

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

**Agenda  
March 5, 2019 at 1:00 p.m.**

**Wheeler Ridge-Maricopa Water Storage District Headquarters  
12109 Highway 166, Mettler, CA 93313**

- 1. Call to order**
- 2. Recognition of Guests**
- 3. Approval of Minutes of the Regular Board Meeting of September 4, 2018**
- 4. Report by Board Secretary (Angelica)**
  - a. Proposition 1 Grant Agreement
  - b. Financial Accounting
  - c. Form 700 due date
- 5. Updates on Actions Discussed or Authorized on September 4, 2018 (EKI)**
  - a. Final Basin Prioritization
  - b. Update on Foundational GSP Elements
  - c. Update on Groundwater Modeling Coordination
  - d. Proposition 68 SGWP Grant
  - e. Next Tasks: Task 3 Sustainability Planning and Task 4 GSP Preparation & Submittal
- 6. Schedule Stakeholder Workshop #1 for June 4, 2019**
- 7. Discuss and consider approval of remaining Task Order tasks**
- 8. Wheeler Ridge-Maricopa WSD Mettler Recharge Project (Sheridan)**
- 9. Correspondence**
- 10. Public Comment**

*At this time, the public may address the Board on any item not appearing on the agenda that is within the subject matter jurisdiction of the Board. Comments will be limited to three minutes.*
- 11. Consider and provide direction on future agenda items**
- 12. Adjourn**

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

# White Wolf Subbasin Groundwater Sustainability Agency

Conference Room, Iron Skillet  
5821 Dennis McCarthy Dr., Lebec, CA 93243

## MINUTES

### OF THE REGULAR BOARD OF DIRECTORS MEETING

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Date of Meeting: Tuesday, September 4, 2018

Place of Meeting: Conference Room, Iron Skillet, 5821 Dennis McCarthy Drive, Lebec, CA 93243

Meeting Commenced at 1:00 p.m.

**DIRECTORS PRESENT:** Allen Lyda, Jeff Mettler, Patty Poire, Tito Martinez.

**ALTERNATES:** Jeevan Muhar, Sheridan Nicholas.

**DIRECTORS ABSENT:** Jon Reiter, Jeff Guimarra.

**PUBLIC AND STAFF:** See attendees attached.

On motion by Director Muhar, seconded by Director Nicholas, the draft minutes of the Regular Board meeting of September June 5, 2018 were approved unanimously.

Ms. Martin explained Resolution No. 2018-02. It proposed a new location for the WW GSA meetings. The proposed location was at the Wheeler Ridge-Maricopa WSD Headquarters. After a brief discussion, Director Mettler motioned to approve Resolution 2018-02, Director Lyda seconded. Resolution 2018-02 was unanimously approved by the Board.

Ms. Martin presented three logo options for the Board to vote on. The logo with the most votes would be used to represent the WW GSA. After a brief discussion the vote took place and option #3 was unanimously selected by the Board of Directors.

Anona Dutton from EKI Consultants began her presentation by informing that a letter had been sent to the Department of Water Resources regarding reprioritization of the White Wolf basin. DWR said they would consider and they would respond before the end of the year 2018.

Mrs. Dutton provided an update on the model C2VSIM and the discrepancy that it has on the trace delineation of the White Wolf Basin boundary compared to the one approved by DWR. She informed that she had submitted a letter to the Department of Water Resources and they had acknowledge receipt of it. The letter was also sent to TODD but no response had been received from them. Director Poire recommended that EKI call TODD and make sure they acknowledge receipt of said letter. Director Nicholas commented that he had talked to Ms. Phyllis, from TODD, and she was unaware of the letter or the issue. The Board directed Mrs. Dutton to send the letter to Ms. Phyllis directly and to follow up with DWR. She also informed that DWR had accepted TCWD as the Grantee and the Proposition 1 Grant Agreement would be sent to TCWD by the end of the month. Once that is finalized we can start requesting reimbursements from the grant.

Mrs. Dutton followed up on the Technical Support Services grant application, and the need to refine locations for one to five nested monitoring wells in areas of existing gaps. There was also discussion about using two monitoring wells located on Tejon Ranch land and built by Wheeler Ridge Maricopa WSD. Sheridan agreed to check and see if those wells are still being monitored. It was also mentioned that it would be a good idea to contact the Kern River Watershed Coalition to request a list of the wells they are already using to monitor within the White Wolf Subbasin. Director Poire said she could obtain a list of the selected wells.

Mrs. Dutton continued to provide a reconciliation of cost share between GSP parties to date. Upon approval of the Board, Ms. Martin agreed to create and provide invoices to respective parties. Ms. Dutton talked about the Stakeholder Survey results. Approximately 20 surveys have been answered and received. The public water system in the basin, Tut Brothers Farm #96, has been contacted via email and phone calls but no response has been received. Efforts to reach out will continue. The next step is to plan a workshop preferably for the first half of 2019.

Mrs. Dutton talked about the C2VSim model and informed that it was expected that TODD provide a very high level water budget draft by November of 2018. The modeling effort will be conducted using the uncalibrated beta fine grid C2VSim model.

The next Item in the agenda was presented by Sheridan Nicolas who explained the Wheeler Ridge-Maricopa WSD Mettler Recharge Project. A WRMWSD landowner proposed the recharge project to the District. The proposed site is within the White Wolf Basin. The District will have second priority input and output. The water will be utilized only within WRMWSD District. It will be foreign water and 10% will stay in the basin. Maximum capacity is 36,000 acre-feet in a year. Mr. Muhar advised that Arvin Edison WSD had sent a letter to WRMWSD and all interested parties regarding their thoughts about the recharge program. Ms. Martin stated that a copy of the letter would be included in the next Board packet.

Mr. Muhar announced he would become an alternate Director for the WW GSA Board and Jeff Guimarra would now be the Director representing AEWS.

There was one public comment. Jim Beck, from Hallmark Group, is now representing Wildlands Conservancy and they are very interested in being helpful and active in all SGMA related matters.

President Martinez adjourned the meeting at 2:20 p.m.

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Angelica Martin, Secretary, White Wolf Subbasin GSA

Approved by: White Wolf Subbasin GSA Board of Directors

Dated: March 5, 2019



# White Wolf Groundwater Sustainability Agency

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

## AGENDA MEMORANDUM

**Date:** 26 February 2019

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

**From:** Angelica Martin, Secretary, White Wolf GSA

**Item:** 4.a Prop 1 Grant Agreement/ Kick-Off Meeting

## BACKGROUND

On November 9, 2017, the White Wolf GSA submitted the Application for Proposition 1 Sustainable Groundwater Planning (SGWP) Grant. After scoring an 18/19 ranking in its initial review, the Department of Water Resources (DWR) recommended full funding. On April 11, 2018 the White Wolf GSA was officially granted full funding. On August 14, 2018, the Board approved resolution 2018-04, authorizing Tejon-Castac Water District (TCWD) to act as contracting party on behalf of the WW GSA for Proposition 1 Grant Agreement. On December 18, 2018 the Agreement was fully executed.

## INFORMATIONAL

On January 15 2019, DWR and the WW Technical Committee had a Grant Agreement “kick-off” meeting to discuss the details of the reimbursement process (i.e., invoice submittal, filling out the required paperwork, etc.) There was also the discussion of the preference to use the Concurrent Drawdown between grant funds and cost share, versus the standard Funding Match Drawdown.

**Attached:** Fully Executed Proposition Grant Agreement

**DEPARTMENT OF WATER RESOURCES**

1416 NINTH STREET, P.O. BOX 942836  
SACRAMENTO, CA 94236-0001  
(916) 653-5791



December 18, 2018

Ms. Angelica Martin  
Secretary  
Tejon-Castac Water District  
Post Office Box 1000  
Tejon Ranch, California 93243

**2017 Proposition 1 Sustainable Groundwater Planning (SGWP) Grant; Agreement #4600012752**

Dear Ms. Martin:

Enclosed is an original executed copy of Agreement #4600012752.

If you have any questions, please contact Geoffrey Anderson, Project Manager at (559)230-3319 or via email at [Geoffrey.Anderson@water.ca.gov](mailto:Geoffrey.Anderson@water.ca.gov)

Sincerely,

A handwritten signature in blue ink, appearing to read "Lana Quidgeon Graber".

Lana Quidgeon Graber  
Associate Government Program Analyst  
Financial Assistance Branch  
Division of Integrated Regional Water Management

Enclosures



**GRANT AGREEMENT BETWEEN THE STATE OF CALIFORNIA  
(DEPARTMENT OF WATER RESOURCES) AND**

**TEJON-CASTAC WATER DISTRICT**

**AGREEMENT NUMBER 4600012752**

**2017 PROPOSITION 1 SUSTAINABLE GROUNDWATER PLANNING (SGWP) GRANT**

THIS GRANT AGREEMENT is entered into by and between the Department of Water Resources of the State of California, herein referred to as the "State" or "DWR" and the Tejon-Castac Water District, a public agency in the State of California, duly organized, existing, and acting pursuant to the laws thereof, herein referred to as the "Grantee," which parties do hereby agree as follows:

- 1) **PURPOSE.** The State shall provide funding from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) to assist the Grantee in financing the planning and/or selected project activities (Project) that will improve sustainable groundwater management, pursuant to Water Code Section 79700 et seq. The provision of State funds pursuant to this Agreement shall not be construed or interpreted to mean that the Groundwater Sustainability Plan (GSP), or any components of the GSP, implemented in accordance with the Work Plan as set forth in Exhibit A, will be: adopted by the applicable Groundwater Sustainability Agency (GSA); obtain the necessary desirable results of Sustainable Management Criteria; or, meet all of the evaluation and assessment criteria when submitted to the Department of Water Resources as required by the Sustainable Groundwater Management Act and implementing regulations.
- 2) **TERM OF GRANT AGREEMENT.** The term of this Grant Agreement begins on the date this Grant Agreement is executed by the State, through final payment plus three (3) years unless otherwise terminated or amended as provided in this Grant Agreement. However, all work shall be completed in accordance with the Schedule as set forth in Exhibit C.
- 3) **GRANT AMOUNT.** The maximum amount payable by the State under this Grant Agreement shall not exceed \$557,998.
- 4) **GRANTEE COST SHARE.** The Grantee is required to provide a Local Cost Share (non-State funds) of not less than 50 percent of the Total Project Cost. The cost share requirement for projects benefiting a Severely Disadvantaged Community (SDAC), Disadvantaged Community (DAC), or an Economically Distressed Areas (EDA) may be waived or reduced. The Grantee agrees to provide a Local Cost Share (non-State funds) for the amount as documented in Exhibit B (Budget). Local Cost Share may include Eligible Project Costs directly related to Exhibit A incurred after January 1, 2015.
- 5) **BASIC CONDITIONS.** The State shall have no obligation to disburse money for a project under this Grant Agreement until the Grantee has satisfied the following conditions (if applicable):
  1. Prior to execution of this Grant Agreement, selected applicants (Groundwater Sustainability Agency) for GSP Development projects must submit evidence of a notification to the public and DWR prior to initiating development of a GSP in compliance with California Code of Regulations, title 23, Section 350 et seq. (GSP Regulations) and Water Code Section 10727.8.
  2. The Grantee must demonstrate compliance with all relevant eligibility criteria as set forth on pages 7 and 8 of the 2015 Grant Program Guidelines for the SGWP Grant Program.
  3. For the term of this Grant Agreement, the Grantee submits timely reports and all other deliverables as required by Paragraph 16, "Submission of Reports" and Exhibit A.
- 6) **DISBURSEMENT OF FUNDS.** The State will disburse to the Grantee the amount approved, subject to the availability of funds through normal State processes. Notwithstanding any other provision of this Grant Agreement, no disbursement shall be required at any time or in any manner which is in violation of, or in conflict with, federal or state laws, rules, or regulations, or which may require any rebates to the federal government, or any loss of tax-free status on state bonds, pursuant to any federal statute or regulation. Any and all money disbursed to the Grantee under this Grant Agreement shall be deposited in a non-interest bearing account and shall be used solely to pay Eligible Project Costs.

