



**MINUTES OF THE MEETING
OF THE BOARD OF DIRECTORS
HELD APRIL 10, 2023**

At approximately 1:00 p.m. on April 10, 2023, at the KDWCD, 2975 N. Farmersville Blvd., Farmersville California, Chairman Don Mills of the Greater Kaweah GSA called to order a meeting of the Board of Directors of the Greater Kaweah Groundwater Sustainability Agency Joint Powers Authority (“GKGSA”).

Directors	Paul Boyer Joe Cardoza Stephen Johnson Don Mills	Eric Shannon Ernie Taylor Pete Vander Poel
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Directors Absent:	Brian Watte	Chris Tantau
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Also Present:	Shawn Corley Jeff Ritchie Mark Larsen Josh Fox John Gailey Larry Dotson James Silva Matt Klinchuch Geoff Vanden Heuvel Shane Smith Sarah Rutherford Andrew Hart David De Groot Courtney Barnes Jasmine Rivera Emmanuel Llamas Dianna Zegarra Tien Tran Chris Hunter	John Keller Craig Hornung Anya Goosev Collin Fernandes Brayden Sanchez Katie Hyde Brian Brown Dino Giacomazzi Savannah Tjaden Jacob Salinas Dan Tucker Dan Sliskovich Cornell Kasbergen Allison Tristao Joel Kimmelshue Richard Garcia Bo Champlin David Cox
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PUBLIC COMMENT

Chairman Mills opened the meeting for public comment. No public comment was presented.

CORRESPONDENCE AND ANNOUNCEMENTS

General Manager Larsen apologized for the cancellation of the Agency's March meeting, noting the exceptional circumstances and flooding that required the cancellation. Mr. Larsen introduced Shane Smith, who will serve as the new General Manager of Kaweah Delta Water Conservation District.

MINUTES

Approve Minutes for the February 13, 2023, Board Meeting

General Manager Larsen referred the Board to Agenda Item #4a, a copy of the minutes, which is attached hereto and incorporated by reference.

Director Shannon moved and Director Johnson seconded to approve the minutes as presented in the agenda packet. The motion was unanimously approved.

FINANCIAL REPORT

Consider for Approval the Quarterly Financial Report for the Quarter Ending March 31, 2023.

General Manager Larsen referred the Board to Agenda Item #5, a copy of the financial report for the quarter ending March 31, 2023, which is attached hereto and incorporated by reference. Mr. Larsen reviewed the report with Board members.

Director Cardoza arrived at this time.

Discussion ensued regarding the matters presented in the report.

Director Shannon moved and Director Cardoza seconded to approve the minutes as presented in the agenda packet. The motion was unanimously approved.

KAWEAH SUBBASIN GROUNDWATER SUSTAINABILITY PLANS

Review Department of Water Resources Determination Letter and Conclusion GSPs are Inadequate

General Manager Larsen referred the Board to the determination letter sent to GKGSA from DWR, a copy of which is attached hereto as Agenda Item No. 6 and incorporated herein by reference. Mr. Larsen reviewed the specific items in the letter with board members.

Mr. Larsen noted that, although the Kaweah Subbasin agencies have done substantial work, more detail needs to be added in explaining and describing it for the Board so that DWR staff can follow the plan more effectively.

Discussion ensued regarding potential summaries of amendments to the GSP. Mr. Larsen advised that the DWR has expressed reluctance to accept “executive summaries” or their functional equivalents.

Discussion ensued regarding the fact that data gaps abound with respect to many of the issues related to undesirable results such as subsidence.

Mr. Larsen continued his report.

David De Groot provided background regarding how the GSA is going about the process of addressing the matters identified in DWR’s determination letter.

Director Vander Poel arrived at this time.

Discuss Jurisdiction Shift to the State Water Resources Control Board

General Manager Larsen advised that the State Water Resources Control Board now has jurisdiction, and the primary question is whether it will begin the process of exercising jurisdiction over GSAs that have received inadequate determinations.

Discussion ensued regarding coordination between the State Board and DWR concerning the exercise of State Board jurisdiction.

Next Steps

The next meeting with the State Board is scheduled for May of this year. The three GSAs within the subbasin have coordinated in order to deal with the necessary action items efficiently. The plan is to present DWR with an agenda for that meeting, including questions to be discussed. As they continue to coordinate with the State Board, the GSAs will generate a plan of action and associated timeline.

Mr. Larsen continued with his report, related to the recent meetings between GSA staff and the State Board/DWR.

The meeting was briefly suspended to address audio issues for online attendees.

KAWEAH SUBBASIN ANNUAL MONITORING REPORT (AMR):

Consulting Engineer Matt Klinchuch advised that the Subbasin’s Annual Report was submitted to DWR on March 31, 2023. Mr. Klinchuch provided a summary of the Report’s contents. It was noted that the entire Subbasin provides the annual report, and that the report’s details include GSA-specific information.

JOINT POWERS AGREEMENT AMENDMENT

Status Report

It appears that Tulare County and Kings County Water District still need to approve the amended Joint Powers Agreement. Once all member agencies have signed the amended Agreement, staff will submit the Agreement to the Secretary of State.

GSA REPORTS AND COMMITTEE DISCUSSION

Combined Rural Communities & Stakeholder Committees

Summary of February 21, 2023 Combined Meeting

General Manager Larsen provided a report of the February 21, 2023 combined meeting of the Rural Communities Committee and the Stakeholder Committee. A written summary of the meeting is attached hereto as Agenda Item 9-a-i and incorporated herein by reference.

Consider Appointment of Applicants to the Stakeholder Committee to Fill Two (2) Open Seats for a Term of Four (4) Years

General Manager Larsen noted that there are two vacancies for “Non-Ag/Other” seats on the Stakeholder Committee. Mr. Larsen reported on the applications received.

The Board conferred regarding deliberations, as well as the prospect of obtaining a recommendation from the committee regarding its own needs and the interests currently represented on the Committee.

Following discussion of the matter, the consensus of the Board was to await the recommendation of the Stakeholder Committee, and to revisit the matter at the next Board meeting.

Consider Approval of Recommendation by Stakeholder Committee to Reappoint Joe Cardoza as Director and Blake Mauritson as Alternate Director to the Greater Kaweah GSA Board for a Term of Four (4) Years

General Manager Larsen provided a report on recommendations. He noted that the Stakeholder Committee recommended the reappointment of Joe Cardoza as Director and Blake Mauritson as Alternate Director.

Director Shannon moved and Director Vander Poel seconded to reappoint Joe Cardoza as Director and Blake Mauritson as Alternate Director. The board unanimously approved.

Consider Approval of Recommendation by Rural Communities Committee to Reappoint Paul Boyer as Director and Appoint Barbara Sally as Alternate Director on the Greater Kaweah GSA Board for a Term of Four (4) Years

General Manager Larsen provided a report of the recommendations. He noted that the Rural Communities Committee recommended the reappointment of Paul Boyer as Director and Barbara Sally as Alternate Director.

Director Shannon moved and Director Cardoza seconded to reappoint Paul Boyer as Director and to appoint Barbara Sally as Alternate Director. The board unanimously approved.

Mr. Larsen noted that the next combined meeting of the Committees is April 24, 2023, at 1:30pm.

Technical Advisory Committee

General Manager Larsen advised that the next meeting will be April 20, 2023.

Kaweah Subbasin Management Team

General Manager Larsen advised that the Team has yet to meet this year.

Grants

General Manager Larsen provided a report on existing grants. Mr. Larsen noted that activity has been limited, given the challenges associated with recent flood events.

Multi-benefit Land Repurposing Grant

General Manager Larsen reported that there has been a lot of activity, with Valley Eco moving forward in terms of outreach.

Land IQ Dashboard

General Manager Larsen advised that there has been a lot of communication with landowners who have questions or concerns regarding the Dashboard.

