may be interested in the results.*

- a. *Explain how the project results will be communicated internally, and to interested stakeholders and interested water resources managers in the area, if appropriate.*

The project results will be communicated through the Stockton East Water District's website (www.sewd.net) this way anyone internal or external can view the results. GWA website will provide a project summary page and links to the SEWD website. The results will also be in one of SEWD's weekly board meetings in order to more directly inform the interested stakeholders. Additionally, an email including the detailed results will go out to the interested stakeholders and water resources managers in the area, including a presentation to the GWA. The GWA Technical



Advisory Committee will review interim and draft deliverables throughout the course of the project and be provided regular status reports. Final results will be presented to the GWA Board of Directors. DCSE, SEWD and SJC staff are committed to publishing and presenting through the California Groundwater Resources Association, the Association of California Water Agencies, and/or the U.S. Council of Irrigation and Drainage to inform other areas in the west as to the benefits of the approach.

## Environmental and Cultural Resources Compliance

This project will not negatively impact surrounding environments. There will not be any earth-disturbing work or negative effects on the air, water, or animal habitat in the project area. The results of this project will help maintain and preserve the environment, water, and animal habitats.

*Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?*

There are no State or Federal endangered species or critical habitats that will be affected by the project.

*Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?"*

There are no jurisdictional wetlands which will be affected.

*When was the water delivery system constructed?*

SEWD and NSJWCD were founded in 1948. CSJWCD was formed in 1958 under the State of California. Portions of the New Hogan system were constructed in the 1930's by the Linden Irrigation District, later consolidated with SEWD. The Bellota facility was constructed in the early 1970s. The Upper and Lower Farmington Canals were completed in the mid-1990s.

*Will the proposed project result in any modification of or effects to, individual features of an irrigation system?*

No changes will be made to any parts of an irrigation system.

*Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?*

No.

*Are there any known archeological sites in the proposed project area?*

No.

*Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?*

No.

*Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?*

No.

*Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*

No.

## Required Permits

The proposed project solely consists of data collection and processing using contactless techniques and results in no impacts to any physical features. No permits or approvals are required for the project.

## Project Budget

### Funding Plan

Funding for this project will be provided by the Stockton East Water District with additional direct contribution from the GWA and/or San Joaquin County (SJC), as needed, to meet the local match requirements. The SJC and GWA are committed to support the project. Table 1 itemizes the funding sources and provides the total project expense.

SEWD direct funding is included within the SEWD fiscal year 2021-2022 budget and are available for immediate use. The SJC funding is available upon grant award and per the letter of commitment from the SJC. SEWD funds are only allowed for expenses through March 31, 2022.

The SEWD, CSJWCD, and NSJWCD estimate contributing approximately \$2,500 in-kind funding to the project. The SJC will be contributing in-kind funding to the project in the estimated amount of \$5,000. The in-kind funding will consist of staff hours needed to compile data and review draft documents.

Table 1.—Summary of Non-Federal and Federal Funding Sources

| Funding Sources               | Funding Amount |
|-------------------------------|----------------|
| Non-Federal Entities          |                |
| SEWD Direct Funding           | \$ 50,000      |
| SJC Direct Funding            | \$ 9,080       |
| SEWD In-Kind Funding          | \$ 2,500       |
| CSJWCD In-Kind Funding        | \$ 2,500       |
| NSJWCD In-Kind Funding        | \$ 2,500       |
| GWA In-Kind Funding           | \$ 5,000       |
| Other Federal Entities        |                |
| None                          |                |
| Other Federal Subtotal        | \$ -           |
| Requested Reclamation Funding | \$ 58,000      |
| Total Study Funding           | \$ 129,580     |

### Budget Proposal

See Table 2.