- 7) **ELIGIBLE PROJECT COST.** The Grantee shall apply State funds received only to eligible Project Costs in accordance with applicable provisions of the law and Exhibit B. Eligible Project Costs include the reasonable costs of studies, engineering, design, land and easement acquisition, legal fees, preparation of environmental documentation, environmental mitigations, monitoring, project construction, and/or any other scope of work efforts as described in Exhibit A. Reimbursable administrative expenses are the necessary costs incidental but directly related to the Project included in this Agreement. Work performed on the Project after July 1, 2017, but before April 30, 2022, shall be eligible for reimbursement.

Costs that are not eligible for reimbursement with State funds cannot be counted as Cost Share. Costs that are not eligible for reimbursement include, but are not limited to, the following items:

1. Costs, other than those noted above, incurred prior to the award date of this Grant.
  2. Costs for preparing and filing a grant application belonging to another solicitation.
  3. Operation and maintenance costs, including post construction performance and monitoring costs.
  4. Purchase of equipment that is not an integral part of a project.
  5. Establishing a reserve fund.
  6. Purchase of water supply.
  7. Monitoring and assessment costs for efforts required after project construction is complete.
  8. Replacement of existing funding sources for ongoing programs.
  9. Travel and per diem costs.
  10. Support of existing agency requirements and mandates (e.g., punitive regulatory agency requirement).
  11. Purchase of land in excess of the minimum required acreage necessary to operate as an integral part of a project, as set forth and detailed by engineering and feasibility studies, or land purchased prior to the execution date of this Grant Agreement.
  12. Overhead and indirect costs: "Indirect Costs" means those costs that are incurred for a common or joint purpose benefiting more than one cost objective and are not readily assignable to the funded project (i.e., costs that are not directly related to the funded project). Examples of Indirect Costs include, but are not limited to: central service costs; general administration of the Grantee; non-project-specific accounting and personnel services performed within the Grantee's organization; depreciation or use allowances on buildings and equipment; the costs of operating and maintaining non-project-specific facilities; tuition and conference fees; and, generic overhead or markup. This prohibition applies to the Grantee and any subcontract or sub-agreement for work on the Project that will be reimbursed pursuant to this Agreement.
- 8) **METHOD OF PAYMENT FOR REIMBURSEMENT.** After the disbursement requirements in Paragraph 5 "Basic Conditions" are met, the State will disburse the whole or portions of State funding to the Grantee, following receipt from the Grantee via U.S. mail or Express mail delivery of a "wet signature" invoice for costs incurred, including Cost Share, and timely Progress Reports as required by Paragraph 16, "Submission of Reports." Payment will be made no more frequently than monthly, in arrears, upon receipt of an invoice bearing the Grant Agreement number. The State will notify the Grantee, in a timely manner, whenever, upon review of an Invoice, the State determines that any portion or portions of the costs claimed are not eligible costs or is not supported by documentation or receipts acceptable to the State. The Grantee may, within thirty (30) calendar days of the date of receipt of such notice, submit additional documentation to the State to cure such deficiency(ies). If the Grantee fails to submit adequate documentation curing the deficiency(ies), the State will adjust the pending invoice by the amount of ineligible or unapproved costs.

Invoices submitted by the Grantee shall include the following information:

1. Costs incurred for work performed in implementing the project during the period identified in the particular invoice.

2. Costs incurred for any interests in real property (land or easements) that have been necessarily acquired for a project during the period identified in the particular invoice for the implementation of a project.
3. Invoices shall be submitted on forms provided by the State and shall meet the following format requirements:
  - a. Invoices must contain the date of the invoice, the time period covered by the invoice, and the total amount due.
  - b. Invoices must be itemized based on the categories (i.e., tasks) specified in the Exhibit B. The amount claimed for salaries/wages/consultant fees must include a calculation formula (i.e., hours or days worked times the hourly or daily rate = the total amount claimed).
  - c. One set of sufficient evidence (i.e., receipts, copies of checks, time sheets) must be provided for all costs included in the invoice.
  - d. Each invoice shall clearly delineate those costs claimed for reimbursement from the State's funding amount, as depicted in Paragraph 3, "Grant Amount" and those costs that represent the Grantee's costs, as applicable, in Paragraph 4, "Grantee Cost Share."
  - e. Original signature and date (in ink) of the Grantee's Project Representative. Submit the original "wet signature" copy of the invoice form to the address listed in Paragraph 22, "Project Representative."

All invoices submitted shall be accurate and signed under penalty of perjury. Any and all costs submitted pursuant to this Agreement shall only be for the tasks set forth herein. The Grantee shall not submit any invoice containing costs that are ineligible or have been reimbursed from other funding sources unless required and specifically noted as such (i.e., match costs). Any eligible costs for which the Grantee is seeking reimbursement shall not be reimbursed from any other source. Double or multiple billing for time, services, or any other eligible cost is illegal and constitutes fraud. Any suspected occurrences of fraud, forgery, embezzlement, theft, or any other misuse of public funds may result in suspension of disbursements of grant funds and/or termination of this Agreement requiring the repayment of all funds disbursed hereunder plus interest. Additionally, the State may request an audit pursuant to Exhibit D and refer the matter to the Attorney General's Office or the appropriate district attorney's office for criminal prosecution or the imposition of civil liability. (Civ. Code, §§ 1572-1573; Pen. Code, §§ 470, 489-490.)

- 9) **ADVANCED PAYMENT.** Water Code Section 10551 authorizes advance payment by the State for projects included and implemented in an applicable integrated regional water management plan, and when the project proponent is a nonprofit organization; a DAC; or the project benefits a DAC. If the project is awarded less than \$1,000,000 in grant funds, the project proponent may receive an advanced payment of up to 50% of the grant award; the remaining 50% of the grant award will be reimbursed in arrears. Within ninety (90) calendar days of execution of the Grant Agreement, the Grantee may provide the State an Advanced Payment Request. Advanced Payment Requests received ninety-one (91) calendar days after execution of this Agreement, or later, will not be eligible to receive advance payment. The Advanced Payment Request must contain the following:
  1. Documentation demonstrating that each Local Project Sponsor (if different from the Grantee, as listed in Exhibit I) was notified about their eligibility to receive an advanced payment and a response from the Local Project Sponsor stating whether it wishes to receive the advanced payment or not.
  2. If the Local Project Sponsor is requesting the advanced payment, the request must include:
    - a. A funding plan which shows how the advanced funds will be expended within 18 months of this Grant Agreement's execution (i.e., for what, how much, and when).
    - b. A discussion of the Local Project Sponsor's financial capacity to complete the project once the advance funds have been expended, and include an "Audited Financial Statement Summary Form" specific to the DAC.

3. If a Local Project Sponsor is requesting advanced payment, the Grantee shall also submit a single Advance Payment Form Invoice, containing the request for each qualified project, to the State Project Manager with "wet signature" and date of the Grantee's Project Representative, as indicated in Paragraph 22, "Project Representative." The Grantee shall be responsible for the timely distribution of the advanced funds to the respective Local Project Sponsor(s). Within sixty (60) calendar days of receiving the Advanced Payment Form Invoice and subject to the availability of funds, the State will authorize payment of the advanced funds sought of up to 50% of the grant award for the qualified project(s). The Advanced Payment Form Invoice shall be submitted on forms provided by the State and shall meet the following format requirements:
    - a. Invoice must contain the date of the invoice, the time period covered by the invoice, and the total amount due.
    - b. Invoice must be itemized based on the categories (i.e., tasks) specified in Exhibit B.
    - c. The State Project Manager will notify the Grantee, in a timely manner, when, upon review of an Advance Payment Form Invoice, the State determines that any portion or portions of the costs claimed are not eligible costs. The Grantee may, within thirty (30) calendar days of the date of receipt of such notice, submit additional documentation to cure such deficiency(ies). After the distribution requirements in Paragraph 5, "Basic Conditions" are met, the State will disburse the whole or portions of State funding to the Grantee, following receipt from the Grantee via US mail or Express mail delivery of a "wet signature" invoice for costs incurred, including Cost Share, and timely Progress Reports as required by Paragraph 16, "Submission of Reports."
  4. On a quarterly basis, the Grantee will submit an Accountability Report to the State that demonstrates how actual expenditures compare with the scheduled budget. The Accountability Report shall include the following information:
    - a. An itemization of how advanced funds have been expended to-date (Expenditure Summary), including documentation that supports the expenditures (e.g., contractor invoices, receipts, personnel hours, etc.). Invoices must be itemized based on the budget categories (i.e., tasks) specified in Exhibit B.
    - b. A funding plan which shows how the remaining advanced funds will be expended.
    - c. Documentation that the funds were placed in a non-interest bearing account, including the dates of deposits and withdrawals from that account.
    - d. The State Project Manager will notify the Grantee, in a timely manner, when, upon review of the Expenditure Summary, the State determines that any portion of the expenditures claimed are not eligible costs. The Grantee may, within thirty (30) calendar days of the date of receipt of such notice, submit additional documentation to cure such deficiency(ies). If costs are not consistent with the tasks in Exhibit B, the State will reject the claim and remove them from the Expenditure Summary.
  5. Once the Grantee has expended all advanced funds, then the method of payment will revert to the reimbursement process specified in Paragraph 8, "Method of Payment for Reimbursement.", and any remaining requirements of Paragraph 5, "Basic Conditions."
- 10) **REPAYMENT OF ADVANCES.** The State may demand repayment from the Grantee of all or any portion of the advanced State funding along with interest at the California general obligation bond interest rate at the time the State notifies the Grantee, as directed by the State, and take any other action that it deems necessary to protect its interests for the following conditions:
1. A project is not being implemented in accordance with the provisions of the Grant Agreement.
  2. The Grantee has failed in any other respect to comply with the provisions of this Grant Agreement, and if the Grantee does not remedy any such failure to the State's satisfaction.

3. Repayment amounts may also include:

- a. Advance funds which have not been expended within 18 months of the Grant Agreement's execution.
- b. Actual costs incurred are not consistent with the activities presented in Exhibit A, not supported, or are ineligible.
- c. At the completion of the project, the funds have not been expended.

For conditions 10) 3.a. and 10) 3.b., repayment may consist of deducting the amount from future reimbursement invoices. The State may consider the Grantee's refusal to repay the requested advanced amount a substantial breach of this Grant Agreement subject to the default provisions in Paragraph 12, "Default Provisions." If the State notifies the Grantee of its decision to demand repayment or withhold the entire funding amount from the Grantee pursuant to this paragraph, this Grant Agreement shall terminate upon receipt of such notice by the Grantee and the State shall no longer be required to provide funds under this Grant Agreement and the Grant Agreement shall no longer be binding on either party.

11) WITHHOLDING OF DISBURSEMENTS BY THE STATE. If the State determines that a project is not being implemented in accordance with the provisions of this Grant Agreement, or that the Grantee has failed in any other respect to comply with the provisions of this Grant Agreement, and if the Grantee does not remedy any such failure to the State's satisfaction, the State may withhold from the Grantee all or any portion of the State funding and take any other action that it deems necessary to protect its interests. Where a portion of the State funding has been disbursed to the Grantee and the State notifies the Grantee of its decision not to release funds that have been withheld pursuant to Paragraph 13, "Continuing Eligibility," the portion that has been disbursed shall thereafter be repaid immediately with interest at the California general obligation bond interest rate at the time the State notifies the Grantee, as directed by the State. The State may consider the Grantee's refusal to repay the requested disbursed amount a contract breach subject to the default provisions in Paragraph 12, "Default Provisions." If the State notifies the Grantee of its decision to withhold the entire funding amount from the Grantee pursuant to this paragraph, this Grant Agreement shall terminate upon receipt of such notice by the Grantee and the State shall no longer be required to provide funds under this Grant Agreement and the Grant Agreement shall no longer be binding on either party.

12) DEFAULT PROVISIONS. The Grantee will be in default under this Grant Agreement if any of the following occur:

1. Substantial breaches of this Grant Agreement, or any supplement or amendment to it, or any other agreement between the Grantee and the State evidencing or securing the Grantee's obligations;
2. Making any false warranty, representation, or statement with respect to this Grant Agreement or the application filed to obtain this Grant Agreement;
3. Failure to operate or maintain project in accordance with this Grant Agreement.
4. Failure to make any remittance required by this Grant Agreement.
5. Failure to comply with Labor Compliance Plan requirements.
6. Failure to submit timely progress reports.
7. Failure to routinely invoice the State.
8. Failure to meet any of the requirements set forth in Paragraph 13, "Continuing Eligibility."