Land Following Ad-Hoc Working Group

General Manager Larsen provided a report, and noted that the group's activities would be covered in more detail later in the meeting during the discussion of land following.

DWR LANDFLEX PROGRAM

Status Report

General Manager Larsen reported that the Grant Agreement with the State of California has been implemented. This was accomplished at lightning speed compared to other contracts to which DWR is a party.

Consider Ratification of Grant Agreement Between the State of California and Greater Kaweah GSA

General Manager Larsen referred the board to Agenda Item #8b, a copy of the Grant Agreement.

Director Shannon moved and Director Vander Poel seconded to approve the Grant Agreement as presented in the agenda packet. The board unanimously approved.

Consider Ratification of LandFlex Grant Award to Growers – Domestic Well Drought Relief Cap

General Manager Larsen provided an overview of the Domestic Well Drought Relief Cap.

Director Vander Poel moved and Director Shannon seconded to approve the cap at \$350.00. The board unanimously approved.

LAND FALLOWING (REVERSE AUCTION)

2023-24 Program Update

General Manager Larsen advised that, in light of the recent flooding events, progress on these matters has slowed.

Mr. Dino Giacomazzi advised that the land fallowing committee had been with the goal of getting work done this water year. The Committee subsequently determined that more time was needed. The Committee anticipated a revenue stream by 2024. He advised that the Committee will explore potential additional actions, as well as potential additional revenue streams, that may have arisen as a result of this wet year.

Discussion ensued regarding the use of technology to identify optimal channel capacities.

Discussion ensued regarding the ability to gauge recharge capacity, and related matters.

Public comment was received from Tien Tran.

Land Following Outreach Event

It was noted that the previously schedule outreach event was cancelled due to events associated with local flooding.

Public comment was received from Tien Tran.

Public comment was received from Sarah Rutherford.

SURFACE WATER DATA

Consider Approval of Non-Disclosure Agreement with Wutchumna Water Company

General Manager Larsen provided an overview of the Non-Disclosure Agreement with Wutchumna Water Company.

Discussion ensued regarding how other companies' interests might be implicated. Director Cardoza noted that it may be in the interest of efficiency to establish a policy to which private companies could later be referred.

The matter was tabled, pending discussion of the matter at the level of the Kaweah & St. Johns River Association.

NEXT MEETING DATE

Chairman Mills announced the next meeting of the Groundwater Sustainability Agency will commence on Monday, May 8, 2023, at 1:00 p.m.

CLOSED SESSION

CONFERENCE WITH LEGAL COUNSEL - ANTICIPATED LITIGATION

[Government Code Section 54956.9(d)(2)]

Number of Potential Cases: One

The Board elected not to enter into closed session.

CLOSED SESSION ITEMS

Report Action Taken in Closed Session Required by Government Code 54957.1

As the Board elected to forego closed session, there was nothing to report.

ADJOURNMENT

As there was no further business to come before the Board of Directors, the meeting was concluded.

Respectfully submitted,

Mark Larsen, Secretary

CONSULTANT AGREEMENT

THIS AGREEMENT is made this ____ day of _____, 2023, by and between GREATER KAWEAH GROUNDWATER SUSTAINABILITY AGENCY (hereinafter “GKGSA”) and BREAK9 (hereinafter “Consultant”).

Article I Term of Contract

This agreement will become effective upon its execution by GKGSA. Consultant will commence work on this contract immediately after it becomes effective. This agreement will continue indefinitely, until terminated by written notice from one of the parties as hereinafter provided in Articles VII or VIII.

Article II Independent Contractor

Consultant enters into this agreement, and will remain throughout the term of the agreement, an independent contractor. Consultant agrees that neither it nor any of its employees will become an employee of GKGSA while this agreement is in effect. Consultant agrees that while this agreement is in effect that neither it nor any of its employees is or shall become entitled to the rights or benefits afforded to GKGSA’S employees, if any, including disability or unemployment insurance, workers’ compensation, medical insurance, sick leave, or any other employment benefit.

Consultant is responsible for providing at Consultant’s own expense, disability, unemployment, any other insurance, workers’ compensation, training, permits, and licenses for Consultant and for its employees and subcontractors, if any.

Article III Authorized Representatives

The General Manager of GKGSA, or in his absence his designated representative shall be the authorized representative of GKGSA with respect to all of Consultant’s dealings with GKGSA in connection with Consultant’s work pursuant to this agreement. Consultant shall designate an authorized employee or representative to represent it with respect to its dealings with GKGSA in connection with Consultant’s work pursuant to this agreement.

Article IV Scope of Services

The scope of services to be provided by Consultant to GKGSA under this agreement are those services which Consultant is qualified to provide to GKGSA and which GKGSA, at any time during the existence of this agreement, requests, in writing, be provided to GKGSA, (hereinafter “Scope of Services”). Each Scope of Services shall be described in a document entitled “Scope of Work” or some similar title, which document shall also incorporate by reference all of the provisions of this agreement.

Article V Indemnification, Hold Harmless and Insurance

- 5.1 Consultant will defend, indemnify and hold harmless GKGSA, its directors, officers, employees, and authorized volunteers from all claims and demands of all persons or entities that arise out of, pertain to, or relate to the Consultant’s negligence, recklessness, or willful misconduct in the performance (or actual or alleged non-performance) of the Scope of Services or any other work performed by Consultant. Consultant shall defend itself against any and all liabilities, claims, losses, damages,

and costs arising out of or alleged to arise out of Consultant's performance or non-performance of the Scope of Services or any other work performed by Consultant, and shall not tender such claims to GKGSA nor to its directors, officers, employees, or authorized volunteers, for defense or indemnity.

- 5.2 By its signing of this agreement, Consultant certifies that it is aware of the provisions of California Labor Code Section 3700, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and that Consultant will comply with such provisions before commencing the performance of the Scope of Services. Consultant will keep workers' compensation insurance for its employees in effect during all the performance of any work covered by this agreement and it will require its subcontractors to do the same.
- 5.3 Consultant will file with GKGSA, before beginning any work under this agreement, documentation satisfactory to GKGSA evidencing professional liability coverage of not less than \$1,000,000 per claim and annual aggregate, requiring 30 days notice of cancellation (10 days for non-payment of premium) to GKGSA. Coverage is to be placed with a carrier with an A.M. Best rating of no less than A-; VII, or equivalent, or as otherwise approved by GKGSA. The retroactive date (if any) is to be no later than the effective date of this agreement. Consultant shall maintain such coverage continuously for a period of at least three years after the completion of the contract work. Consultant shall purchase a one-year extended reporting period i) if the retroactive date is advanced past the effective date of this agreement; ii) if the policy is cancelled or not renewed; or iii) if the policy is replaced by another claims-made policy with a retroactive date subsequent to the effective date of this agreement. In the event that the Consultant employs other consultants (sub-consultants) as part of the work covered by this agreement, it shall be the Consultant's responsibility to require and confirm that each sub-consultant meets the minimum insurance requirements specified above.
- 5.4 Consultant will file with GKGSA, before beginning any work under this agreement, certificates of insurance satisfactory to GKGSA evidencing general liability coverage, including liability coverage for errors and omissions, of not less than \$1,000,000 per occurrence (\$2,000,000 general and products-completed operations aggregate, if used) for bodily injury, personal injury and property damage; auto liability of at least \$1,000,000 for bodily injury and property damage each accident limit; workers' compensation (statutory limits) and employer's liability (\$1,000,000) (if applicable); requiring 30 days (10 days for non-payment of premium) notice of cancellation to GKGSA. The general liability coverage is to state or be endorsed to state "such insurance shall be primary and any insurance, self-insurance or other coverage maintained by GKGSA, its directors, officers, employees, or authorized volunteers shall not contribute to it." The general liability coverage shall give GKGSA, its directors, officers, employees, and authorized volunteers insured status using ISO endorsement CG2010, CG2033, or equivalent, or as otherwise approved by GKGSA. In the event that Consultant employs other consultants (sub-consultants) as part of the work covered by this agreement, it shall be Consultant's responsibility to require and confirm that each sub-consultant meets the minimum insurance requirements specified above.