Table 2 - Budget Proposal

| Budget Item Description         | Computation   |          | Quantity Type<br>(hours/days) | Total Cost       |
|---------------------------------|---|----------|-------------------------------|------------------|
|                                 | \$/unit   | Quantity |                               |                  |
| <b>Salaries and Wages</b>       |   |          |                               |                  |
|                                 | No federal funds to be used for salaries/wages              |          |                               |                  |
| <b>Fringe Benefits</b>          |   |          |                               |                  |
|                                 | No fringe benefits provided by this project                 |          |                               |                  |
| <b>Travel</b>                   |   |          |                               |                  |
|                                 | No federal funds to be used for travel to install equipment |          |                               |                  |
| <b>Equipment</b>                |   |          |                               |                  |
|                                 |   |          |                               | \$0              |
| Subtotal                        |   |          |                               | <b>\$0</b>       |
| <b>Supplies and Materials</b>   |   |          |                               |                  |
|                                 | \$ 1,000.00   | 1        | LS                            | \$1,000          |
| Subtotal                        |   |          |                               | <b>\$1,000</b>   |
| <b>Contractual/Construction</b> |   |          |                               |                  |
| Year 1                          | \$ 116,080.00   | 1        | LS                            | \$116,080        |
|                                 |   |          |                               | \$0              |
| Subtotal                        |   |          |                               | <b>\$116,080</b> |
| Total Direct Costs              |   |          |                               | <b>\$117,080</b> |

### Budget Narrative

The total estimated project cost is \$129,580. Salaries, wages, and fringe benefits will not be reimbursed by the grant and are included as in-kind contributions by SEWD and SJC. Contractual, materials, and supplies costs will be shared by the grant and direct expenditures from SEWD and JSC. The project does not include any travel, equipment purchases, or other costs. Table 3 identifies the approximate percentages of grant funding and non-grant funding.

Table 3 - Total Project Cost Table

| Federal Grant Funding |  |  |
|-----------------------|--|--|
|                       |  |  |
|                       |  |  |

## Letters of Funding Commitments



SAN JOAQUIN COUNTY  
**FLOOD CONTROL & WATER  
CONSERVATION DISTRICT**  
P. O. BOX 1810  
1810 EAST HAZELTON AVENUE  
STOCKTON, CALIFORNIA 95201  
TELEPHONE (209) 468-3000  
FAX NO. (209) 468-2999

**KRIS BALAJI**  
DIRECTOR OF PUBLIC WORKS  
FLOOD CONTROL ENGINEER

April 19, 2021

Subject: WaterSMART Applies Sciences Grant (R21AS00289) Funding Commitment and Letter of Support

To whom it may concern:

I am the Manager of Water Resources in the San Joaquin County Public Works Department and coordinate the Eastern San Joaquin Groundwater Authority (GWA). On April 14, 2021 the GWA Steering Committee, acting on behalf of the Board, passed a motion in support of the "Eastside Groundwater Use Measurement Project" submitted by the Stockton East Water District for consideration under the Reclamation WaterSMART Applied Science Grant. The full GWA Board will be acting on the Budget in June of 2021 and the matching funds to support the project are included.

In addition, the County has discretionary funds in our Water Resources budgets (Flood Control and Water Conservation District and Zone 2 Water Resources Fund) that can be committed should they be needed. As such, we will provide both direct and in-kind funding to the proposed project and are excited to further apply the results of the prior pilot and demonstration project to the rest of the SEWD area, and to the wider GWA areas of the NSJWCD and CSJWCD. In our prior pilot project we demonstrated and tested the GROWMASS technologies and think it is appropriate to apply the tools to the larger area to benefit our efforts to implement our East San Joaquin Groundwater Sustainability Plan adopted in January 2020 in compliance with the Sustainable Groundwater Management Act.

I coordinate the activities of 14 professional and engineering staff that will be providing in-kind support to the GWA Board, Steering Committee and Technical Advisory Committee during project execution, and will ensure that the results of the project will be widely distributed to stakeholders and applied as we move forward to further implement the East San Joaquin Groundwater Sustainability Plan. Senior Engineering staff and I will also provide peer review and support all aspects of project delivery.

Thank you for your consideration and we hope to deliver an exemplary Applied Science project.

Sincerely,

A handwritten signature in black ink, appearing to read "Matt Zidar".

Matt Zidar  
Water Resources Manager  
San Joaquin County Public Works, Water Management Division.

# Letters of Support



1810 E. Hazelton Avenue  
P. O. Box 1810  
Stockton, CA 95201

(209) 468-3089  
ESJgroundwater@sjgov.org  
esjgroundwater.org

April 19, 2021

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

Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District

Dear Grant Application Committee:

As Chairman of the East San Joaquin Groundwater Authority (ESJ GWA) it is my pleasure to support the Stockton East Water District's ("District") application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project. I am also the Chairman of the ESJ GWA Steering Committee which acted on behalf of the GWA on April 14 to unanimously support the District grant proposal.