Should an event of default occur, the State shall provide a notice of default to the Grantee and shall give the Grantee at least ten (10) calendar days to cure the default from the date the notice is sent via first-class mail to the Grantee. If the Grantee fails to cure the default within the time prescribed by the State, the State may do any of the following:

9. Declare the funding be immediately repaid, with interest, which shall be equal to the State of California general obligation bond interest rate in effect at the time of the default.
10. Terminate any obligation to make future payments to the Grantee.
11. Terminate the Grant Agreement.
12. Take any other action that it deems necessary to protect its interests.

In the event the State finds it necessary to enforce this provision of this Grant Agreement in the manner provided by law, the Grantee agrees to pay all costs incurred by the State including, but not limited to, reasonable attorneys' fees, legal expenses, and costs.

13) **CONTINUING ELIGIBILITY.** The Grantee must meet the following ongoing requirement(s) to remain eligible to receive State funds:

1. An urban water supplier that receives grant funds pursuant to this Grant Agreement must maintain compliance with the Urban Water Management Planning Act (UWMP; Wat. Code, § 10610 et seq.) and Sustainable Water Use and Demand Reduction (Wat. Code, § 10608 et seq.) by doing the following:
  - a. Have submitted their 2015 UWMP and had it deemed consistent by DWR. If the 2015 UWMP has not been submitted to DWR funding disbursements to the urban water supplier will cease until the 2015 UWMP is submitted. If the 2015 UWMP is deemed inconsistent by DWR, the urban water supplier will be ineligible to receive funding disbursements until the inconsistencies are addressed and DWR deems the UWMP consistent. For more information, visit the following website: <https://www.water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans>.
  - b. All urban water suppliers must submit documentation that demonstrates they are meeting the 2015 interim gallons per capita per day (GPCD) target. If not meeting the interim target, the Grantee must submit a schedule, financing plan, and budget for achieving the GPCD target, as required pursuant to Water Code Section 10608.24. Urban water suppliers that did not meet their 2015 interim GPCD target must also submit annual reports that include a schedule, financing plan, and budget for achieving the GPCD target by June 30 of each year.
2. An agricultural water supplier receiving grant funding must:
  - a. Comply with Sustainable Water Use and Demand Reduction requirements outlined in Water Code Section 10608, et seq. Submit to the State a schedule, financing plan, and budget for implementation of the efficient water management practices, required pursuant to Water Code Section 10608.48.
  - b. Have their Agricultural Water Management Plan (AWMP) deemed consistent by DWR. To maintain eligibility and continue funding disbursements, an agricultural water supply must have their 2015 AWMP identified on the State's website. For more information, visit the following website: <https://www.water.ca.gov/Work-With-Us/Grants-And-Loans/Agriculture-Water-Use-Efficiency>.
3. The Grantee diverting surface water must maintain compliance with diversion reporting requirements as outlined in Part 5.1 of Division 2 of the Water Code.
4. If applicable, the Grantee must demonstrate compliance with the Groundwater Management Act set forth on pages 7 and 8 of the 2015 SGWP Grant Program Guidelines, dated October 2015.
5. Grantees that have been designated as monitoring entities under the California Statewide Groundwater Elevation Monitoring (CASGEM) Program must maintain reporting compliance, as required by Water Code Section 10932 and the CASGEM Program.

14) **PERMITS, LICENSES, APPROVALS, AND LEGAL OBLIGATIONS.** The Grantee shall be responsible for obtaining any and all permits, licenses, and approvals required for performing any work under this Grant Agreement, including those necessary to perform design, construction, or operation and maintenance of

the Project(s). The Grantee shall be responsible for observing and complying with any applicable federal, state, and local laws, rules or regulations affecting any such work, specifically those including, but not limited to, environmental, procurement, and safety laws, rules, regulations, and ordinances. The Grantee shall provide copies of permits and approvals to the State.

- 15) **RELATIONSHIP OF PARTIES.** If applicable, the Grantee is solely responsible for design, construction, and operation and maintenance of projects within the work plan. Review or approval of plans, specifications, bid documents, or other construction documents by the State is solely for the purpose of proper administration of funds by the State and shall not be deemed to relieve or restrict responsibilities of the Grantee under this Grant Agreement.
- 16) **SUBMISSION OF REPORTS.** The submittal and approval of all reports is a requirement for the successful completion of this Grant Agreement. Reports shall meet generally accepted professional standards for technical reporting and shall be proofread for content, numerical accuracy, spelling, and grammar prior to submittal to the State. All reports shall be submitted to the State's Project Manager, and shall be submitted via Department of Water Resources (DWR) "Grant Review and Tracking System" (GRanTS). If requested, the Grantee shall promptly provide any additional information deemed necessary by the State for the approval of reports. Reports shall be presented in the formats described in the applicable portion of Exhibit F. The timely submittal of reports is a requirement for initial and continued disbursement of State funds. Submittal and subsequent approval by the State of a Project Completion Report is a requirement for the release of any funds retained for such project.
1. **Progress Reports:** The Grantee shall submit Progress Reports to meet the State's requirement for disbursement of funds. Progress Reports shall be uploaded via GRanTS, and the State's Project Manager notified of upload. Progress Reports shall, in part, provide a brief description of the work performed, Grantees activities, milestones achieved, any accomplishments and any problems encountered in the performance of the work under this Grant Agreement during the reporting period. The first Progress Report should be submitted to the State no later than four (4) months after the execution of the agreement, with future reports then due on successive three-month increments based on the invoicing schedule and this date.
  2. **Groundwater Sustainability Plan:** The Grantee shall submit a Final Groundwater Sustainability Plan (GSP) to DWR by the date as specified per the Sustainable Groundwater Management Act (SGMA). The GSP shall be formatted, drafted, prepared, and completed as required by the GSP Regulations, and in accordance with any other regulations or requirements that are stipulated through SGMA.
  3. **Coordination Agreement:** The Grantee shall provide the State a copy of the executed Coordination Agreement, and all supporting documentation. This condition is only required in basins where GSAs develop multiple GSPs pursuant to Water Code Section 10727(b)(3). Refer to the GSP Regulations for necessary details and requirements to prepare and submit a Coordination Agreement.
  4. **Accountability Report:** The Grantee shall prepare and submit to the State an Accountability Report on a quarterly basis if the Grantee received an Advanced Payment, consistent with the provisions in Paragraph 9, "Advanced Payment."
  5. **Completion Report:** The Grantee shall prepare and submit to the State a separate Completion Report for each project or component included in Exhibit A. The Grantee shall submit a Completion Report within ninety (90) calendar days of project/component completion. Each Completion Report shall include, in part, a description of actual work done, any changes or amendments to each project, and a final schedule showing actual progress versus planned progress, copies of any final documents or reports generated or utilized during a project. The Completion Report shall also include, if applicable for Implementation Project(s), certification of final project by a registered civil engineer, consistent with Exhibit D. A "Certification of Project Completion" form will be provided by the State.
  6. **Grant Completion Report:** Upon completion of the Project included in Exhibit A, the Grantee shall submit to the State a Grant Completion Report. The Grant Completion Report shall be submitted within

ninety (90) calendar days of submitting the Completion Report for the final component or project to be completed under this Grant Agreement. The Grant Completion Report shall include reimbursement status, a brief description of each component completed, and how those components will further the goals of the GSP and sustainable groundwater. Retention for the last component, or project, to be completed as part of this Grant Agreement will not be disbursed until the Grant Completion Report is submitted to be approved by the State.

- 17) OPERATION AND MAINTENANCE OF PROJECT. For the useful life of construction and implementation projects (pertinent to Implementation Projects) and in consideration of the funding made by the State, the Grantee agrees to ensure or cause to be performed the commencement and continued operation of the project, and shall ensure or cause the project to be operated in an efficient and economical manner; shall ensure all repairs, renewals, and replacements necessary to the efficient operation of the same are provided; and shall ensure or cause the same to be maintained in as good and efficient condition as upon its construction, ordinary and reasonable wear and depreciation excepted. The State shall not be liable for any cost of such maintenance, management, or operation. The Grantee or their successors may, with the written approval of the State, transfer this responsibility to use, manage, and maintain the property. For purposes of this Grant Agreement, "useful life" means period during which an asset, property, or activity is expected to be usable for the purpose it was acquired or implemented; "operation costs" include direct costs incurred for material and labor needed for operations, utilities, insurance, and similar expenses, and "maintenance costs" include ordinary repairs and replacements of a recurring nature necessary for capital assets and basic structures and the expenditure of funds necessary to replace or reconstruct capital assets or basic structures. Refusal by the Grantee to ensure operation and maintenance of the projects in accordance with this provision may, at the option of the State, be considered a breach of this Grant Agreement and may be treated as default under Paragraph 12, "Default Provisions."
- 18) STATEWIDE MONITORING REQUIREMENTS. The Grantee shall ensure that all groundwater projects and projects that include groundwater monitoring requirements are consistent with the Groundwater Quality Monitoring Act of 2001 (Wat. Code, § 10780 et seq.) and, where applicable, projects that affect water quality shall include a monitoring component that allows the integration of data into statewide monitoring efforts, including where applicable, the Surface Water Ambient Monitoring Program carried out by the State Water Resources Control Board. See Exhibit G for web links and information regarding other State monitoring and data reporting requirements.
- 19) NOTIFICATION OF STATE. The Grantee shall promptly notify the State, in writing, of the following items:
1. Events or proposed changes that could affect the scope, budget, or work performed under this Grant Agreement. The Grantee agrees that no substantial change in the scope of a project will be undertaken until written notice of the proposed change has been provided to the State and the State has given written approval for such change. Substantial changes generally include changes to the scope of work, schedule or term, and budget.
  2. Any public or media event publicizing the accomplishments and/or results of this Grant Agreement and provide the opportunity for attendance and participation by the State's representatives. The Grantee shall make such notification at least fourteen (14) calendar days prior to the event.
  3. Applicable to Implementation Projects only, Final inspection of the completed work on a project by a Registered Professional (Civil Engineer, Engineering Geologist, or other State approved certified/license Professional), in accordance with Exhibit D. The Grantee shall notify the State's Project Manager of the inspection date at least 14 calendar days prior to the inspection in order to provide the State the opportunity to participate in the inspection.
- 20) NOTICES. Any notice, demand, request, consent, or approval that either party desires or is required to give to the other party under this Grant Agreement shall be in writing. Notices may be transmitted by any of the following means:
1. By delivery in person.

2. By certified U.S. mail, return receipt requested, postage prepaid.
3. By "overnight" delivery service; provided that next-business-day delivery is requested by the sender.
4. By electronic means.
5. Notices delivered in person will be deemed effective immediately on receipt (or refusal of delivery or receipt). Notices sent by certified mail will be deemed effective given ten (10) calendar days after the date deposited with the U.S. Postal Service. Notices sent by overnight delivery service will be deemed effective one business day after the date deposited with the delivery service. Notices sent electronically will be effective on the date of transmission, which is documented in writing. Notices shall be sent to the addresses listed below. Either party may, by written notice to the other, designate a different address that shall be substituted for the one below.

21) PERFORMANCE EVALUATION. Upon completion of this Grant Agreement, the Grantee's performance will be evaluated by the State and a copy of the evaluation will be placed in the State file and a copy sent to the Grantee.

22) PROJECT REPRESENTATIVES. The Project Representatives during the term of this Grant Agreement are as follows:

Department of Water Resources

Arthur Hinojosa  
Chief, Division of Integrated Regional Water  
Management  
P.O. Box 942836  
Sacramento, CA 94236-0001  
Phone: (916) 653-4736  
Email: [Arthur.Hinojosa@water.ca.gov](mailto:Arthur.Hinojosa@water.ca.gov)

Tejon-Castac Water District

Angelica Martin  
Secretary  
P.O. Box 1000  
Tejon Ranch, CA 93243  
Phone: (661) 663-4262  
Email: [amartin@tejonranch.com](mailto:amartin@tejonranch.com)

Direct all inquiries to the Project Manager:

Department of Water Resources

Geoffrey Anderson  
Division of IRWM  
3374 East Shields Avenue  
Fresno, CA 93726  
Phone: (559) 230-3319  
Email: [Geoffrey.Anderson@water.ca.gov](mailto:Geoffrey.Anderson@water.ca.gov)

Tejon-Castac Water District

Angelica Martin  
Secretary  
P.O. Box 1000  
Tejon Ranch, CA 93243  
Phone: (661) 663-4262  
Email: [amartin@tejonranch.com](mailto:amartin@tejonranch.com)

Either party may change its Project Representative or Project Manager upon written notice to the other party.