- 5.5 If any of the required coverages expire during the term of this agreement, Consultant shall deliver the renewal certificate(s) including the general liability additional insured endorsement to GKGSA at least ten (10) days prior to the expiration date.
- 5.6 If Consultant, for any reason, fails to maintain insurance coverage which is required pursuant to this agreement, the same shall be deemed a material breach of this agreement. GKGSA, at its sole option, may terminate this agreement and obtain damages from Consultant resulting from said breach. Alternatively, GKGSA may purchase such required insurance coverage, and without further notice to Consultant, GKGSA may deduct from sums due Consultant any premium cost advanced by GKGSA for such insurance.

Article VI Compensation

- 6.1 Consultant shall be compensated by GKGSA at Consultant's regular hourly rates for performing the Scope of Services and advancing the costs that Consultant expends in performing the Scope of Services.
- 6.2 Payment for those portions of the Scope of Services completed and related costs advanced by Consultant shall be made by GKGSA within thirty (30) days after receiving an invoice from Consultant for such items.

Article VII Termination By Either Party Without Cause

Either party may terminate this agreement, without cause, by giving the other party sixty (60) days written notice of such termination as provided in paragraph 13.4 of this agreement. In such a case, Consultant shall have no claims against GKGSA, except for the value of work performed to the date of termination, and the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date of termination, if such materials and equipment would be needed to complete the Scope of Services that Consultant was performing at the request of GKGSA.

Article VIII Termination of Agreement for Cause

- 8.1 GKGSA may terminate the whole or any part of this agreement if Consultant fails to make reasonable progress in completing any Scope of Services; if Consultant fails to timely complete any Scope of Services; or if Consultant commits a material breach of this agreement. Prior to terminating this agreement pursuant to this Paragraph 8.1, GKGSA must give the Consultant five (5) days written notice of its intent to terminate and an opportunity to cure the breach prompting such notice.
- 8.2 In the event GKGSA terminates this agreement as provided above in Article VII or paragraph 8.1 of this agreement, GKGSA may procure, upon such terms and such manner as it may determine, appropriate services similar to those terminated.
- 8.3 Except with respect to defaults of subcontractors, Consultant shall not be liable for any excess costs if the failure to perform this agreement arises out of causes beyond the control and without the fault or negligence of Consultant. Such causes include, but are not limited to, acts of God, floods, epidemics, quarantine restrictions, strikes and unusually severe weather.

8.4 Should this agreement be terminated as provided above in Article VII or paragraph 8.1 of this agreement, Consultant shall provide GKGSA with all finished and unfinished documents, data, studies, services, drawings, maps, models, photographs, reports, etc., prepared by Consultant pursuant to this agreement. Upon termination as provided above in Article VII or paragraph 8.1 of this agreement, Consultant shall be paid the value of the work performed, less payments of compensation previously made.

Article IX Ownership of Consultant's Work Product

Upon termination of this agreement, ownership and title to all reports and documents produced pursuant to this agreement will automatically be vested in GKGSA and no further contract or agreement will be necessary to transfer ownership to GKGSA. GKGSA agrees that it will not modify the work product generated by Consultant pursuant to this agreement or use it for any purpose other than the originally intended purpose without the written permission of the Consultant.

Article X Assignment

Neither this agreement nor any duties or obligation under this agreement may be assigned by a party hereto without the prior written consent of the other party.

Article XI Safety

Consultant and its subcontractors, if any, shall comply with the provisions of the Safety and Health Regulations for Construction, promulgated by the California Division of Industrial-Relations.

Article XII Attorney Fees

If any legal action, including an action for declaratory relief, is brought to enforce or interpret the provisions of this agreement, the prevailing party will be entitled to reasonable attorneys' fees, costs of suit and expert witness fees, which may be set by the court in the same action or in a separate action brought for that purpose, in addition to any other relief to which that party may be entitled.

Article XIII Miscellaneous Provisions

13.1 Consultant covenants that Consultant presently has no interest, and shall not have any interest, direct or indirect, which would conflict in any manner with its performance of this agreement.

13.2 Consultant will not discriminate against any employee, or applicant for employment, because of race, color, religion, sex, marital status, or national origin. Consultant will take affirmative action to insure that applicants to be employed by it are considered for employment, and the employees are treated during employment, without regard to their race, color, religion, sex, marital status, gender preference or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

13.3 Consultant and any subcontractor hired by Consultant shall pay all mechanics and laborers employed directly upon the site of any project pertinent to this agreement, unconditionally and not less often than may be required by law. Also, if required by law, the amounts paid shall be computed at wage rates not less than those determined by the Secretary of Labor to be prevailing for the corresponding classes of laborers and mechanics employed on projects of a similar character, regardless of any contractual relationship which may be alleged to exist between Consultant or subcontractor and such laborers and mechanics, and the scale of wages to be paid shall be posted by Consultant or subcontractor in a prominent and easily accessible place at the site of the work.

13.4 Any notices required to be given under this agreement by either party to the other may be effected in writing by personal delivery or by mail (registered or certified), postage prepaid with return receipt requested. Mailed notices must be addressed to the parties at their addresses as follows:

Consultant:

BREAK9:

ADDRESS
ADDRESS

GKGSA:

General Manager
GREATER KAWEAH GROUNDWATER SUSTAINABILITY AGENCY
2975 North Farmersville Blvd.
Farmersville, CA 93223

Each party may change its foregoing address by giving written notice in accordance with this paragraph. Notices delivered personally will be deemed communicated as of actual receipt. Mailed notices will be deemed communicated as of the fifth day after mailing.

13.5 Any modification of this agreement will be effective only if it is in writing and signed by the party to be charged.

13.6 If any provision of this agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this agreement will continue in full force and effect without being impaired or invalidated in any way.

13.7 This agreement will be governed by and construed in accordance with the laws of the State of California. The venue for any legal proceeding between GKGSA and Consultant regarding this agreement shall be in Tulare County.

13.8 GKGSA is subject to laws relating to public agencies which are part of this agreement as though fully set forth herein. Consultant shall comply with such federal and state laws as relate to the work provided for in this agreement or the overall project.

13.9 Time is of the essence as to the performance of each and every action required of one or more of the parties pursuant to this agreement.

Article XIV Confidentiality

- 14.1 Consultant shall maintain the confidentiality of all information acquired during the course of the work and all reports or written products produced as part of the work pursuant to this agreement. However, after giving GKGSA ten (10) days written notice of its intent to release all or a portion of its work product produced pursuant to this agreement and its reason for doing so, Consultant may be released from the foregoing confidentiality requirement for any information that is available via public record, or which must be disclosed to comply with the law.

- 14.2 Consultant shall not transmit any written product to any third party without the express written consent of GKGSA.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the date first above written.

GKGSA:

GREATER KAWEAH
GROUNDWATER SUSTAINABILITY AGENCY

Consultant:

BREAK9

By: _____
General Manager

By: _____

Title: _____

MEMORANDUM



FROM: Mark Larsen
DATE: April 24, 2023
SUBJECT: Combined RCC & SC Summary Notes
CC:

MINUTES:

Approved minutes.

KAWEAH WATER FOUNDATION:

Update on bottled water program.

STAKEHOLDER COMMITTEE POSITIONS:

Reviewed eight applicants for two open slots on committee. The committee recommends the Greater Kaweah GSA board seat Collin Fernandes and Jonathan Vaughn.

KAWEAH SUBBASIN GSPs:

Reviewed Inadequate Determination and discussed Undesirable Results and process.