The ESJ GWA is a Joint Powers Authority comprised of 16 Groundwater Sustainability Agencies (GSAs) that includes area Cities, the County and a host of independent water districts which prepared and adopted the East San Joaquin Groundwater Sustainability Plan (GSP) pursuant to the California Sustainable Groundwater Sustainability Act (SGMA). This plan defines how our critically overdrafted groundwater basin will achieve sustainability by the year 2040. The Eastside Groundwater Use Measurement Project is consistent with this long-term plan and will help us achieve our goal to better account for and manage available surface and groundwater resources.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries, all of whom are members of the ESJ GWA. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

San Joaquin County has two GSAs which are part of the ESJ GWA. The County is actively supporting capital projects to recharge groundwater and working to implement related management actions. The ESJ GWA supports this project because it will provide much needed data to help meet the GSA's accurate measure of basin groundwater use which is essential for basin management and to establish long-term sustainability.

We believe the proposal is extremely consistent with Reclamation's objectives for this grant. The project will develop hydrologic information and apply the GROWMASS tool to help improve modeling and demand forecasting capabilities; account for groundwater use and provide information and tools to help water managers to increase water supply reliability, provide flexibility in water delivery, and improve water management and conjunctive use operations. Project results will be applied to respond to drought, assess fees and charges for groundwater and administer local water rights.

Therefore, we highly recommend this project for your Applied Science Grant opportunity.

Sincerely,

Chuck Winn, Chairman  
East San Joaquin Groundwater Authority





**SOUTH SAN JOAQUIN  
IRRIGATION DISTRICT**

April 15, 2021

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

**SUBJECT: LETTER OF SUPPORT FOR THE STOCKTON EAST WATER DISTRICT 2021  
WATERSMART – APPLIED SCIENCE GRANT APPLICATION**

Dear Grant Application Committee:

On behalf of the South San Joaquin Irrigation District (SSJID), it is my pleasure to voice our support for the Stockton East Water District's (SEWD) application to the Applied Science Grant Program to fund the Eastside Groundwater Use Measurement Project (Project).

The purpose of the Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of net-to-from groundwater within the agricultural areas of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) totaling well over 300,000 acres. The data provided by the Project is critical for improved conjunctive water management by more accurately measuring groundwater use. Additionally, the technology accessed would improve the future accuracy of regulatory reporting pursuant to the Sustainable Groundwater Management Act.

SSJID is part of the multi-agency South San Joaquin Groundwater Sustainability Agency (SSJGSA) in partnership with the Cities of Ripon and Escalon. The SSJGSA is one of 16 Groundwater Sustainability Agencies (GSAs) which comprise the Eastern San Joaquin Groundwater Authority (GWA), formed to develop the GSP and assist in the implementation of projects and management actions. The GSAs support this project because it will provide access to emerging technologies improving the accuracy of data to help meet the Region's sustainability goals. Accurate measurement of basin groundwater use is essential for basin management and to establish long-term sustainability.

SSJID urges you to fund this important project. Thank you for your time and consideration.

Sincerely,  
SOUTH SAN JOAQUIN IRRIGATION DISTRICT

A handwritten signature in blue ink, appearing to read "Robert Holmes", is written over a light blue horizontal line.

ROBERT HOLMES, President

C: Scot Moody, Stockton East Water District

*P.O. Box 747, Ripon, CA 95366-0747 (Mailing)  
11011 E. Highway 120, Manteca, CA 95336-9750  
(209) 249-4600*



**Stanislaus & Tuolumne Rivers Groundwater Basin Association**  
**Groundwater Sustainability Agency**  
1231 11<sup>th</sup> Street | Modesto, CA 95354  
Phone: (209) 526-7564 | Fax: (209) 526-7352  
Email: [John.Davids@mid.org](mailto:John.Davids@mid.org)

April 15, 2021

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

**Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District**

Dear Grant Application Committee:

As Chairman of the Stanislaus and Tuolumne Rivers Groundwater Basin Association Groundwater Sustainability Agency (STRGBA GSA) it is my pleasure to support the Stockton East Water District's ("District") application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

STRGBA GSA consists of seven public agencies in Stanislaus County who elected to become one of two Groundwater Sustainability Agencies for the Modesto Sub-basin. Since its inception, STRGBA GSA has provided a forum for local agencies to work cooperatively in the pursuit of effective and sustainable groundwater management of the Modesto Sub-basin as well as neighboring sub-basins. The STRGBA GSA supports this project because it will provide much needed data to help meet the sustainability goal of the Eastern San Joaquin Sub-basin which shares a common boundary with the Modesto Sub-basin along the Stanislaus River. Accurate measurement of basin groundwater use is essential for basin management and to establish long-term sustainability.