23) STANDARD PROVISIONS. The following Exhibits are attached and made a part of this Grant Agreement by this reference:

Exhibit A – Work Plan

Exhibit B – Budget

Exhibit C – Schedule

Exhibit D – Standard Conditions

Exhibit E – Authorizing Resolution Accepting Funds

Exhibit F – Report Formats and Requirements

Exhibit G – Requirements for Data Submittal

Exhibit H – State Audit Document Requirements and Cost Share Guidelines for Grantees

Exhibit I – Local Project Sponsors (Not Used)

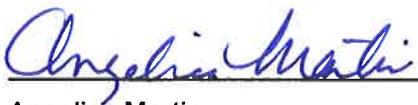
Exhibit J – Project Location

IN WITNESS WHEREOF, the parties hereto have executed this Grant Agreement.

STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES

Tejon-Castac Water District

  
\_\_\_\_\_  
Arthur Hinojosa  
Chief, Division of Integrated Regional Water  
Management

  
\_\_\_\_\_  
Angelica Martin  
Secretary

Date 12/17/18

Date 11/2/2018

Approved as to Legal Form and Sufficiency

  
\_\_\_\_\_  
Robin Brewer, Assistant Chief Counsel  
Office of Chief Counsel

Date 12-4-18



## **EXHIBIT A WORK PLAN**

**Project Title:** White Wolf Subbasin Groundwater Sustainability Plan Development

**Project Description:** The Grantee will conduct activities associated with planning, development, and preparation of a GSP for the White Wolf Groundwater Subbasin (Subbasin). The resulting GSP will incorporate appropriate Best Management Practices (BMPs) as developed by DWR, and will result in a more complete understanding of the Subbasin to support long-term sustainable groundwater management. The Grantee is a member agency of the White Wolf Groundwater Sustainability Agency (White Wolf GSA), whose service area covers the entire Subbasin. The Grantee will conduct grant administration and manage contracts with technical consultant(s) for GSP development. The White Wolf GSA will conduct stakeholder engagement and GSP development efforts.

**Category (a): Grant Administration**

Manage the Grant Agreement including execution and amendment(s) (if necessary), Environmental Information Form (EIF) preparation, communication with DWR on a timely basis, and maintenance of project files related to implementation of the Grant Agreement. General Project and contract administration management including, subconsultant management, meetings with GSA(s), and correspondence and communications. Prepare and submit invoices to DWR, track progress, budget, and schedule. Compile required invoice backup information.

Prepare reports detailing work completed during reporting period as outlined in Exhibit F. Progress Reports will include sufficient information for DWR Program Manager to understand and review backup documentation submitted with invoices. Quarterly invoices will accompany the Progress Reports and should be submitted to the DWR Project Manager for review to receive reimbursement on Eligible Project Costs per the Grant Agreement. Backup documentation will be collected and organized by category, along with a summary Excel compatible document detailing contents of the backup documentation.

Prepare draft Grant Completion Report and submit to DWR for Project Manager's comments and review no later than 90-days after work completion. Additionally, a Final Report addressing the DWR Project Manager's comments will be prepared. The reports will be prepared and presented in accordance with the provisions of Exhibit F of this Agreement.

**Deliverables:**

- Executed Grant Agreement and amendment(s) (if necessary)
- EIF Form
- Invoices and associated backup documentation
- Quarterly Progress Reports
- Draft and Final Grant Completion Report

**Category (b): Stakeholder Engagement**

Develop Stakeholder Communication and Engagement Plan (SCEP). Conduct and document stakeholder communication and engagement consistent with the SCEP. The SCEP will guide stakeholder engagement throughout the GSP development and implementation process. Invite beneficial users of groundwater to participate in at least two (2) stakeholder workshops focused on:

1. Identifying the interests, priorities, issues stakeholders would like to see addressed in the GSP, best tools for communication, and presenting and receiving feedback on preliminary Basin Setting; and
2. Presenting and receiving input on the sustainable management criteria and identifying potential projects and management actions.

White Wolf GSA will hold regular Board meetings to provide a forum for interested members of the public to track GSP development and provide ongoing input. Distribute a draft GSP to Subbasin stakeholders and hold a public hearing to receive feedback on the draft GSP. The public hearing is planned to be held no sooner than 90 days after providing notice to a city or county within the area of the proposed GSP.

**Deliverables:**

- A Stakeholder Communication and Engagement Plan
- Outreach materials
- Public workshop agendas
- White Wolf GSA Website link

**Category (c): GSP Development**

Prepare a GSP for the Subbasin. The Work Plan has been designed to:

- Consider GSP regulations and requirements;
- Incorporate appropriate BMPs, where applicable; and
- Develop a more complete understanding of the Subbasin including interactions with surface water and the adjacent Kern County Subbasin to support sustainable groundwater management.

Tasks associated with this work are identified below.

**Task 1: GSP Foundation**

Prepare the GSP with the data, information, technical tools (i.e., a selected numerical model), and funding and outreach plans needed to successfully perform subsequent Tasks 2 and 3. Subtasks used to accomplish this work may include, but are not limited to:

- Conduct Preliminary GSP Development Efforts (e.g., development of Hydrogeologic Conceptual Models for Arvin-Edison Water Storage District and Wheeler Ridge-Maricopa Water Storage District, planning modeling efforts)
- Provide Initial Notification of GSP Development
- Design a Data Management System (DMS)
- Gather and Compile Available Data into the DMS
- Gather and Compile Information on the GSP Area and Basin Management Activities
- Conduct Data Gaps Assessment
- Evaluate Numerical Groundwater Model Options
- Update and Implement the GSP Development Funding Plan
- Participate in Intrabasin and Interbasin Coordination Efforts

**Deliverables:**

- Draft Technical Memorandum #1 – GSP Foundation

**Task 2: Basin Characterization and Analysis**

Build a comprehensive understanding of the Subbasin. Subtasks used to accomplish this work may include, but are not limited to:

- Implement plan for Filling Data Gaps Needed for GSP Preparation (e.g., process and analyze DWR Well Completion Reports, conduct pumping tests, sample and analyze groundwater quality, collect groundwater elevation data)
- Assess Groundwater Conditions and Develop Hydrogeologic Conceptual Model
- Coordination regarding C2VSim Modeling
- Develop a Basin-Wide Water Budget
- Assess Existing Monitoring Programs and Develop Monitoring Network

Deliverables:

- Draft Technical Memorandum #2 – Basin Setting

**Task 3: Sustainability Planning**

Plan for sustainable management of the Subbasin. Subtasks used to accomplish this work may include, but are not limited to:

- Evaluate Potential Management Areas
- Develop Sustainable Management Criteria, including:
  - Define Sustainability Goal;
  - Define Undesirable Results and Minimum Thresholds; and
  - Define Measurable Objectives and Interim Milestones.
- Identify Projects and Management Actions
- Create GSP Implementation Plan, including planning for:
  - Annual reporting;
  - Periodic (5-year) GSP evaluations; and
  - DMS maintenance.
- Finalize Monitoring Network and Protocols

Deliverables:

- Draft Technical Memorandum #3 – Sustainable Management Criteria Projects and Management Actions, and Monitoring Network

**Task 4: GSP Preparation and Submittal**

Prepare GSP that meets the SGMA regulations and DWR requirements. This will include compiling Draft GSP, and distributing draft GSP and revise GSP (if necessary) per stakeholder feedback.

Deliverables:

- Draft GSP
- Proof of Final GSP submittal to DWR

**EXHIBIT B  
BUDGET**

<b>Project Title: White Wolf Subbasin Groundwater Sustainability Plan Development</b>					
<b>Budget Category</b>		<b>Grant Amount</b>	<b>Required Cost Share (non-state source)*</b>	<b>Other Cost Share</b>	<b>Total Cost</b>
(a)	Grant Administration	\$48,871	\$48,871	\$0	\$97,742
(b)	Stakeholder Engagement	\$28,509	\$28,509	\$0	\$57,018
(c)	GSP Development	\$480,618	\$480,618	\$0	\$961,236
<b>TOTAL COSTS</b>		<b>\$557,998</b>	<b>\$557,998</b>	<b>\$0</b>	<b>\$1,115,996</b>

**NOTES:**

\*The Grantee did not receive a cost share waiver.

**EXHIBIT C  
SCHEDULE**

<b>Project Title: White Wolf Subbasin Groundwater Sustainability Plan Development</b>			
<b>Categories</b>		<b>Start Date</b>	<b>End Date</b>
(a)	Grant Administration	4/1/2018	4/30/2022
(b)	Stakeholder Engagement	4/1/2018	1/31/2022
(c)	GSP Development	1/1/2015	1/31/2022

**EXHIBIT D**  
**STANDARD CONDITIONS**

**D.1) ACCOUNTING AND DEPOSIT OF FUNDING DISBURSEMENT:**

- a) **Separate Accounting of Funding Disbursements:** The Grantee shall account for the money disbursed pursuant to this Grant Agreement separately from all other Grantee funds. The Grantee shall maintain audit and accounting procedures that are in accordance with generally accepted accounting principles and practices, consistently applied. The Grantee shall keep complete and accurate records of all receipts and disbursements on expenditures of such funds. The Grantee shall require its contractors or subcontractors to maintain books, records, and other documents pertinent to their work in accordance with generally accepted accounting principles and practices. Records are subject to inspection by the State at any and all reasonable times.
- b) **Disposition of Money Disbursed:** All money disbursed pursuant to this Grant Agreement shall be deposited in a non-interest bearing account, administered, and accounted for pursuant to the provisions of applicable law.
- c) **Remittance of Unexpended Funds:** The Grantee shall remit to the State any unexpended funds that were disbursed to the Grantee under this Grant Agreement and were not used to pay Eligible Project Costs within a period of sixty (60) calendar days from the final disbursement from the State to the Grantee of funds or, within thirty (30) calendar days of the expiration of the Grant Agreement, whichever comes first.

**D.2) ACKNOWLEDGEMENT OF CREDIT AND SIGNAGE:** The Grantee shall include appropriate acknowledgement of credit to the State for its support when promoting the Project or using any data and/or information developed under this Grant Agreement. Signage shall be posted in a prominent location at Project site(s) (if applicable) or at the Grantee's headquarters and shall include the Department of Water Resources color logo and the following disclosure statement: "Funding for this project has been provided in full or in part from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 and through an agreement with the State Department of Water Resources." The Grantee shall also include in each of its contracts for work under this Agreement a provision that incorporates the requirements stated within this paragraph.

**D.3) AMENDMENT:** This Grant Agreement may be amended at any time by mutual agreement of the Parties, except insofar as any proposed amendments are in any way contrary to applicable law. Requests by the Grantee for amendments must be in writing stating the amendment request and the reason for the request. The State shall have no obligation to agree to an amendment.

**D.4) AMERICANS WITH DISABILITIES ACT:** By signing this Grant Agreement, the Grantee assures the State that it complies with the Americans with Disabilities Act (ADA) of 1990, (42 U.S.C. § 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

**D.5) AUDITS:** The State reserves the right to conduct an audit at any time between the execution of this Grant Agreement and the completion of the Project, with the costs of such audit borne by the State. After completion of the Project, the State may require the Grantee to conduct a final audit to the State's specifications, at the Grantee's expense, such audit to be conducted by and a report prepared by an independent Certified Public Accountant. Failure or refusal by the Grantee to comply with this provision shall be considered a breach of this Grant Agreement, and the State may elect to pursue any remedies provided in Paragraph 12 or take any other action it deems necessary to protect its interests.