WELL MITIGATION PROGRAM:

The committees were forwarded for review the “Framework for a Drinking Water Well Impact Mitigation Program,” the “Lower Tule River Irrigation District GSA, Pixley Irrigation District GSA Groundwater Sustainability Plan Impact Mitigation Plan,” and the “Eastern Tule GSA Well Mitigation Program.” The committees discussed the Subbasin’s commitment to establishing a Well Mitigation Program and review options and critical elements necessary for an effective program.

MEMORANDUM



FROM: Mark Larsen
DATE: April 20, 2023
SUBJECT: TAC Summary Notes
CC:

MINUTES:

Approved three sets of back minutes.

ANNUAL MONITORING REPORT (AMR):

Reviewed submitted report.

SUBBASIN DMS UPDATE:

Reviewed and discussed M&A's DMS proposal and voted to recommend the BOD accept the proposal with the inclusion of:

- 1) M&A allow a GSA review, input, and approval process,
- 2) the Subbasin have ownership of the developed DMS,
- 3) the Subbasin eventually house the DMS and not a consultant, and
- 4) an "out" provision, should a GSA decide to do its own separate DMS

SUBBASIN GROUNDWATER FLOW MODEL UPDATE:

The TAC reviewed and discussed M&A's Groundwater Flow Model proposal and voted to recommend the BOD accept the proposal with the inclusion of:

- 1) M&A allow GSA review, input, and approval process (including distributing latest Model every 3 weeks for review),
- 2) the Subbasin have ownership of the developed Model,
- 3) the GSAs' supporting consultants roles and responsibilities are clearly defined,
- 4) A conflict resolution process is defined, and
- 5) an "out" provision, should a GSA want to do its own separate Modeling

The TAC recommended the BOD consider the value of hiring a third-party manager to ensure the Modeling process kept on task, on schedule, and respected all three GSAs' input. Additionally, there was discussion around the concept of starting a parallel Groundwater Flow Modeling process within the Greater as a backup should the Subbasin effort stall or fall short of its goal.

KAWEAH SUBBASIN GSPs:

Reviewed Inadequate Determination and discussed Undesirable Results and process.



**MONTGOMERY
& ASSOCIATES**

Water Resource Consultants

Agenda Item 10



September 2, 2022

Eric Osterling, General Manager
Greater Kaweah GSA
2975 Farmersville Rd
Farmersville, CA 93223

Mike Hagman, General Manager
East Kaweah GSA
P.O. Box 908
Lindsay, CA 93247

Aaron Fukuda, General Manger
Mid-Kaweah GSA
6826 Avenue 240
Tulare, CA 93274

SUBJECT: PROPOSED SCOPE OF WORK AND ESTIMATED COSTS FOR DEVELOPING AND MAINTAINING A HYDROLOGIC DATA MANAGEMENT SYSTEM AND WEB PORTAL FOR THE KAWEAH SUBBASIN

Dear Kaweah Subbasin GSAs:

Montgomery & Associates (M&A) has prepared this Scope of Work (SOW) and estimated cost for developing, servicing, and maintaining an M&A-hosted, web-based hydrologic data management system (DMS) for the Kaweah Subbasin (Subbasin). This DMS allows secure logins for approved users to access a web portal that includes an internal web map interface with tools for visualization, query, and export of project data and figures. The DMS also allows for public access to a web map interface that includes data visualization tools if approved by the Groundwater Sustainability Agency managers.

Sustainable Groundwater Management Act (SGMA) Draft Regulations require that agencies develop and maintain a data management system that can store and report information relevant to the development or implementation of the Groundwater Sustainability Plan (GSP or Plan) and monitoring of the Subbasin. Furthermore, the SGMA Draft Regulations require a single, coordinated DMS be developed for the Subbasin and be described in the coordination agreement.

DATA MANAGEMENT SYSTEM DESCRIPTION

This proposal describes an online DMS to meet GSP Regulations related to the data management system, fulfill requirements to report monitoring data annually, and make data used in GSPs and annual reports transparent and accessible to the public. The proposed DMS stores data that can be visualized on both the internal and publicly accessible web maps. The DMS includes groundwater well information used to develop the basin setting, data related to GSP development and revisions, and monitoring data reported to DWR. The proposed DMS meets SGMA Draft Regulations §352.4(c)(3), §352.6, and §354.40.

The proposed DMS consists of HydroSQL and EnviroData databases. The HydroSQL database, developed by M&A, is a SQL server database for storing hydrologic data such as well information, groundwater levels, and groundwater pumping. The EnviroData database, developed by Geotech, stores water quality data and is linked to the HydroSQL database to relate water quality to specific locations and monitoring points. Data from the HydroSQL and EnviroData databases can be viewed through the Web Map interface. For reporting data to DWR, data tables from HydroSQL and EnviroData can be queried from an Access database and formatted for upload.

Development of the DMS will coincide with and support ongoing work on the Kaweah Subbasin water budget and proposed work on the Kaweah Subbasin groundwater model.

A general diagram of the DMS is shown on Figure 1.

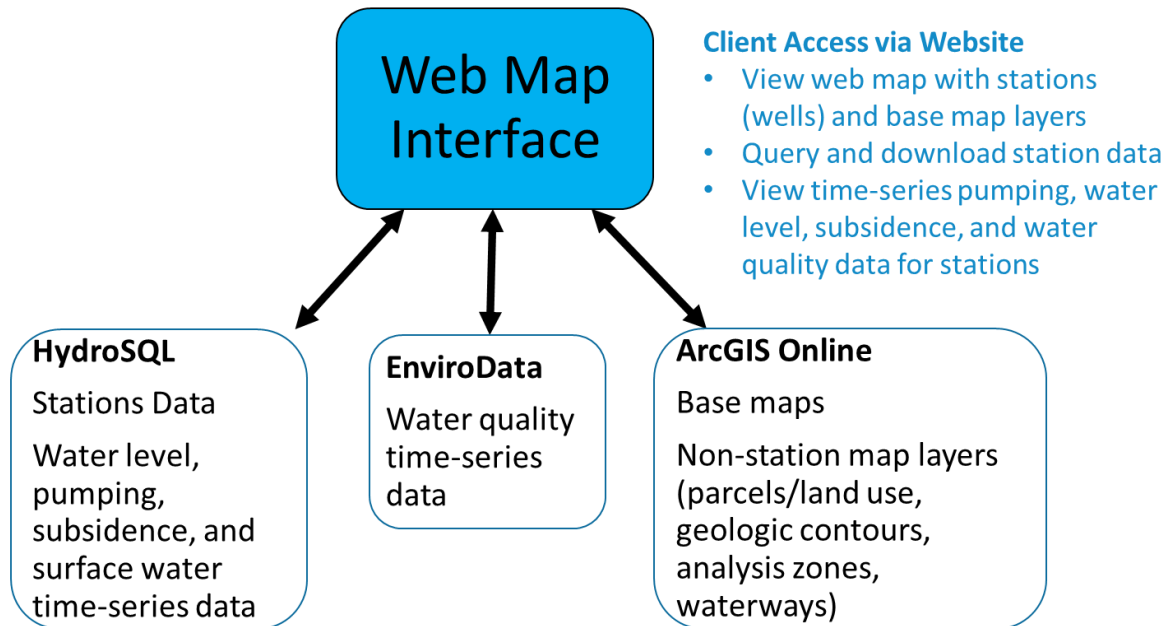


Figure 1. General Diagram of M&A's Existing Data Management System

The proposed DMS is hosted on M&A's secure web platform which offers the Subbasin GSAs a centralized location for storing groundwater data and provides online access to spatially visualize and document progress toward sustainability. The proposed web portal will:

- Provide transparency to stakeholders by making relevant data accessible to the public
- Protect the confidentiality and privacy of well owners who cooperatively share data with Kaweah Subbasin GSAs including 2 levels of access to data
- Relieve the GSAs of the need to maintain the associated hardware and software for the database
- Enable GSAs to submit relevant data stored in the DMS to the California Department of Water Resources (DWR)
- Provide graphs that display time-series data for 1 or multiple sites, allowing for comparisons
- Provide easily accessible data tables and time-series chart exports to GSA managers

The proposed data that will be stored on the DMS and be available through the web portal are shown in Table 1. Some potential additional features are also included in Table 1; costs for these potential additional items are split out with the ability to be incorporated in a later phase of work.