We highly recommend this project for your Applied Science Grant opportunity. If you have any questions regarding this letter of support, please feel free to contact me at (209) 526-7564.

Sincerely,

John B. Davids, P.E.  
STRGBA GSA Chairman

[City of Modesto](#) | [City of Oakdale](#) | [City of Riverbank](#) | [City of Waterford](#)  
[Modesto Irrigation District](#) | [Oakdale Irrigation District](#) | [Stanislaus County](#)





April 19, 2021

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

**Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District**

Dear Grant Application Committee:

On behalf of the Oakdale Irrigation District (OID), I would like to express my support of the Stockton East Water District's (SEWD) application to the Applied Science Grant Program to fund the Eastside Groundwater Use Measurement Project (Project).

The purpose of the Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of net-to-from groundwater within the SEWD, North San Joaquin Water Conservation District, and Central San Joaquin Water Conservation District boundaries. The data provided by the Project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

OID is one of 16 Groundwater Sustainability Agencies (GSAs) which comprise the Eastern San Joaquin Groundwater Authority (GWA), formed to complete the Eastern San Joaquin Groundwater Sustainability Plan (GSP) and assist in the subsequent implementation of projects and management actions. The OID GSA supports this Project because it will provide much needed data to help meet the GSP's sustainability goal. Accurate measurement of groundwater use is essential for long term groundwater management and sustainability within the basin.

I highly recommend this Project for the Applied Science Grant opportunity. If OID can be of any further assistance, please do not hesitate to contact me at (209) 840-5525.

Sincerely,

**OAKDALE IRRIGATION DISTRICT**

A handwritten signature in blue ink, appearing to read "Steve Knell", is written over the printed name.

Steve Knell, P.E.  
General Manager

1205 East F Street / Oakdale, CA 95361 / (209) 847-0341 / Fax (209) 847-3468  
[www.oakdaleirrigation.com](http://www.oakdaleirrigation.com)

# SOUTH DELTA WATER AGENCY

1806 KETTLEMAN LANE SUITE L  
LODI, CALIFORNIA 95242  
TELEPHONE (209) 224-5854  
FAX (209) 663-9148  
E-MAIL Jherrlaw@aol.com

Directors:

Jerry Robinson, Chairman  
Mary Hildebrand, Vice-Chairman  
Natalino Bacchetti  
Jack Alvarez  
Paul Marchini

Counsel & Manager:  
John Herrick

April 12, 2021

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

Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District

Dear Grant Application Committee:

As manager and general counsel for South Delta Water Agency (“SDWA”) I would like to express our agency’s support the Stockton East Water District’s (“District”) application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

SDWA is one of 16 Groundwater Sustainability Agencies (GSAs) which comprise the Eastern San Joaquin Groundwater Authority (GWA), formed to complete the 2019 Eastern San Joaquin Groundwater Sustainability Plan (GSP) and assist in the implementation of projects and management actions. The GSAs support this project because it will provide much needed data to help meet the GSP’s sustainability goal. Accurate measurement of basin groundwater use is essential for basin management and to establish long-term sustainability.

///

Bureau of Reclamation  
April 12, 2021  
Page two

We highly recommend this project for your Applied Science Grant opportunity.

Very truly yours,



JOHN HERRICK

# OID

OAKDALE IRRIGATION DISTRICT



April 19, 2021

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

**Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District**

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The purpose of the Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of net-to-from groundwater within the SEWD, North San Joaquin Water Conservation District, and Central San Joaquin Water Conservation District boundaries. The data provided by the Project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

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Sincerely,

**OAKDALE IRRIGATION DISTRICT**

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Steve Knell, P.E.  
General Manager

# SOUTH DELTA WATER AGENCY

1806 KETTLEMAN LANE SUITE L  
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Counsel & Manager:  
John Herrick

April 12, 2021

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

Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District

Dear Grant Application Committee:

As manager and general counsel for South Delta Water Agency (“SDWA”) I would like to express our agency’s support the Stockton East Water District’s (“District”) application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

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///



Bureau of Reclamation  
April 12, 2021  
Page two

We highly recommend this project for your Applied Science Grant opportunity.