Pursuant to Government Code Section 8546.7, the Grantee shall be subject to the examination and audit by the State for a period of three (3) years after final payment under this Grant Agreement with respect of all matters connected with this Grant Agreement, including but not limited to, the cost of administering this Grant Agreement. All records of the Grantee or its contractor or subcontractors shall

be preserved for this purpose for at least three (3) years after receipt of the final disbursement under this Agreement. If an audit reveals any impropriety, the Bureau of State Audits or the State Controller's Office may conduct a full audit of any or all of the Funding Recipient's activities. (Wat. Code, § 79708, subd. (b).)

- D.6) **BUDGET CONTINGENCY:** If the Budget Act of the current year covered under this Grant Agreement does not appropriate sufficient funds for this program, this Grant Agreement shall be of no force and effect. This provision shall be construed as a condition precedent to the obligation of the State to make any payments under this Grant Agreement. In this event, the State shall have no liability to pay any funds whatsoever to the Grantee or to furnish any other considerations under this Grant Agreement and the Grantee shall not be obligated to perform any provisions of this Grant Agreement. Nothing in this Grant Agreement shall be construed to provide the Grantee with a right of priority for payment over any other Grantee. If funding for any fiscal year after the current year covered by this Grant Agreement is reduced or deleted by the Budget Act, by Executive Order, or by order of the Department of Finance, the State shall have the option to either cancel this Grant Agreement with no liability occurring to the State, or offer a Grant Agreement amendment to the Grantee to reflect the reduced amount.
- D.7) **CEQA:** Activities funded under this Grant Agreement, regardless of funding source, must be in compliance with the California Environmental Quality Act (CEQA). (Pub. Resources Code, § 21000 et seq.) Any work that is subject to CEQA and funded under this Grant Agreement shall not proceed until documents that satisfy the CEQA process are received by the State's Project Manager and the State has completed its CEQA compliance. Work funded under the Grant Agreement subject to a CEQA document shall not proceed until and unless approved by the State Project Manager. Such approval is fully discretionary and shall constitute a condition precedent to any work for which it is required. If CEQA compliance by the Grantee is not complete at the time the State signs this Agreement, once the State has considered the environmental documents, it may decide to require changes, alterations, or other mitigation to the Project; or to not fund the Project. Should the State decide to not fund the Project, this Agreement shall be terminated in accordance with Paragraph 12.
- D.8) **CHILD SUPPORT COMPLIANCE ACT:** The Grantee acknowledges in accordance with Public Contract Code Section 7110, that:
- a) The Grantee recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Family Code Section 5200 et seq.; and
  - b) The Grantee, to the best of its knowledge is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.
- D.9) **CLAIMS DISPUTE:** Any claim that the Grantee may have regarding performance of this Agreement including, but not limited to, claims for additional compensation or extension of time, shall be submitted to the DWR Project Representative, within thirty (30) days of the Grantee's knowledge of the claim. The State and the Grantee shall then attempt to negotiate a resolution of such claim and process an amendment to this Agreement to implement the terms of any such resolution.
- D.10) **COMPETITIVE BIDDING AND PROCUREMENTS:** The Grantee shall comply with all applicable laws and regulations regarding securing competitive bids and undertaking competitive negotiations in the Grantee's contracts with other entities for acquisition of goods and services and construction of public works with funds provided by the State under this Grant Agreement.
- D.11) **COMPUTER SOFTWARE:** The Grantee certifies that it has appropriate systems and controls in place to ensure that State funds will not be used in the performance of this Grant Agreement for the acquisition, operation, or maintenance of computer software in violation of copyright laws.

- D.12) **CONFLICT OF INTEREST:** All participants are subject to state and federal conflict of interest laws. Failure to comply with these laws, including business and financial disclosure provisions, will result in the application being rejected and any subsequent contract being declared void. Other legal action may also be taken. Applicable statutes include, but are not limited to, Government Code Section 1090 and Public Contract Code Sections 10410 and 10411, for State conflict of interest requirements.
- a) **Current State Employees:** No State officer or employee shall engage in any employment, activity, or enterprise from which the officer or employee receives compensation or has a financial interest and which is sponsored or funded by any State agency, unless the employment, activity, or enterprise is required as a condition of regular State employment. No State officer or employee shall contract on his or her own behalf as an independent contractor with any State agency to provide goods or services.
  - b) **Former State Employees:** For the two-year period from the date he or she left State employment, no former State officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements, or any part of the decision-making process relevant to the contract while employed in any capacity by any State agency. For the twelve-month period from the date he or she left State employment, no former State officer or employee may enter into a contract with any State agency if he or she was employed by that State agency in a policy-making position in the same general subject area as the proposed contract within the twelve-month period prior to his or her leaving State service.
  - c) **Employees of the Grantee:** Employees of the Grantee shall comply with all applicable provisions of law pertaining to conflicts of interest, including but not limited to any applicable conflict of interest provisions of the California Political Reform Act. (Gov. Code, § 87100 et seq.)
  - d) **Employees and Consultants to the Grantee:** Individuals working on behalf of the Grantee may be required by DWR to file a Statement of Economic Interests (Fair Political Practices Commission Form 700) if it is determined that an individual is a consultant for Political Reform Act purposes.
- D.13) **DELIVERY OF INFORMATION, REPORTS, AND DATA:** The Grantee agrees to expeditiously provide throughout the term of this Grant Agreement, such reports, data, information, and certifications as may be reasonably required by the State.
- D.14) **DISPOSITION OF EQUIPMENT:** The Grantee shall provide to the State, not less than 30 calendar days prior to submission of the final invoice, an itemized inventory of equipment purchased with funds provided by the State. The inventory shall include all items with a current estimated fair market value of more than \$5,000.00 per item. Within 60 calendar days of receipt of such inventory the State shall provide the Grantee with a list of the items on the inventory that the State will take title to. All other items shall become the property of the Grantee. The State shall arrange for delivery from the Grantee of items that it takes title to. Cost of transportation, if any, shall be borne by the State.
- D.15) **DRUG-FREE WORKPLACE CERTIFICATION:** Certification of Compliance: By signing this Grant Agreement, the Grantee, its contractors or subcontractors hereby certify, under penalty of perjury under the laws of State of California, compliance with the requirements of the Drug-Free Workplace Act of 1990 (Gov. Code § 8350 et seq.) and have or will provide a drug-free workplace by taking the following actions:
- a) Publish a statement notifying employees, contractors, and subcontractors that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees, contractors, or subcontractors for violations, as required by Government Code Section 8355.
  - b) Establish a Drug-Free Awareness Program, as required by Government Code Section 8355 to inform employees, contractors, or subcontractors about all of the following:

- i) The dangers of drug abuse in the workplace,
  - ii) The Grantee's policy of maintaining a drug-free workplace,
  - iii) Any available counseling, rehabilitation, and employee assistance programs, and
  - iv) Penalties that may be imposed upon employees, contractors, and subcontractors for drug abuse violations.
- c) Provide, as required by Government Code Section 8355, that every employee, contractor, and/or subcontractor who works under this Grant Agreement:
- i) Will receive a copy of the Grantee's drug-free policy statement, and
  - ii) Will agree to abide by terms of the Grantee's condition of employment, contract or subcontract.

D.16) **EASEMENTS:** Where the Grantee acquires property in fee title or funds improvements to real property already owned in fee by the Grantee using State funds provided through this Grant Agreement, an appropriate easement or other title restriction providing for floodplain preservation and agricultural and/or wildlife habitat conservation for the subject property in perpetuity, approved by the State, shall be conveyed to a regulatory or trustee agency or conservation group acceptable to the State. The easement or other title restriction must be in first position ahead of any recorded mortgage or lien on the property unless this requirement is waived by the State.

Where the Grantee acquires an easement under this Agreement, the Grantee agrees to monitor and enforce the terms of the easement, unless the easement is subsequently transferred to another land management or conservation organization or entity with State permission, at which time monitoring and enforcement responsibilities will transfer to the new easement owner.

Failure to provide an easement acceptable to the State can result in termination of this Agreement.

D.17) **FINAL INSPECTIONS AND CERTIFICATION OF REGISTERED PROFESSIONAL:** Upon completion of the Project, the Grantee shall provide for a final inspection and certification by a California Registered Professional (i.e., Professional Civil Engineer, Engineering Geologist, that the Project has been completed in accordance with submitted final plans and specifications and any modifications thereto and in accordance with this Grant Agreement.

D.18) **GRANTEE'S RESPONSIBILITY.** The Grantee and its representatives shall:

- a) Faithfully and expeditiously perform or cause to be performed all project work as described in Exhibit A and in accordance with Project Exhibit B and Exhibit C.
- b) Accept and agree to comply with all terms, provisions, conditions, and written commitments of this Grant Agreement, including all incorporated documents, and to fulfill all assurances, declarations, representations, and statements made by the Grantee in the application, documents, amendments, and communications filed in support of its request for funding.
- c) Comply with all applicable California, federal, and local laws and regulations.
- d) Implement the Project in accordance with applicable provisions of the law.
- e) Fulfill its obligations under the Grant Agreement and be responsible for the performance of the Project.
- f) Obtain any and all permits, licenses, and approvals required for performing any work under this Grant Agreement, including those necessary to perform design, construction, or operation and maintenance of the Project. The Grantee shall provide copies of permits and approvals to the State.
- g) Be solely responsible for design, construction, and operation and maintenance of projects within the work plan. Review or approval of plans, specifications, bid documents, or other construction documents by the State is solely for the purpose of proper administration of funds by the State and shall not be deemed to relieve or restrict responsibilities of the Grantee under this Agreement.

- h) Be solely responsible for all work and for persons or entities engaged in work performed pursuant to this Grant Agreement, including, but not limited to, contractors, subcontractors, suppliers, and providers of services. The Grantee shall be responsible for any and all disputes arising out of its contracts for work on the Project, including but not limited to payment disputes with contractors and subcontractors. The State will not mediate disputes between the Grantee and any other entity concerning responsibility for performance of work.
- D.19) **GOVERNING LAW:** This Grant Agreement is governed by and shall be interpreted in accordance with the laws of the State of California.
- D.20) **INCOME RESTRICTIONS:** The Grantee agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Grantee under this Agreement shall be paid by the Grantee to the State, to the extent that they are properly allocable to costs for which the Grantee has been reimbursed by the State under this Agreement.
- D.21) **INDEMNIFICATION:** The Grantee shall indemnify and hold and save the State, its officers, agents, and employees, free and harmless from any and all liabilities for any claims and damages (including inverse condemnation) that may arise out of the Project and this Agreement, including, but not limited to any claims or damages arising from planning, design, construction, maintenance and/or operation of this Project and any breach of this Agreement. The Grantee shall require its contractors or subcontractors to name the State, its officers, agents and employees as additional insureds on their liability insurance for activities undertaken pursuant to this Agreement.
- D.22) **INDEPENDENT CAPACITY:** The Grantee, and the agents and employees of the Grantees, in the performance of the Grant Agreement, shall act in an independent capacity and not as officers, employees, or agents of the State.
- D.23) **INSPECTION OF BOOKS, RECORDS, AND REPORTS:** During regular office hours, each of the parties hereto and their duly authorized representatives shall have the right to inspect and to make copies of any books, records, or reports of either party pertaining to this Grant Agreement or matters related hereto. Each of the parties hereto shall maintain and shall make available at all times for such inspection accurate records of all its costs, disbursements, and receipts with respect to its activities under this Grant Agreement. Failure or refusal by the Grantee to comply with this provision shall be considered a breach of this Grant Agreement, and the State may withhold disbursements to the Grantee or take any other action it deems necessary to protect its interests.
- D.24) **INSPECTIONS OF PROJECT BY STATE:** The State shall have the right to inspect the work being performed at any and all reasonable times during the term of the Grant Agreement. This right shall extend to any subcontracts, and the Grantee shall include provisions ensuring such access in all its contracts or subcontracts entered into pursuant to its Grant Agreement with the State.
- D.25) **LABOR CODE COMPLIANCE:** The Grantee agrees to be bound by all the provisions of the Labor Code regarding prevailing wages and shall monitor all contracts subject to reimbursement from this Agreement to assure that the prevailing wage provisions of the Labor Code are being met. Current Department of Industrial Relations (DIR) requirements may be found at <http://www.dir.ca.gov/lcp.asp>. For more information, please refer to DIR's *Public Works Manual* at: <http://www.dir.ca.gov/dlse/PWManualCombined.pdf>. The Grantee affirms that it is aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance, and the Grantee affirms that it will comply with such provisions before commencing the performance of the work under this Agreement and will make its contractors and subcontractors aware of this provision.
- D.26) **MODIFICATION OF OVERALL WORK PLAN:** At the request of the Grantee, the State may at its sole discretion approve non-material changes to the portions of Exhibit A which concern the budget and schedule without formally amending this Grant Agreement. Non-material changes with respect to the budget are changes that only result in reallocation of the budget and will not result in an increase in the

amount of the State Grant Agreement. Non-material changes with respect to the Project schedule are changes that will not extend the term of this Grant Agreement. Requests for non-material changes to the budget and schedule must be submitted by the Grantee to the State in writing and are not effective unless and until specifically approved by the State's Program Manager in writing.