Table 1. Data Available Through Proposed Web Portal for Current Proposal and Potential Additions

Data Type	Category	Data
Spatial Data	Well Information	Location, construction details, well type, aquifer, sustainable management criteria (SMC), etc. for representative monitor sites (RMS), other monitoring wells, and metered pumping wells
Spatial Data	Surface Water	Gage locations, canals, reservoirs, natural waterways, laterals, wasteways, agricultural drains where available, surface water allocations, waterway materials (i.e., lined, or unlined)
Spatial Data	Recharge Basins	Location, area, recharge rates
Spatial Data	Subsidence	Subsidence monitoring locations and information
Spatial Data	Base Layers	Roads, topography, GSA boundaries, analysis zones, parcels, land use, water and irrigation district boundaries
Spatial Data	Groundwater Levels	Baseline (2017) groundwater level contours by principal aquifer
Spatial Data	Geology	Estimated lateral extent of Corcoran clay, contours of estimated depth to Corcoran clay top and bottom
Time Series	Groundwater Levels	Water level measurements at individual RMS wells from 1998 to present
Time Series	Groundwater Extraction	Time series of annual groundwater extraction by well from 1998 to present
Time Series	Groundwater Quality	Concentrations at wells, to be imported from most recent GEI database
Time Series	Surface Water	Flow rate at gage locations along waterways or at diversions, reservoir releases, recycled water releases from 1998 to present
Time Series	Subsidence	Subsidence measurements at monitoring locations from 1998 to present
PDF	Document Repository	PDFs of GSP Documents and Annual Reports
Potential Additions		
Spatial Data	Water Levels	Annual and/or semi-annual groundwater level contours by principal aquifer units and/or from all aquifers together
Spatial Data	Precipitation	Precipitation gage locations
Spatial Data	Subsidence	InSAR measurements, land surface elevations
Spatial Data	Land Cover/Use	Disadvantaged communities, DWR crop mapping
PDF	Document Repository	PDFs of well logs and schematics of RMS with accessible link from each well information table, documents, reports, or useful references
Time Series	Precipitation	Precipitation time series data
Spatial Data	Evapotranspiration	Evapotranspiration grid layer



DMS DEVELOPMENT SCOPE OF WORK

M&A has identified 2 tasks for the Subbasin DMS and Web Portal:

Task 1: Data Compilation and Development of the Kaweah Subbasin Web Portal

Task 2: Training Support and DMS Hosting/Maintenance through January 2025

TASK 1: Data Compilation and Development of The Kaweah Subbasin Web Portal

Data Compilation

Previous work conducted by M&A, including the 2022 Kaweah Subbasin GSP revisions and review of the Subbasin groundwater flow model, has aided M&A staff's familiarity with the Kaweah datasets and has resulted in an initial data compilation for the DMS/web portal. However, additional data compilation, formatting, and organization are needed to integrate these data into a more robust, comprehensive, and accessible schema prior to importing to the DMS.

Data compilation and associated subtasks include the following:

- a) Establish project folder structure for data and documents for DMS/web portal
- b) Inventory existing project geodatabase and create web portal geodatabase to display spatial data listed in Table 1
- c) Request, review, and format station data listed in Table 1, including well locations, construction information, well type, etc.
- d) Request, review, and format time-series data listed in Table 1, including data from the most recent GEI database, data collected by Provost & Pritchard, and/or other datasets
- e) Compile GSP documents and annual reports to prepare for display in web portal document repository

Spatial data proposed in this SOW are mostly static and likely will not need frequent updates. Time-series data will be compiled from 1998 to present and will be updated as new data are collected. This SOW includes updating time-series data, listed in Table 1, on a semi-annual basis after the initial data compilation.

Development of Web Portal

The proposed DMS/web portal will include 2 web maps; the internal GSA web map will be developed first followed by the public web map. M&A will host a meeting with GSA managers to discuss the design and determine which data will be included in the internal and public web maps.

The M&A DMS is maintained on secure servers located in M&A's offices and is backed up daily. The internal and public web maps will be accessed from the same web portal URL. Users of the internal web map will be provided secure login names and passwords, and a single general login and password for public users will be displayed on the login page for the public web map.

Development of the DMS/web portal will include the following:

- a) Import and symbolize spatial datasets on internal and public web maps in ArcGIS Online
- b) Import station (well) data to HydroSQL, set up data schema for web map (field aliases, which fields to include in station pop ups), and organize stations into web map layers
- c) Import formatted time-series data listed in Table 1 to HydroSQL
- d) Design symbology and order/grouping of station layers and spatial datasets in internal and public web map interfaces; the initial design will be based on an existing GSP DMS and figures from the GSP revisions
- e) Conduct meetings with GSA managers on the design of internal and public web maps while the DMS is under development
- f) Prepare back-end queries in Access database (cloned from HydroSQL database) to format data for DWR submission

TASK 2: Training Support and DMS Hosting/Maintenance Through January 2025

M&A will provide early-access logins for Kaweah GSA managers to the web portal and provide an introduction and training session while the DMS is under development. M&A will conduct a meeting shortly after authorization to proceed with these early-access web portal users to provide a demonstration of web portal capabilities and training on web portal tools and applications. This online training is estimated to be 1 hour plus time to answer questions as users become acquainted with the web portal. Early access to the web portal is provided with the understanding that the development phase will be ongoing for up to 6 months; during this time, data on the portal is still under QA/QC and subject to change. This early-access period will allow for open communication, comments, and recommendations during the DMS and web portal development process.

After the initial development period, M&A will coordinate with Kaweah GSAs to set up a broader user group of personnel to access the internal GSA web map. M&A will then provide a formal, comprehensive training to demonstrate the DMS capabilities for Kaweah GSA managers and the expanded list of approved users. This training session is estimated to be 2 hours.

M&A will also develop a user guide for members of the public, which will include a Quick Reference Guide and a recorded demonstration on how to use the web portal.

Task 2 also includes the monthly hosting fee for the M&A DMS and web portal for 1 year and 11 months, which will begin 6 months after authorization to proceed. Assuming this work will begin in September 2022, the hosting fees will begin in March 2023. The hosting and maintenance fee is \$1,500 per month and covers the secure hosting/storing of data, database, and application maintenance; software and hardware maintenance and updates; data and web server maintenance; and client technical support for troubleshooting application errors. This SOW does not include the cost of hosting and maintenance after January 2025, which would be invoiced at \$1,500 per month. Costs for major updates to the DMS requested by Kaweah GSAs after the web portal is active and development is complete are not included in this SOW.

ESTIMATED COST

Task 1

Task 1 includes requesting, receiving, and formatting data; importing and publishing data on the web portal; setting up the internal GSA web map and public web map; updating time-series data semi-annually; and setting up data queries for submittal to DWR, as well as meetings on the design and planning of the web portal. The total estimated cost for Task 1 is **\$40,000**.

The estimated cost for the potential additional items, listed in Table 1, would be about **\$25,000**.

Task 2

The Task 2 early-access user setup and initial training for Kaweah GSA managers will be scheduled upon authorization to proceed. The comprehensive training for all approved internal web map users will be scheduled after the initial DMS development is complete. Following this training, the recorded demonstration and Quick Reference Guide for public users will be developed. The estimated cost for these Task 2 items is **\$10,500**.

Task 2 also includes hosting and maintenance fees for the M&A DMS and web portal through January 2025. The hosting and maintenance fee is \$1,500 per month and is expected to

commence in March 2023 based on a start date of September 2022. Thus, the total hosting and maintenance fee from March 2023 through January 2025 is **\$34,500**.

Total estimated cost for Task 2 is **\$45,000**.