Very truly yours,

A handwritten signature in black ink, appearing to read "John Herrick", with a stylized flourish at the end.

JOHN HERRICK



SOUTH SAN JOAQUIN  
IRRIGATION DISTRICT

April 15, 2021

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

SUBJECT: LETTER OF SUPPORT FOR THE STOCKTON EAST WATER DISTRICT 2021  
WATERSMART – APPLIED SCIENCE GRANT APPLICATION

Dear Grant Application Committee:

On behalf of the South San Joaquin Irrigation District (SSJID), it is my pleasure to voice our support for the Stockton East Water District's (SEWD) application to the Applied Science Grant Program to fund the Eastside Groundwater Use Measurement Project (Project).

The purpose of the Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of net-to-from groundwater within the agricultural areas of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) totaling well over 300,000 acres. The data provided by the Project is critical for improved conjunctive water management by more accurately measuring groundwater use. Additionally, the technology accessed would improve the future accuracy of regulatory reporting pursuant to the Sustainable Groundwater Management Act.

SSJID is part of the multi-agency South San Joaquin Groundwater Sustainability Agency (SSJGSA) in partnership with the Cities of Ripon and Escalon. The SSJGSA is one of 16 Groundwater Sustainability Agencies (GSAs) which comprise the Eastern San Joaquin Groundwater Authority (GWA), formed to develop the GSP and assist in the implementation of projects and management actions. The GSAs support this project because it will provide access to emerging technologies improving the accuracy of data to help meet the Region's sustainability goals. Accurate measurement of basin groundwater use is essential for basin management and to establish long-term sustainability.

SSJID urges you to fund this important project. Thank you for your time and consideration.

Sincerely,  
SOUTH SAN JOAQUIN IRRIGATION DISTRICT

A blue ink signature of Robert Holmes, the President of the South San Joaquin Irrigation District.

ROBERT HOLMES, President

C: Scot Moody, Stockton East Water District

# Board Resolution

Resolution No. 21-22-01

A RESOLUTION OF THE BOARD OF DIRECTORS OF  
STOCKTON EAST WATER DISTRICT  
AUTHORIZATION TO FILE A GRANT APPLICATION WITH THE  
DEPARTMENT OF INTERIOR UNITED STATES BUREAU OF RECLAMATION  
FOR THE WATERSMART: APPLIED SCIENCE GRANTS FOR FISCAL YEAR 2021 &  
EXECUTE ANY REQUIRED DOCUMENTS AND PROVIDE DELEGATION OF  
AUTHORITY

WHEREAS, the Board of Directors of the Stockton East Water District desires to file a grant application with the Department of the Interior United States Bureau of Reclamation for the WaterSMART: Applied Science Grants (Funding No. R21AS00289) for funding of the Eastside Groundwater Use Measurement Project; and

WHEREAS, the General Manager, Scot A. Moody of the Stockton East Water District is hereby authorized and directed to prepare the necessary data, conduct investigations, file such application and work with Reclamation to meet established deadlines for entering and executing a grant agreement with Department of the Interior United States Bureau of Reclamation; and

WHEREAS, the General Manager, Scot A. Moody of the Stockton East Water District has reviewed and supports the application submitted; and

WHEREAS, the General Manager, Scot A. Moody of the Stockton East Water District and his designee of the Stockton East Water District are hereby authorized and delegated to submit reports, request for cost reimbursement and conduct day-to-day business with Department of the Interior United States Bureau of Reclamation; and

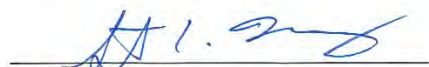
NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Stockton East Water District that the grant application be made to the Department of the Interior United States Bureau of Reclamation to obtain a WaterSMART: Applied Science Grant (Funding No. R21AS00289), to enter into an agreement to receive the grant, and commit the necessary matching funds.