- D.27) **NONDISCRIMINATION:** During the performance of this Grant Agreement, the Grantee and its contractors or subcontractors shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex (gender), sexual orientation, race, color, ancestry, religion, creed, national origin (including language use restriction), pregnancy, physical disability (including HIV and AIDS), mental disability, medical condition (cancer/genetic characteristics), age (over 40), marital status, and denial of medial and family care leave or pregnancy disability leave. The Grantee and its contractors or subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. The Grantee and its contractors or subcontractors shall comply with the provisions of the California Fair Employment and Housing Act (Gov. Code, § 12990.) and the applicable regulations promulgated there under (Cal. Code Regs., tit. 2, § 11000 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing the California Fair Employment and Housing Act are incorporated into this Agreement by reference. The Grantee and its contractors or subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

The Grantee shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the Grant Agreement.

- D.28) **OPINIONS AND DETERMINATIONS:** Where the terms of this Grant Agreement provide for action to be based upon, judgment, approval, review, or determination of either party hereto, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review, or determination to be arbitrary, capricious, or unreasonable.
- D.29) **PRIORITY HIRING CONSIDERATIONS:** If this Grant Agreement includes services in excess of \$200,000, the Grantee shall give priority consideration in filling vacancies in positions funded by the Grant Agreement to qualified recipients of aid under Welfare and Institutions Code Section 11200 in accordance with Public Contract Code Section 10353.
- D.30) **PROHIBITION AGAINST DISPOSAL OF PROJECT WITHOUT STATE PERMISSION:** The Grantee shall not sell, abandon, lease, transfer, exchange, mortgage, hypothecate, or encumber in any manner whatsoever all or any portion of any real or other property necessarily connected or used in conjunction with the Project, or with the Grantee's service of water, without prior permission of the State. The Grantee shall not take any action, including but not limited to actions relating to user fees, charges, and assessments that could adversely affect the ability of the Grantee to meet its obligations under this Grant Agreement, without prior written permission of the State. The State may require that the proceeds from the disposition of any real or personal property be remitted to the State.
- D.31) **REMEDIES NOT EXCLUSIVE:** The use by either party of any remedy specified herein for the enforcement of this Grant Agreement is not exclusive and shall not deprive the party using such remedy of, or limit the application of, any other remedy provided by law.
- D.32) **RETENTION:** The State shall withhold ten percent (10%) of the funds requested by the Grantee for reimbursement of Eligible Project Costs until the Project is completed and Final Project Completion Report is approved. Any retained amounts due to the Grantee will be promptly disbursed to the Grantee, without interest, upon completion of the Project.
- D.33) **RIGHTS IN DATA:** The Grantee agrees that all data, plans, drawings, specifications, reports, computer programs, operating manuals, notes and other written or graphic work produced in the performance of this Grant Agreement shall be made available to the State and shall be in the public domain to the extent to which release of such materials is required under the California Public Records Act. (Gov.

Code, § 6250 et seq.) The Grantee may disclose, disseminate and use in whole or in part, any final form data and information received, collected and developed under this Grant Agreement, subject to appropriate acknowledgement of credit to the State for financial support. The Grantee shall not utilize the materials for any profit-making venture or sell or grant rights to a third party who intends to do so. The State shall have the right to use any data described in this paragraph for any public purpose.

- D.34) SEVERABILITY: Should any portion of this Grant Agreement be determined to be void or unenforceable, such shall be severed from the whole and the Grant Agreement shall continue as modified.
- D.35) SUSPENSION OF PAYMENTS: This Grant Agreement may be subject to suspension of payments or termination, or both if the State determines that:
- a) The Grantee, its contractors, or subcontractors have made a false certification, or
  - b) The Grantee, its contractors, or subcontractors violates the certification by failing to carry out the requirements noted in this Grant Agreement.
- D.36) SUCCESSORS AND ASSIGNS: This Grant Agreement and all of its provisions shall apply to and bind the successors and assigns of the parties. No assignment or transfer of this Grant Agreement or any part thereof, rights hereunder, or interest herein by the Grantee shall be valid unless and until it is approved by State and made subject to such reasonable terms and conditions as the State may impose.
- D.37) TERMINATION BY GRANTEE: Subject to State approval which may be reasonably withheld, the Grantee may terminate this Agreement and be relieved of contractual obligations. In doing so, the Grantee must provide a reason(s) for termination. The Grantee must submit all progress reports summarizing accomplishments up until termination date.
- D.38) TERMINATION FOR CAUSE: Subject to the right to cure under Paragraph 12, the State may terminate this Grant Agreement and be relieved of any payments should the Grantee fail to perform the requirements of this Grant Agreement at the time and in the manner herein, provided including but not limited to reasons of default under Paragraph 12.
- D.39) TERMINATION WITHOUT CAUSE: The State may terminate this Agreement without cause on 30 days advance written notice. The Grantee shall be reimbursed for all reasonable expenses incurred up to the date of termination.
- D.40) THIRD PARTY BENEFICIARIES: The parties to this Agreement do not intend to create rights in, or grant remedies to, any third party as a beneficiary of this Agreement, or any duty, covenant, obligation or understanding established herein.
- D.41) TIMELINESS: Time is of the essence in this Grant Agreement.
- D.42) TRAVEL – DAC, EDA, or SDAC PROJECT/COMPONENT: If a Project/Component obtains a DAC, EDA, or SDAC Cost Share Waiver, the Grantee may submit travel and per diem costs for eligible reimbursement with State funds. Travel includes the reasonable and necessary costs of transportation, subsistence, and other associated costs incurred by personnel during the term of this Grant Agreement. Any reimbursement for necessary travel and per diem shall be at rates not to exceed those set by the California Department of Human Resources. These rates may be found at: <http://www.calhr.ca.gov/employees/Pages/travel-reimbursements.aspx>. Reimbursement will be at the State travel and per diem amounts that are current as of the date costs are incurred. No travel outside the State of California shall be reimbursed unless prior written authorization is obtained from the State. All travel approved expenses will be reimbursed at the percentage rate of the DAC, EDA, or SDAC Cost Share Waiver. For example, if the Grantee obtains a 100% Waiver, 100% of all approved travel expenses can be invoiced for reimbursement. If the Grantee obtains a 50% Waiver, only 50% of eligible travel expenses will be reimbursed by these grant funds.

- D.43) TRAVEL – NON-DAC, EDA, or SDAC PROJECT/COMPONENT: The Grantee agrees that travel and per diem costs shall NOT be eligible for reimbursement with State funds, unless the Grantee's service area is considered a DAC, EDA, or SDAC. The Grantee also agrees that travel and per diem costs shall NOT be eligible for computing Grantee Local Cost Share. Travel includes the costs of transportation, subsistence, and other associated costs incurred by personnel during the term of this Grant Agreement.
- D.44) UNION ORGANIZING: The Grantee, by signing this Grant Agreement, hereby acknowledges the applicability of Government Code Sections 16645 through 16649 to this Grant Agreement. Furthermore, the Grantee, by signing this Grant Agreement, hereby certifies that:
- a) No State funds disbursed by this Grant Agreement will be used to assist, promote, or deter union organizing.
  - b) The Grantee shall account for State funds disbursed for a specific expenditure by this Grant Agreement to show those funds were allocated to that expenditure.
  - c) The Grantee shall, where State funds are not designated as described in (b) above, allocate, on a pro rata basis, all disbursements that support the program.
  - d) If the Grantee makes expenditures to assist, promote, or deter union organizing, the Grantee will maintain records sufficient to show that no State funds were used for those expenditures and that the Grantee shall provide those records to the Attorney General upon request.
- D.45) VENUE: The State and the Grantee hereby agree that any action arising out of this Agreement shall be filed and maintained in the Superior Court in and for the County of Sacramento, California, or in the United States District Court in and for the Eastern District of California. The Grantee hereby waives any existing sovereign immunity for the purposes of this Agreement.
- D.46) WAIVER OF RIGHTS: None of the provisions of this Grant Agreement shall be deemed waived unless expressly waived in writing. It is the intention of the parties here to that from time to time either party may waive any of its rights under this Grant Agreement unless contrary to law. Any waiver by either party of rights arising in connection with the Grant Agreement shall not be deemed to be a waiver with respect to any other rights or matters, and such provisions shall continue in full force and effect.

**EXHIBIT E**  
**AUTHORIZING RESOLUTION ACCEPTING FUNDS**

**BEFORE THE BOARD OF DIRECTORS OF  
TEJON-CASTAC WATER DISTRICT**

**IN THE MATTER OF:**

**RESOLUTION NO. 2018-04**

**RESOLUTION AUTHORIZING DISTRICT TO ACT AS CONTRACTING PARTY ON  
BEHALF OF WHITE WOLF GROUNDWATER SUSTAINABILITY AGENCY FOR  
PROPOSITION 1 GRANT AGREEMENT**

**WHEREAS**, the District is a member of the White Wolf Groundwater Sustainability Agency (the "GSA"), formed pursuant to that certain Joint Powers Agreement for Formation of a Groundwater Sustainability Agency for the White Wolf Subbasin under the Sustainable Groundwater Management Act dated May 9, 2017 (the "JPA"); and,

**WHEREAS**, in November 2017, the GSA submitted to the California Department of Water Resources (DWR) a Proposition 1 Sustainable Groundwater Program Grant Application for Groundwater Sustainability Plan Development in the White Wolf Subbasin (the "Application"); and

**WHEREAS**, DWR requires one member of the GSA to act as the contracting party for purposes of entering into and administering the agreement for the Grant that is the subject of the Application (the "Agreement").

**NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE TEJON-CASTAC WATER DISTRICT** does hereby resolve, declare and order as follows:

- 1) Each of the matters set forth above is true and correct and the Board so finds and determines.
- 2) The Board finds that it is in the best interests of the District to act as the contracting party with DWR under the Agreement on behalf of the GSA, and the Board hereby authorizes the District to so act.
- 3) The President, Dennis Atkinson, and Secretary, Angelica Martin, of the District, or designee is hereby authorized and directed to prepare the necessary data, conduct investigations, file such application, and execute a grant agreement with DWR.

All the foregoing being on motion of Director Poire, seconded by Director Fachin, and

authorized by the following vote, to wit:

AYES: 5

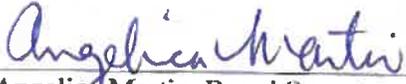
NOES: 0

ABSTAIN: 0

ABSENT: 0

I HEREBY CERTIFY that the foregoing resolution is the resolution of said District as duly passed and adopted by said Board of Directors on the 14 day of August 2018.

WITNESS my hand and seal of said Board of Directors this 14 day of August 2018.

  
Angelica Martin, Board Secretary

## **EXHIBIT F**

### **REPORT FORMATS AND REQUIREMENTS**

The following reporting formats should be utilized. Please obtain State approval prior to submitting a report in an alternative format.

#### **PROGRESS REPORTS**

Progress reports shall generally use the following format. This format may be modified as necessary to effectively communicate information. For the Project, or each component, discuss the following at the task level, as organized in Exhibit A:

- Percent complete estimate.
- Discussion of work accomplished during the reporting period.
- Milestones or deliverables completed/submitted during the reporting period.
- Meetings held or attended.
- Scheduling concerns and issues encountered that may delay completion of the task.

For each project, discuss the following at the project level, as organized in Exhibit A:

- Work anticipated for the next reporting period.
- Photo documentation, as appropriate.
- Any schedule or budget modifications approved by DWR during the reporting period.

#### **COMPLETION REPORT**

The Completion Report shall generally use the following format provided below for each Component or Project after completion.