Summary of Estimated Costs

Estimated costs for data compilation, development, and hosting/maintenance of the M&A DMS and web portal are summarized in the table below:

Task	Professional Fees	Expenses	Estimated Total Cost
1	\$40,000	--	\$40,000
1*	\$25,000	--	\$25,000
2	\$10,500	\$34,500	\$45,000
Total	\$75,500	\$34,500	\$110,000

*Rough estimate of cost for potential additional future consideration items

Total estimated cost for the M&A DMS and web portal through January 2025 is **\$85,000**. Including the potential additional categories listed in Table 1, the total would be approximately **\$110,000**. M&A would work with the GSAs to develop a firm scope and cost for work on additional DMS categories before starting the additional work. Billing will be on a time and materials basis. Estimated cost will not be exceeded without prior authorization from the client.

PROPOSED SCHEDULE

The proposed schedule for this SOW is shown below. The schedule includes 6 months for the development of the DMS and web portal and a design meeting 3 to 4 months after project initiation. The early access and training for GSA managers will also occur during this initial development phase. The training for all internal web map users will occur upon completion of the initial development phase, as will the recorded demonstration and Quick Reference Guide for

	2022	2023				2024				2025										
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1										
DMS Development	■	■	■																	
Design Meeting			■	■																
GSA Early Access			■	■																
Web Portal Active			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Trainings			■	■																
Semi-Annual Data Updates					■	■			■	■		■	■		■	■				



the public web map. Semi-annual updates will occur mid-year and end of year corresponding to data collection and reporting needs.

We appreciate the opportunity to provide this proposal. If you have any questions regarding the proposed SOW, estimated costs, or project timing, please contact us.

Sincerely,
MONTGOMERY & ASSOCIATES

A handwritten signature in black ink that reads "Alyssa Kirk".

Alyssa Kirk
Groundwater Hydrologist

A handwritten signature in black ink that reads "Timothy Leo".

Timothy Leo, PG, CHg
Principal Hydrogeologist

SENT VIA EMAIL

November 30, 2022

Numerical Model Update and Recalibration Workplan

Prepared for:

Mid-Kaweah Groundwater Sustainability Agency

Prepared by:

Montgomery & Associates

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1 INTRODUCTION

Water resources in the Kaweah Subbasin are managed by 3 groundwater sustainability agencies (GSAs): East Kaweah GSA, Greater Kaweah GSA, and Mid-Kaweah GSA. Water supplies in the Subbasin comprise native surface water and groundwater, imported surface water, and recycled water. The water resources management goal is to achieve and maintain sustainable use of water supplies by 2040 in accordance with the Sustainable Groundwater Management Act (SGMA) and the 3 Subbasin groundwater sustainability plans (GSPs). Achieving sustainability will require new infrastructure projects to deliver and store new surface water supplies and management actions that address water conservation and water demand reduction. Implementing projects and management actions (PMA) will require proactive planning and adaptive management; implementation approaches may differ between the GSAs. To effectively plan and adaptively manage, the Subbasin numerical groundwater model should be updated and recalibrated. The update and recalibration work should begin in 2022 and be completed by the end of 2023 so the model is available in 2024 to develop the 2025 updated GSPs.

This work plan was prepared for the Mid-Kaweah Groundwater Sustainability Agency (MKGSA). Montgomery & Associates (M&A) intends to execute a contract with the MKGSA for the modeling work. MKGSA will execute cost-sharing agreements with the other Subbasin GSAs.

Frequent communication between the consultant team and GSA managers is recommended during the modeling program to facilitate the transfer of information and input, and to update work progress and any changes.

The scope of work and estimated cost presented in this workplan are for M&A. The modeling will require input from Provost & Pritchard (P&P). The scope of work and cost estimate for work completed by P&P will be submitted in a separate document by them.

1.1 Background

A numerical groundwater flow model was used to prepare the Subbasin GSPs. This model was a refined version of a previously developed Subbasin model. The model was developed using the MODFLOW-2005 code. The model simulates historical groundwater conditions from 1999 to 2017.

1.1.1 Stanford Model Refinements

In 2020, Stanford University and the United States Geological Survey (USGS) began refining the Subbasin groundwater model under a grant funded by the National Space and Aeronautics

Administration (NASA). The primary objective of the NASA grant was to add a subsidence package to the GSP model. The Stanford-USGS team are scheduled to deliver the refined model to the GSAs in 2022.

1.1.2 2021 Model Evaluation

In 2021, the GSAs retained M&A to evaluate the GSP model for use in future groundwater management. Results of this evaluation identified some deficiencies that needed to be addressed to improve the model. The following recommendations came from the model evaluation:

- Update water budgets to at least 2021
- Prepare a workplan to outline the modeling tasks, cost, and schedule
- Restructure model input and output to improve water budgeting and implement the water accounting framework
- Recalibrate model to improve confidence in model projections

This document represents the modeling workplan.

1.2 Model Objectives and Uses

An updated and recalibrated groundwater model is needed to achieve the following objectives:

- Improve confidence in the Subbasin water budget by improving understanding of the water budget components and deriving the operating water budget from the numerical groundwater model.
- Integrate the model-derived water budget with the water accounting framework.
- Locate and quantify benefits and tradeoffs from water management projects and actions.
- Provide a trusted decision-making platform to adaptively manage future projects and actions under conditions of hydrologic uncertainty and climate change.

1.3 Data Management System

A hydrologic data management system (DMS) is required for SGMA. An initial DMS was developed for the GSP but has not been actively used or maintained since development. The initial DMS should be modified to support groundwater modeling, future groundwater management, and required reporting efforts. A proposal to take the initial DMS and migrate and advance it using a new software platform was submitted to the GSAs for consideration on September 2, 2022. If approved by the GSAs, the DMS work will be executed under a DMS-

specific task order; therefore, DMS costs are not included in this workplan. If the new DMS is not developed now, the modeling costs would increase to include some DMS tasks that are needed for the modeling.

1.4 Ongoing Work

In January 2022, the GSAs approved funding for a joint effort between P&P and M&A to update the water budgets and prepare the modeling workplan. This work was delayed so that the consulting team could focus on revising the GSPs to incorporate the Department of Water Resources' comments. The Kaweah Subbasin GSAs are currently discussing further work to update the individual GSA Water Budgets and understand that between the work being done on the DMS and the Modeling Workplan, the water budgets will be updated.

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2 PRE-MODELING TASKS

Two pre-modeling tasks are proposed. These tasks would start immediately after receiving notice to proceed from the GSAs. Starting these tasks as soon as possible is recommended to achieve the overall modeling and GSP update schedule.

2.1 Task 1 – Review Stanford-USGS Model

The Stanford-USGS team is scheduled to deliver their updated model version to the GSAs before the end of 2022. M&A has tracked and provided input to Stanford-USGS team on model development and has reviewed preliminary model files. After delivery, Stanford and USGS will provide support to the GSAs on use of the revised model. M&A will work with the Stanford-USGS team to understand model revisions. Subsequently, M&A will conduct a detailed evaluation of the Stanford-USGS model version and present the results of this evaluation to the GSA managers.

2.1.1 Meetings and Deliverables

Task 1 includes the following meetings and deliverables:

Meetings

- One 1.5-hour meeting with the GSA managers to present the results of the Stanford-USGS model review

Deliverables

- A presentation that summarizes results of the Stanford-USGS model review

It is recommended that Task 1 begin in 2022 if possible.

2.2 Task 2 – Compile Data and Update Model Files

Task 2 would include compiling new hydrogeologic data and updating the existing time-dependent model files to incorporate new data and the updated water budget information. Task 2 would focus on updating the municipal and other measured pumping, surface water flows and distribution, evapotranspiration, recharge basins, boundary conditions, and mountain front recharge. Furthermore, water level data collected since 2017 will be processed for comparison against model-simulated water levels.

Task 2 work could be conducted concurrently with Task 1. Updating the model files early will expedite model development and calibration in 2023.