PASSED AND ADOPTED at a regular meeting by the Board of Directors of the Stockton East Water District on the 13<sup>th</sup> day of April 2021 by the following vote of the members thereof:

AYES: Atkins, Cortopassi, McGaughey, McGurk, Panizza, Sanguinetti, Watkins  
NAYES: None  
ABSENT: None  
ABSTAIN: None

  
Andrew Watkins, President

ATTEST:

  
Scot A. Moody  
Secretary of the Board





A RESOLUTION OF THE BOARD OF DIRECTORS OF  
STOCKTON EAST WATER DISTRICT  
AUTHORIZATION TO FILE A GRANT APPLICATION WITH THE  
DEPARTMENT OF INTERIOR UNITED STATES BUREAU OF RECLAMATION  
FOR THE WATERSMART: APPLIED SCIENCE GRANTS FOR FISCAL YEAR 2021 &  
EXECUTE ANY REQUIRED DOCUMENTS AND PROVIDE DELEGATION OF  
AUTHORITY

WHEREAS, the Board of Directors of the Stockton East Water District desires to file a grant application with the Department of the Interior United States Bureau of Reclamation for the WaterSMART: Applied Science Grants (Funding No. R21AS00289) for funding of the Eastside Groundwater Use Measurement Project; and

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WHEREAS, the General Manager, Scot A. Moody of the Stockton East Water District has reviewed and supports the application submitted; and

WHEREAS, the General Manager, Scot A. Moody of the Stockton East Water District and his designee of the Stockton East Water District are hereby authorized and delegated to submit reports, request for cost reimbursement and conduct day-to-day business with Department of the Interior United States Bureau of Reclamation; and


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AYES: Atkins, Cortopassi, McGaughey, McGurk, Panizza, Sanguinetti, Watkins  
NAYES: None  
ABSENT: None  
ABSTAIN: None

  
Andrew Watkins, President

ATTEST:

  
Scot A. Moody  
Secretary of the Board



1.



**SAN JOAQUIN COUNTY**  
**FLOOD CONTROL & WATER  
CONSERVATION DISTRICT**  
P. O. BOX 1810  
1810 EAST HAZELTON AVENUE  
STOCKTON, CALIFORNIA 95201  
TELEPHONE (209) 468-3000  
FAX NO. (209) 468-2999

**KRIS BALAJI**  
DIRECTOR OF PUBLIC WORKS  
FLOOD CONTROL ENGINEER

April 19, 2021

Subject: WaterSMART Applies Sciences Grant (R21AS00289) Funding Commitment and Letter of Support

To whom it may concern:

I am the Manager of Water Resources in the San Joaquin County Public Works Department and coordinate the Eastern San Joaquin Groundwater Authority (GWA). On April 14, 2021 the GWA Steering Committee, acting on behalf of the Board, passed a motion in support of the "Eastside Groundwater Use Measurement Project" submitted by the Stockton East Water District for consideration under the Reclamation WaterSMART Applied Science Grant. The full GWA Board will be acting on the Budget in June of 2021 and the matching funds to support the project are included.

In addition, the County has discretionary funds in our Water Resources budgets (Flood Control and Water Conservation District and Zone 2 Water Resources Fund) that can be committed should they be needed. As such, we will provide both direct and in-kind funding to the proposed project and are excited to further apply the results of the prior pilot and demonstration project to the rest of the SEWD area, and to the wider GWA areas of the NSJWCD and CSJWCD. In our prior pilot project we demonstrated and tested the GROWMASS technologies and think it is appropriate to apply the tools to the larger area to benefit our efforts to implement our East San Joaquin Groundwater Sustainability Plan adopted in January 2020 in compliance with the Sustainable Groundwater Management Act.

I coordinate the activities of 14 professional and engineering staff that will be providing in-kind support to the GWA Board, Steering Committee and Technical Advisory Committee during project execution, and will ensure that the results of the project will be widely distributed to stakeholders and applied as we move forward to further implement the East San Joaquin Groundwater Sustainability Plan. Senior Engineering staff and I will also provide peer review and support all aspects of project delivery.

Thank you for your consideration and we hope to deliver an exemplary Applied Science project.

Sincerely,

Matt Zidar  
Water Resources Manager  
San Joaquin County Public Works, Water Management Division.