##### **Executive Summary**

The Executive Summary should include a brief summary of project information and include the following items:

- Brief description of work proposed to be done in the original Grant application.
- Description of actual work completed and any deviations from Exhibit A. List any official amendments to this Grant Agreement, with a short description of the amendment.

##### **Reports and/or Products**

The following items should be provided, unless already submitted as a deliverable:

- A copy of the Groundwater Sustainability Plan (GSP) that meets all the requirements of the GSP Regulations (for GSP Development Projects), or verification (e.g., acceptance email, or other approved documentation from SGMA), that the GSP was submitted to DWR as required.
- A copy of any final technical report or study, produced for or utilized in this Project as described in the Work Plan
- Electronic copies of any data collected, not previously submitted
- Discussion of problems that occurred during the work and how those problems were resolved
- Final Component schedule showing actual progress versus planned progress

Additional information that may be applicable for Implementation Projects and/or Components includes the following:

- As-built drawings
- Final geodetic survey information
- Project or Component photos

### **Cost & Disposition of Funds**

A list showing:

- Summary of Project costs including the following items:
  - Accounting of the cost of project expenditure
  - Include all internal and external costs not previously disclosed (i.e., additional cost share); and
  - A discussion of factors that positively or negatively affected the project cost and any deviation from the original Project cost estimate.

### **Additional Information**

- Benefits derived from the Component, with quantification of such benefits provided, applicable for Implementation Components.
- A final project schedule showing actual progress versus planned progress as shown in Exhibit C.
- Certification from a California Registered Professional (Civil Engineer or Geologist, as appropriate) that the project was conducted in accordance with the approved work plan and any approved modifications thereto.

### **GRANT COMPLETION REPORT**

The Grant Completion Report shall generally use the following format. This format may be modified as necessary to effectively communicate information on the various projects in the SGWP Grant Program funded by this Grant Agreement, and includes the following:

#### **Executive Summary**

The Executive Summary consists of a maximum of ten (10) pages summarizing information for the grant as well as the individual components.

#### **Reports and/or products**

- Brief comparison of work proposed in the original 2017 SGWP Grant application and actual work done.
- Brief description of the Project or components completed and how they achieve either or both of the following:
  - Serve SDAC(s) and support groundwater sustainability planning and management in the basin (Implementation Projects); and/or
  - Support planning, development, and/or preparation of GSP(s) that will comply with and meet the requirements of the GSP Regulations (GSP Development Projects).
- Identify remaining work and mechanism for their implementation (Implementation Projects).
- If applicable (e.g., if a DAC, EDA, or SDAC Cost Share Waiver was approved), a discussion of the benefits to DAC, EDA, and/or SDAC as part of this Grant Agreement.

#### **Cost & Disposition of Funds Information**

- A summary of final funds disbursement for the Project, or each component.

## EXHIBIT G

### REQUIREMENTS FOR DATA SUBMITTAL

#### **Surface and Groundwater Quality Data:**

Groundwater quality and ambient surface water quality monitoring data that include chemical, physical, or biological data shall be submitted to the State as described below, with a narrative description of data submittal activities included in project reports, as described in Exhibit F.

Surface water quality monitoring data shall be prepared for submission to the California Environmental Data Exchange Network (CEDEN). The CEDEN data templates are available on the CEDEN website. Inclusion of additional data elements described on the data templates is desirable. Data ready for submission should be uploaded to your CEDEN Regional Data Center via the CEDEN website. (CEDEN website: <http://www.ceden.org>).

If a project's Work Plan contains a groundwater ambient monitoring element, groundwater quality monitoring data shall be submitted to the State for inclusion in the State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment (GAMA) Program Information on the GAMA Program can be obtained at: [http://www.waterboards.ca.gov/water\\_issues/programs/gama/](http://www.waterboards.ca.gov/water_issues/programs/gama/). If further information is required, the Grantee can contact the State Water Resources Control Board (SWRCB) GAMA Program. A listing of SWRCB staff involved in the GAMA program can be found at: [http://www.swrcb.ca.gov/water\\_issues/programs/gama/contact.shtml](http://www.swrcb.ca.gov/water_issues/programs/gama/contact.shtml)

#### **Groundwater Level Data**

The Grantee shall submit to DWR groundwater level data collected as part of this grant. Water level data must be submitted using the California Statewide Groundwater Elevation Monitoring (CASGEM) online data submission system. The Grantee should use their official CASGEM Monitoring Entity or Cooperating Agency status to gain access to the online submittal tool and submit data. If the data is from wells that are not part of the monitoring network, the water level measurements should be classified as voluntary measurements in the CASGEM system. If the Grantee is not a Monitoring Entity or Cooperating Agency, please contact your DWR grant project manager for further assistance with data submittal. The activity of data submittal should be documented in appropriate progress or final project reports, as described in Exhibit F. Information regarding the CASGEM program can be found at: <http://www.water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM>

## EXHIBIT H

### STATE AUDIT DOCUMENT REQUIREMENTS AND COST SHARE GUIDELINES FOR GRANTEES

The following provides a list of documents typically required by State Auditors and general guidelines for Grantees. List of documents pertains to both State funding and the Grantee's Cost Share and details the documents/records that State Auditors would need to review in the event of this Grant Agreement is audited. Grantees should ensure that such records are maintained for each funded project.

#### **State Audit Document Requirements**

##### Internal Controls

1. Organization chart (e.g., Agency's overall organization chart and organization chart for the State funded Program/Project).
2. Written internal procedures and flowcharts for the following:
  - a) Receipts and deposits
  - b) Disbursements
  - c) State reimbursement requests
  - d) Expenditure tracking of State funds
  - e) Guidelines, policy, and procedures on State funded Program/Project
3. Audit reports of the Agency internal control structure and/or financial statements within the last two years.
4. Prior audit reports on the State funded Program/Project.

##### State Funding:

1. Original Grant Agreement, any amendment(s) and budget modification documents.
2. A listing of all bond-funded grants, loans, or subventions received from the State.
3. A listing of all other funding sources for each Program/Project.

##### Contracts:

1. All subcontractor and consultant contracts and related or partners documents, if applicable.
2. Contracts between the Agency and member agencies as related to the State funded Program/Project.

##### Invoices:

1. Invoices from vendors and subcontractors for expenditures submitted to the State for payments under the Grant Agreement.
2. Documentation linking subcontractor invoices to State reimbursement, requests and related Grant Agreement budget line items.
3. Reimbursement requests submitted to the State for the Grant Agreement.

##### Cash Documents:

1. Receipts (copies of warrants) showing payments received from the State.
2. Deposit slips (or bank statements) showing deposit of the payments received from the State.
3. Cancelled checks or disbursement documents showing payments made to vendors, subcontractors, consultants, and/or agents under the grants or loans.
4. Bank statements showing the deposit of the receipts.

Accounting Records:

1. Ledgers showing entries for the Grantee's receipts and cash disbursements.
2. Ledgers showing receipts and cash disbursement entries of other funding sources.
3. Bridging documents that tie the general ledger to requests for Grant Agreement reimbursement.

Administration Costs:

1. Supporting documents showing the calculation of administration costs.

Personnel:

1. List of all contractors and Agency staff that worked on the State funded Program/Project.
2. Payroll records including timesheets for contractor staff and the Agency personnel who provided services charged to the program

Project Files:

1. All supporting documentation maintained in the project files.
2. All Grant Agreement related correspondence.

**Cost Share Guidelines**

Cost Share consists of non-State funds, including in-kind services. In-kind services are defined as work performed (i.e., dollar value of non-cash contributions) by the Grantee (and potentially other parties) directly related to the execution of the funded project. Examples include volunteer services, equipment use, and use of facilities. The cost of in-kind service can be counted as cost share in-lieu of actual funds (or revenue) provided by the Grantee. Other cost share and in-kind service eligibility conditions may apply. Provided below is guidance for documenting cost share with and without in-kind services.

1. Although tracked separately, in-kind services shall be documented and, to the extent feasible, supported by the same methods used by the Grantee for its own employees. Such documentation should include the following:
  - a. Detailed description of the contributed item(s) or service(s)
  - b. Purpose for which the contribution was made (tied to project work plan)
  - c. Name of contributing organization and date of contribution
  - d. Real or approximate value of contribution. Who valued the contribution and how was the value determined? (e.g., actual, appraisal, fair market value, etc.). Justification of rate. (See item #2, below)
  - e. Person's name and the function of the contributing person
  - f. Number of hours contributed
  - g. If multiple sources exist, these should be summarized on a table with summed charges
  - h. Source of contribution if it was provided by, obtained with, or supported by government funds
2. Rates for volunteer or in-kind services shall be consistent with those paid for similar work in the Grantee's organization. For example, volunteer service of clearing vegetation performed by an attorney shall be valued at a fair market value for this service, not the rate for professional legal services. In those instances in which the required skills are not found in the recipient organization, rates shall be consistent with those paid for similar work in the labor market. Paid fringe benefits that are reasonable, allowable and allocable may be included in the valuation.
3. Cost Share contribution (including in kind services) shall be for costs and services directly attributed to activities included in the Grant Agreement. These services, furnished by professional and technical

personnel, consultants, and other skilled and unskilled labor may be counted as in-kind if the activities are an integral and necessary part of the project funded by the Grant Agreement.

4. Cash contributions made to a project shall be documented as revenue and in-kind services as expenditure. These costs should be tracked separately in the Grantee's accounting system.

**EXHIBIT I**  
**LOCAL PROJECT SPONSORS (NOT USED)**





**Table 1**  
**Accounting of GSP Development Efforts in the White Wolf Basin, 2018 Quarter 3 <sup>(1)</sup>**  
 Tejon-Castac Water District

Revised		EKI Task Name	Technical Consultant Cost	Assumed Grant Reimbursable Amount <sup>(2)</sup>	Grant Cost Share Amount <sup>(2)</sup>	Not Grant Reimbursable Amount <sup>(3)</sup>	
Grant Task	Subtask #						
(a) - Project Administration	1.1	<i>Proposition 1 Grant Management, Administration, and Reporting</i>	\$5,018	\$2,509	\$2,509	\$0	
	1.2	<i>Project Management</i>	\$7,500	\$3,750	\$3,750	\$0	
	1.3	<i>Quality Assurance/Quality Control</i>	\$0	\$0	\$0	\$0	
(b) - Stakeholder Engagement	2.1	<i>Develop Stakeholder Communication and Engagement Plan</i>	\$0	\$0	\$0	\$0	
	2.2	<i>Conduct Stakeholder Engagement Related to GSP Foundation</i>	\$2,867	\$1,433	\$1,433	\$0	
	2.3	<i>Conduct Stakeholder Engagement Related to Basin Characterization and Analysis</i>	\$958	\$479	\$479	\$0	
(c) - GSP Development	3.1	<i>Provide Initial Notification of GSP Development</i>	\$0	\$0	\$0	\$0	
	3.2	<i>Select or Design Data Management System (DMS)</i>	\$2,045	\$1,086	\$959	\$0	
	3.3	<i>Gather Available Data and Compile into DMS</i>	\$8,832	\$4,691	\$4,141	\$0	
	3.4	<i>Compile Information on the Plan Area and Basin Management Activities</i>	\$0	\$0	\$0	\$0	
	3.5	<i>Conduct Data Gaps Assessment</i>	\$11,664	\$6,195	\$5,468	\$0	
	3.6	<i>Evaluate Numerical Groundwater Modeling Options</i>	\$527	\$280	\$247	\$0	
	3.7	<i>Update GSP Development Funding Plan</i>	\$0	\$0	\$0	\$0	
	3.8	<i>Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$26,079	\$13,852	\$12,227	\$0	
	3.9 <sup>(4)</sup>	<i>Implement Plan for Filling Data Gaps Needed for GSP Preparation</i>	\$6,543	\$0	\$6,543	\$0	
	3.10	<i>Assess Groundwater Conditions &amp; Develop Hydrogeologic Conceptual Model</i>	\$18,918	\$10,048	\$8,870	\$0	
	3.11	<i>Coordinate Regarding C2VSim Modeling</i>	\$4,278	\$2,272	\$2,005	\$0	
	3.12	<i>Develop Basin-Wide Water Budget</i>	\$32,671	\$17,353	\$15,318	\$0	
	3.13	<i>Assess Existing Monitoring Programs &amp; Develop SGMA-Compliant Monitoring Network</i>	\$0	\$0	\$0	\$0	
	3.14	<i>Implement GSP Development Funding Plan</i>	\$0	\$0	\$0	\$0	
Travel <sup>(3)</sup>	4.1	<i>Travel</i>	\$849	\$0	\$0	\$849	
Total Technical Consultant Cost			<b>\$128,749</b>	<b>\$63,950</b>	<b>\$63,950</b>	<b>\$849</b>	<b>Amount Owed to TCWD <sup>(5)</sup></b>
Amount Incurred and Paid by AEWSWD			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,317</b>
Amount Incurred And Paid by TCWD			<b>\$128,749</b>	<b>\$63,950</b>	<b>\$63,950</b>	<b>\$849</b>	<b>--</b>
Amount Incurred and Paid by WRMWSD			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,317</b>

**Abbreviations:**

AEWSWD = Arvin-Edison Water Storage District  
 GSA = Groundwater Sustainability Agency  
 GSP = Groundwater Sustainability Plan  
 HCM = hydrogeologic conceptual model

SGMA = Sustainable Groundwater Management Act  
 TCWD = Tejon-Castac Water District  
 WRMWSD = Wheeler Ridge-Maricopa Water Storage District

**Notes:**

- (1) 2018 Quarter 3 fees incurred between 30 June 2018 and 21 September 2018  
 (2) Subtask reimbursement percentage may vary; Grant reimbursable and cost share percentage always equals 50% at the grant task level.  
 (3) Billed travel expenses are not eligible for grant reimbursement nor cost share.  
 (4) Subtask 3.9 is not eligible for Prop 1 grant reimbursement in order to remain eligible for other grants.  
 (5) Amount owed calculated assuming even division of technical consultant cost less travel amount.