2.2.1 Meetings and Deliverables

Task 2 includes the following meetings and deliverables:

Meetings

- One 1-hour meeting with the GSA managers to review planned work, get input from the GSAs, and address data needs
- Three 1-hour meetings between the consultants to coordinate work

Deliverables

- No deliverables are planned.

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3 MODEL DEVELOPMENT AND CALIBRATION

Model development will include revising the model structure to better simulate Subbasin conjunctive water use and improve the input and output data workflow. Revising the model structure will enable the GSAs to efficiently evaluate PMA scenarios during GSP implementation, and to efficiently populate different components of the water accounting framework directly from model outputs. As part of the current work plan, 2 structural modifications will be made to the Stanford-USGS model.

3.1 Task 3 – Develop New Model Files

The Stanford-USGS team migrated the GSP model to the MODFLOW-OWHM (Boyce and others, 2020) code. MODFLOW-OWHM supports the most recent versions of the Farm Process, FMP4, which includes improved capabilities for simulating PMAs and multiple scenarios in comparison with the original version of FMP supported by MODFLOW-2005. However, the Stanford-USGS model did not implement FMP4 or the Streamflow Routing (SFR) package to simulated conjunctive use of groundwater and surface water.

As part of the proposed work, FMP4 and SFR will be incorporated in the Stanford-USGS model. Incorporating FMP4 will facilitate efficient evaluation of the hydrogeologic effects of future changes in land use, climate, surface water availability, and irrigation practices. SFR can be used to simulate surface water flow in natural and engineered channels. The SFR package for the revised model will be designed to simulate the following:

- Reservoir releases
- Surface water diversions and deliveries
- Canal losses
- Groundwater-surface water interactions in natural channels

The SFR will be designed to resolve the flow terms described above to the water accounting framework and will be linked to the FMP4. The revised model will simulate conjunctive use of groundwater and surface water consistent with measured surface water flow and farm delivery data and calculate supplemental groundwater pumping required based on the best available crop consumptive use information.

Together, adding FMP4 and SFR to the model will facilitate use of the model to evaluate PMAs and interface seamlessly with the water accounting framework. These changes will require up-front investment in model revisions that will yield significant time and cost savings during GSP implementation.

3.1.1 Incorporate Farm Process

Implementing FMP4 in the Stanford-USGS model will require:

- Development of spatially distributed climate and land use datasets
- Delineation of water balance subregions over which landscape water budgets are calculated
- Linking irrigation wells to water balance subregions in order to facilitate dynamic calculation of groundwater pumping demands

3.1.1.1 Precipitation and Reference Evapotranspiration (ET)

FMP4 requires spatially distributed arrays of precipitation and reference ET through the simulation period as inputs. Monthly precipitation arrays will be extracted from the Parameter-elevation Regressions on Independent Slopes Model (PRISM) dataset over the simulation period. Also, precipitation data developed by Land IQ will be reviewed for incorporation into the model. For available time periods, spatially distributed reference ET arrays developed by Land IQ will be used. For the time period prior to availability of Land IQ reference ET arrays, reference ET will be taken from the California Basin Characterization Model (BCM; Flint and Flint, 2014). Historical gridded reference ET was calculated as part of the BCM development, and these calculations were calibrated to reference evapotranspiration reported at California Irrigation Management Information System (CIMIS) meteorological stations in California (Flint and others, 2013). Calculations of crop consumptive use used for the existing model were based on reference ET calculated for the CIMIS weather station at Porterville (Davids Engineering, 2018). Consequently, we anticipate that reference ET as calculated for the BCM will be similar to reference ET used by Davids Engineering for calculating crop consumptive use. To ensure consistency between crop consumptive use estimates underpinning the current model revisions, reference ET from the BCM will be compared against reference ET calculated by Davids Engineering. As part of Task 5, simulated actual ET will be benchmarked against remote-sensing based estimates of actual ET for time periods when such estimates are available.

3.1.1.2 Land Uses

FMP4 simulates agricultural water demand as remaining crop consumptive use demand after subtracting effective precipitation. Crop consumptive use is calculated over the model grid as the reference ET multiplied by the crop coefficient.

A combination of County and State land use datasets will be used to define land use over the historical simulation period, including the following:

- 2003 Kings County land use data
- 1999 Tulare County land use data
- 2007 Tulare County land use data
- 2014, 2016, and 2018 statewide crop mapping data developed by Land IQ
- Tulare Irrigation District crop mapping data
- United States Department of Agriculture (USDA) Crop Mapping, if needed

Crop coefficients will initially be defined based on average monthly crop water use coefficients calculated and reported by Davids Engineering for 2014 (Davids Engineering, 2018). Simulated crop consumptive use from the revised model with the initial crop coefficients will be benchmarked against crop consumptive use values in the GSP, and against agricultural irrigation efficiencies as developed by Davids Engineering. Applied water is calculated internally by FMP4 as the crop consumptive use of applied water divided by the irrigation efficiency.

3.1.1.3 Water Balance Subregions

FMP4 calculates landscape water budgets within pre-defined water balance subregions. Water balance subregion extents will be defined in consultation with the GSAs as part of the model revision, based on the following considerations:

- Available data on agricultural surface water deliveries
- Historical and current cropping patterns
- GSA and management area boundaries

3.1.1.4 Water supply

FMP4 will be designed to simulate conjunctive use of groundwater and surface water. Agricultural surface water supply will be simulated for each stress period based on irrigation demand by water balance subregion, reservoir releases, measured surface water diversions, and estimated farm deliveries. Remaining irrigation demand unsatisfied by surface water supplies will be assumed to be satisfied by groundwater pumping. This differs from the existing model, which simulates pumping for agricultural irrigation using specified flow rates calculated externally from the model.

Incorporating FMP4 into the model to simulate agricultural water supply will simplify the workflow for evaluating alternate PMA scenarios, as the revised model will handle all calculations of agricultural groundwater demand internally.

3.1.1.5 Modifying Agricultural Well Simulation

The representation of irrigation wells in the model will be revised from the Stanford-USGS model in 2 ways. First, new wells identified as part of initial data compilation (Task 2) will be incorporated into the model. Second, irrigation pumping will be calculated internally within the model based on agricultural demand and surface water supplies.

The methodology for calculating agricultural irrigation pumping within FMP4 differs from the methodology used for the GSP model. Also, more irrigation wells will be simulated in the updated model than the GSP model. Consequently, we anticipate that initially, simulated irrigation pumping using the updated model will differ from irrigation pumping simulated in the GSP model.

Once the model structural revisions are complete and checked, simulated irrigation pumping will be benchmarked against calculated irrigation pumping specified as input to the Stanford-USGS model.

3.1.2 Incorporate Streamflow Routing

The existing model simulates recharge along natural and engineered channels as specified flux rates calculated externally from the model. These specified flux rates must be recalculated for any future scenarios that consider variations from historical conditions in reservoir releases, natural runoff, and utilization of surface water. Representation of riverbed and canal percolation will be simplified by representing major surface water features with the SFR package.

3.1.3 Meetings and Deliverables

Task 3 includes the following meetings and deliverables:

Meetings

- Three 1-hour meetings with the GSA managers and technical representatives to review planned work, get input from the GSAs, and address data needs
- Eight 1-hour meetings between the consultants to coordinate work, plus preparation time

Deliverables

- Presentations to facilitate the GSA manager meetings

3.2 Task 4 - Modify Model Input and Output Structure

The model input and output structure will be modified to improve model development and use of model output for developing water budgets and implementing the water accounting framework. Task 4 would include use of existing and new computer scripts to streamline FMP4 input data processing and to automate water budget development and populate the water accounting framework using the existing water accounting framework construct.