1810 E. Hazelton Avenue  
P. O. Box 1810  
Stockton, CA 95201

(209) 468-3089  
ESJgroundwater@sjgov.org  
esjgroundwater.org

April 19, 2021

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

Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District

Dear Grant Application Committee:

As Chairman of the East San Joaquin Groundwater Authority (ESJ GWA) it is my pleasure to support the Stockton East Water District's ("District") application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project. I am also the Chairman of the ESJ GWA Steering Committee which acted on behalf of the GWA on April 14 to unanimously support the District grant proposal.

The ESJ GWA is a Joint Powers Authority comprised of 16 Groundwater Sustainability Agencies (GSAs) that includes area Cities, the County and a host of independent water districts which prepared and adopted the East San Joaquin Groundwater Sustainability Plan (GSP) pursuant to the California Sustainable Groundwater Sustainability Act (SGMA). This plan defines how our critically overdrafted groundwater basin will achieve sustainability by the year 2040. The Eastside Groundwater Use Measurement Project is consistent with this long-term plan and will help us achieve our goal to better account for and manage available surface and groundwater resources.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries, all of whom are members of the ESJ GWA. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

San Joaquin County has two GSAs which are part of the ESJ GWA. The County is actively supporting capital projects to recharge groundwater and working to implement related management actions. The ESJ GWA supports this project because it will provide much needed data to help meet the GSA's accurate measure of basin groundwater use which is essential for basin management and to establish long-term sustainability.

We believe the proposal is extremely consistent with Reclamation's objectives for this grant. The project will develop hydrologic information and apply the GROWMASS tool to help improve modeling and demand forecasting capabilities; account for groundwater use and provide information and tools to help water managers to increase water supply reliability, provide flexibility in water delivery, and improve water management and conjunctive use operations. Project results will be applied to respond to drought, assess fees and charges for groundwater and administer local water rights.

Therefore, we highly recommend this project for your Applied Science Grant opportunity.

Sincerely,

A handwritten signature in blue ink that reads 'Chuck Winn' with a horizontal line extending from the end.

Chuck Winn, Chairman  
East San Joaquin Groundwater Authority



**Stanislaus & Tuolumne Rivers Groundwater Basin Association  
Groundwater Sustainability Agency**

1231 11<sup>th</sup> Street | Modesto, CA 95354  
Phone: (209) 526-7564 | Fax: (209) 526-7352  
Email: John.Davids@mid.org

April 15, 2021

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

**Re: 2021 WaterSMART – Applied Science Grant Application of Stockton East Water District**

Dear Grant Application Committee:

As Chairman of the Stanislaus and Tuolumne Rivers Groundwater Basin Association Groundwater Sustainability Agency (STRGBA GSA) it is my pleasure to support the Stockton East Water District's ("District") application to the Applied Science Grant program to fund the Eastside Groundwater Use Measurement Project.

The purpose of the Eastside Groundwater Use Measurement Project is to estimate and produce spatial and temporal maps of monthly evapotranspiration (ET) and estimation of Net-to-From Groundwater within the boundary of Stockton East Water District (SEWD), North San Joaquin Water Conservation District (NSJWCD), and Central San Joaquin Water Conservation District (CSJWCD) boundaries. The data provided by the project is critical for conjunctive use management, accurate measurement of groundwater use, and Groundwater Sustainability Plan reporting.

STRGBA GSA consists of seven public agencies in Stanislaus County who elected to become one of two Groundwater Sustainability Agencies for the Modesto Sub-basin. Since its inception, STRGBA GSA has provided a forum for local agencies to work cooperatively in the pursuit of effective and sustainable groundwater management of the Modesto Sub-basin as well as neighboring sub-basins. The STRGBA GSA supports this project because it will provide much needed data to help meet the sustainability goal of the Eastern San Joaquin Sub-basin which shares a common boundary with the Modesto Sub-basin along the Stanislaus River. Accurate measurement of basin groundwater use is essential for basin management and to establish long-term sustainability.

We highly recommend this project for your Applied Science Grant opportunity. If you have any questions regarding this letter of support, please feel free to contact me at (209) 526-7564.

Sincerely,

John B. Davids, P.E.  
STRGBA GSA Chairman

City of Modesto | City of Oakdale | City of Riverbank | City of Waterford  
Modesto Irrigation District | Oakdale Irrigation District | Stanislaus County