3.2.1 Meetings and Deliverables

Task 4 includes the following meetings and deliverables:

Meetings

- Two 1-hour meetings with the GSA managers and technical representatives to review the revised model input and output structure to ensure it will effectively facilitate implementation of the water accounting framework
- Two 1-hour meetings between the consultants to coordinate work

Deliverables

- A presentation to the GSA managers on the revised model input and output structure

3.3 Task 5 – Benchmark Model

The updated model will be benchmarked against the Stanford-USGS model. Benchmarking will compare simulated water budgets and groundwater level calibration for the 2 models. Model adjustments will be made to ensure the updated model results are consistent with the Stanford-USGS model and the Subbasin hydrogeologic conceptual model.

3.3.1 Meetings and Deliverables

Task 5 includes the following meetings and deliverables:

Meetings

- One 1-hour meeting with the GSA managers and technical representatives to present findings of the benchmarking effort
- Two 1-hour meetings between the consultants to coordinate work

Deliverables

- A presentation to the GSA managers on the findings of the benchmarking effort

3.4 Task 6 – Calibrate Model

The updated model will be calibrated primarily to an updated groundwater level dataset. This dataset will be used to develop model calibration files. Groundwater level calibration will entail manual and automated parameter adjustments. It is anticipated that minimal changes will be made to the calibrated subsidence parameters developed the Stanford-USGS team. Model calibration goals will be developed after model development and benchmarking. These goals will balance tradeoffs between acceptable model calibration to achieve model objectives and the cost and time required to achieve the acceptable calibration.

3.4.1 Meetings and Deliverables

Task 6 includes the following meetings and deliverables:

Meetings

- Three 1-hour meetings with the GSA managers and technical representatives to present progress and results of the model calibration
- Three 1-hour meetings between the consultants to coordinate work

Deliverables

- Presentations to the GSA managers on the progress and results of model calibration

3.5 Task 7 – Prepare Report

A report will be prepared after the model is calibrated. The report will summarize model development, benchmarking, and calibration. A draft report will be provided to the GSAs for review and comment. Comments from the GSAs will be incorporated into the final report. In addition to the report, M&A will provide the calibrated numerical model files to the GSAs.

3.5.1 Meetings and Deliverables

Task 7 includes the following meetings and deliverables:

Meetings

- Two 2-hour meetings with the GSA managers and technical representatives. The first meeting would review the overall project results and preview the report. The second meeting would review GSA manager comments and plan the final report.
- Three 1-hour meetings between the consultants to coordinate work

Deliverables

- Draft and final reports

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4 PROJECT WORKFLOW

Coordination and communication during the modeling work will be critical to ensure that the model achieves the GSA's goals. These goals may change during the modeling work.

4.1 Task 8 - Project Management

Project management will include the activities listed below. These activities are assumed to take place from November 2022 through December 2023 (14 months).

- **Routine Project Coordination** – this activity includes routine coordination at M&A to ensure the work stays on schedule and within budget, and that progress is being made toward the modeling goals.
- **Committee and Board Meetings** – M&A assumes that quarterly updates on the modeling work will be provided to the 3 GSA technical committees and Boards of Directors (6 meetings). These meetings would occur for 5 quarters. A total of 30 meetings are assumed. One presentation would be prepared for each quarter and used at all meetings for that quarter. M&A would participate virtually in 24 of these meetings and would attend 6 meetings in person.

5 SCHEDULE AND COST ESTIMATE

The modeling program includes the following activity periods:

- **2023 – Pre-Modeling and Model Development and Calibration:** Pre-modeling activities, model development, and model calibration will occur in 2023, with reporting finishing in quarter 1 of 2024.
- **2024 – Model GSP Predictive Simulations:** The calibrated model will be used for GSP analyses. The updated GSP will be prepared in 2024 for submittal to DWR by the end of January 2025. **The cost of this phase is not included in this workplan and will be developed during the latter stages of calibration.**

Figure 5-1 shows the projected modeling schedule. Model development and calibration are scheduled to take place in 2023. The calibrated model will be used in 2024 for the GSP update.

ACTIVITY	TASK NO.	TASK NAME	2022	2023				2024				2025
			Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Jan
Pre-Modeling	1	Review Stanford-USGS model		■								
	2	Compile Data and Update Model Files		■								
Develop & Calibrate Model	3	Develop New Model Files			■	■						
	4	Modify Model Input and Output Structure			■	■						
	5	Benchmark Model				■	■					
	6	Calibrate Model					■	■				
Report	7	Prepare Report					■	■				
Model GSP Simulations		Scope and Cost to be Determined after Calibration						■	■			
Prepare, Review & Submit GSP									■	■		
											■	◆

Figure 5-1. Modeling Schedule

Table 5-1 summarizes the Pre-Modeling and Model Development and Calibration costs. Costs for the Model GSP Predictive Simulations work will be provided to the GSAs for review and approval in quarter 4 of 2023.

Table 5-1. Estimated Modeling Cost

ACTIVITY PERIOD (Year)	TASK NUMBER	TASK NAME	ESTIMATED COSTS
Pre-Modeling (2022)	1	Review Stanford-USGS Model	\$15,600
	2	Compile Data and Update Model Files	\$71,100
Model Development and Calibration (2023)	3	Develop New Model Files	\$126,100
	4	Modify Model Input and Output Structure	\$22,900
	5	Benchmark Model	\$32,200
	6	Calibrate Model	\$89,100
Prepare Report (2023-2024)	7	Prepare Report	\$78,900
Project Management & Meetings (2022 – 2023)	8	Project Management	\$129,900
Estimated Total Cost			\$565,800

If this workplan is approved, it will become the scope of work for a contract or task order between the GSAs and M&A.

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6 REFERENCES

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7 ACRONYMS & ABBREVIATIONS

BCM.....	Basin Characterization Model
CIMIS	California Irrigation Management Information System
DMS	data management system
FMP4.....	Farm Process, version 4
GSA.....	groundwater sustainability agencies
GSPs.....	groundwater sustainability plans
M&A.....	Montgomery & Associates
NASA.....	National Space and Aeronautics Administration
P&P.....	Provost & Pritchard
PMA.....	projects and management actions
PRISM.....	Parameter-elevation Regressions on Independent Slopes Model
SFR	Streamflow Routing
SGMA.....	Sustainable Groundwater Management Act
USGS	United States Geological Survey

Opt-In Agreement

This Opt-In Agreement (hereinafter “**Agreement**”) entered into this ____ day of _____, 20____, by and among _____ (“**Owner**”) and the Greater Kaweah Groundwater Sustainability Agency (“**GKGS**A”), a groundwater sustainability agency formed and existing under the Sustainable Groundwater Management Act of 2014.

1. Background. Owner is the owner of that certain piece of real property commonly known as Tulare County APN No. _____ (“**Owner’s Parcel**”)¹. Due to circumstances beyond the immediate control of both Owner and GKGS A, a portion – but not all – of Owner’s Parcel is presently situated within the boundaries of GKGS A.

2. Agreement. Owner agrees that, in the use and custody of Owner’s Parcel, Owner, and any person acting on Owner’s behalf, (1) shall adhere to any rules or regulations governing landowner conduct within GKGS A, and (2) shall pay all assessments, fees, and charges, as though Owner’s Parcel were located wholly within the GKGS A’s boundaries.

3. Application. Requests for the Opt-In Agreement must be received by September 1. Approval of such requests shall be effective October 1, to coincide with the water year as defined in the GKGS A Rules and Regulations.

4. Termination. This Agreement may be terminated by Owner without cause by providing written notice of termination to GKGS A. Either GKGS A or Owner may terminate this Agreement for good cause. As used in this Agreement, “good cause” includes regulatory events rendering performance of the Agreement inefficient or impracticable. The effective date for termination shall be September 30.

Owner acknowledges and agrees that, through this Agreement, Owner shall be contractually bound to abide by all laws and any voter-approved assessments, whether in their current form or any subsequently amended variations.

Owner

GKGS A:

By: _____

By: _____

¹ Additional APNs may be included on an attached sheet.