**Table 1**  
**Accounting of GSP Development Efforts in the White Wolf Basin, 2018 Quarter 4<sup>(1)</sup>**  
 Tejon-Castac Water District

Revised			Technical Consultant Cost	Assumed Grant Reimbursable Amount <sup>(2)</sup>	Grant Cost Share Amount <sup>(2)</sup>	Not Grant Reimbursable Amount <sup>(3)</sup>	
Grant Task	Subtask #	EKI Task Name					
(a) - Project Administration	1.1	<i>Proposition 1 Grant Management, Administration, and Reporting</i>	\$1,123	\$562	\$562	\$0	
	1.2	<i>Project Management</i>	\$3,557	\$1,778	\$1,778	\$0	
	1.3	<i>Quality Assurance/Quality Control</i>	\$6,573	\$3,286	\$3,286	\$0	
(b) - Stakeholder Engagement	2.1	<i>Develop Stakeholder Communication and Engagement Plan</i>	\$0	\$0	\$0	\$0	
	2.2	<i>Conduct Stakeholder Engagement Related to GSP Foundation</i>	\$0	\$0	\$0	\$0	
	2.3	<i>Conduct Stakeholder Engagement Related to Basin Characterization and Analysis</i>	\$250	\$125	\$125	\$0	
(c) - GSP Development	3.1	<i>Provide Initial Notification of GSP Development</i>	\$0	\$0	\$0	\$0	
	3.2	<i>Select or Design Data Management System (DMS)</i>	\$0	\$0	\$0	\$0	
	3.3	<i>Gather Available Data and Compile into DMS</i>	\$234	\$136	\$98	\$0	
	3.4	<i>Compile Information on the Plan Area and Basin Management Activities</i>	\$11,276	\$6,542	\$4,734	\$0	
	3.5	<i>Conduct Data Gaps Assessment</i>	\$21,744	\$12,616	\$9,128	\$0	
	3.6	<i>Evaluate Numerical Groundwater Modeling Options</i>	\$0	\$0	\$0	\$0	
	3.7	<i>Update GSP Development Funding Plan</i>	\$4,576	\$2,655	\$1,921	\$0	
	3.8	<i>Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$5,252	\$3,047	\$2,205	\$0	
	3.9 <sup>(4)</sup>	<i>Implement Plan for Filling Data Gaps Needed for GSP Preparation</i>	\$14,203	\$0	\$14,203	\$0	
	3.10	<i>Assess Groundwater Conditions &amp; Develop Hydrogeologic Conceptual Model</i>	\$16,706	\$9,693	\$7,013	\$0	
	3.11	<i>Coordinate Regarding C2VSim Modeling</i>	\$0	\$0	\$0	\$0	
	3.12	<i>Develop Basin-Wide Water Budget</i>	\$26,837	\$15,571	\$11,267	\$0	
	3.13	<i>Assess Existing Monitoring Programs &amp; Develop SGMA-Compliant Monitoring Network</i>	\$832	\$483	\$349	\$0	
	3.14	<i>Implement GSP Development Funding Plan</i>	\$1,102	\$640	\$463	\$0	
Travel <sup>(3)</sup>	4.1	<i>Travel</i>	\$32	\$0	\$0	\$32	
Total Technical Consultant Cost			<b>\$114,297</b>	<b>\$57,132</b>	<b>\$57,132</b>	<b>\$32</b>	<b>Amount Owed to TCWD<sup>(5)</sup></b>
Amount Incurred and Paid by AEWSWD			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$19,044</b>
Amount Incurred And Paid by TCWD			<b>\$114,297</b>	<b>\$57,132</b>	<b>\$57,132</b>	<b>\$32</b>	<b>--</b>
Amount Incurred and Paid by WRMWSD			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$19,044</b>

**Abbreviations:**

AEWSWD = Arvin-Edison Water Storage District  
 GSA = Groundwater Sustainability Agency  
 GSP = Groundwater Sustainability Plan  
 HCM = hydrogeologic conceptual model

SGMA = Sustainable Groundwater Management Act  
 TCWD = Tejon-Castac Water District  
 WRMWSD = Wheeler Ridge-Maricopa Water Storage District

**Notes:**

- (1) 2018 Quarter 4 fees incurred between 22 September 2018 and 28 December 2018  
 (2) Subtask reimbursement percentage may vary; Grant reimbursable and cost share percentage always equals 50% at the grant task level.  
 (3) Billed travel expenses are not eligible for grant reimbursement nor cost share.  
 (4) Subtask 3.9 is not eligible for Prop 1 grant reimbursement in order to remain eligible for other grants.  
 (5) Amount owed calculated assuming even division of technical consultant cost less travel amount.

# **Sustainable Groundwater Management Act 2018 Basin Prioritization**

Process and Results

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State of California  
California Natural Resources Agency  
Department of Water Resources  
Sustainable Groundwater Management Program

JANUARY 2019



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## Acronyms and Abbreviations

Cal-SIMETAW	California Simulation of Evapotranspiration of Applied Water
CASGEM	California Statewide Groundwater Elevation Monitoring
COD	Critical Overdraft
DOF	California Department of Finance
DWR	California Department of Water Resources
GAMA	Groundwater Ambient Monitoring and Assessment
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
MCL	Maximum Contaminant Level
NHD	National Hydrography Dataset
OSWCR	Online System for Well Completion Reports
PLSS	Public Land Survey System
PWSS	Public Water System Statistics
SGMA	Sustainable Groundwater Management Act
SWRCB	State Water Resources Control Board
UNAVCO	University NAVSTAR Consortium
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WCR	Well Completion Report (DWR Form 188)



## I. Purpose of Report

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This report describes the background, process, and results of the 2018 Sustainable Groundwater Management Act (SGMA) Basin Prioritization. The California Department of Water Resources (DWR) is required to update California's groundwater basin prioritization in accordance with the requirements of SGMA and related laws.<sup>1</sup>

## II. Introduction

Bulletin 118 – Interim Update 2016 (California Department of Water Resources 2016a) defines 517 groundwater basins and subbasins in California. DWR is required to prioritize these 517 groundwater basins and subbasins as either High, Medium, Low, or Very Low. For the purposes of groundwater basin prioritization, basins and subbasins are processed equally and are referred to as basins in this report.

It is the policy of the State through SGMA that groundwater resources be managed sustainably for long-term reliability and multiple benefits for current and future beneficial uses. The State also recognizes that sustainable groundwater management is best achieved locally through the development, implementation, and updating of plans and programs based on the best available science.

DWR plays a key role in providing the framework for sustainable groundwater management in accordance with the statutory requirements of SGMA and other provisions within the California Water Code (Water Code). Other State agencies, including the State Water Resources Control Board (SWRCB) and California Department of Fish and Wildlife, play a role in SGMA implementation and are required to consider SGMA when adopting policies, regulations, or criteria, or when issuing orders or determinations, where pertinent.<sup>2</sup>

## III. Background

Groundwater basin prioritization was initially completed by DWR in response to legislation enacted in California's [2009 Comprehensive Water Package](#) (California Department of Water Resources 2009), which established Part 2.11 of the Water Code requiring groundwater elevations be monitored seasonally in all groundwater basins identified in the Bulletin 118 - 2003 Update<sup>3</sup> (California Department of Water Resources 2003a). Part 2.11 added general provisions to the Water Code that required DWR to identify the extent of groundwater elevation monitoring undertaken within each basin and directed DWR to prioritize basins for that purpose. In response to the new requirements of Part 2.11, DWR established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. In June 2014, the CASGEM Program released its prioritization for the groundwater basins identified in Bulletin 118 - 2003

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<sup>1</sup> Water Code sections 10722.4 and 10933.

<sup>2</sup> Water Code Section 10720.9.

<sup>3</sup> Stats. 2009-2010, 7th Ex. Sess., c. 1 (S.B.6), § 1, eff. Feb. 3, 2010.

Update. The 2014 CASGEM Basin Prioritization classified basins as high, medium, low, or very low based on the consideration of the eight components required in Water Code Section 10933(b).

In September 2014, Governor Brown signed into law three bills that formed SGMA.<sup>4</sup> SGMA required that DWR update basin priority for each groundwater basin no later than January 31, 2015, and reassess the prioritization anytime DWR updates the Bulletin 118 basin boundaries.<sup>5</sup> DWR applied the 2014 CASGEM Basin Prioritization as the initial 2015 SGMA Basin Prioritization under SGMA, resulting in the designation of 127 high and medium priority basins (California Department of Water Resources 2014a).

SGMA applies to all California groundwater basins and requires that high and medium priority groundwater basins form Groundwater Sustainability Agencies (GSAs) and be managed in accordance with locally-developed Groundwater Sustainability Plans (GSPs) or Alternatives to GSPs (Alternatives). High and medium priority basins that are identified in Bulletin 118 – Interim Update 2016 as a Critically Overdrafted Basin are required to submit a GSP by January 31, 2020. The remaining high and medium priority basins are required to submit a GSP by January 31, 2022.

In the fall of 2016, DWR completed and released groundwater basin boundary modifications. DWR published Bulletin 118 – Interim Update 2016, which included the boundary modifications, on December 22, 2016. As a result of these modifications, basin prioritization is required for the groundwater basins identified in Bulletin 118 – Interim Update 2016.

## IV. 2018 SGMA Basin Prioritization

The 2018 SGMA Basin Prioritization process was conducted to reassess the priority of the groundwater basins following the 2016 basin boundary modifications, as required by the Water Code.<sup>6</sup> For the 2018 SGMA Basin Prioritization, DWR followed the process and methodology developed for the 2014 CASGEM prioritization, adjusted as required by SGMA and related legislation. DWR is required to prioritize basins for the purposes of SGMA,<sup>7</sup> which was enacted, among other things, to provide for the sustainable management of groundwater basins. This entailed a reassessment of factors that had been utilized in the CASGEM program to prioritize basins based on groundwater elevation monitoring. SGMA also required DWR to continue to prioritize basins based on a consideration of the components specified in Water Code Section 10933(b), but the list of components had been amended to include the italicized language:

1. The population overlying the basin or subbasin.
2. The rate of current and projected growth of the population overlying the basin or subbasin.

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<sup>4</sup> Stats.2014, c. 346 (S.B.1168), § 3, c. 347 (A.B.1739), § 18, c. 348 (S.B.1319), § 2, eff. Jan. 1, 2015.

<sup>5</sup> Water Code sections 10722.4(b) and 10722.4(c)

<sup>6</sup> Water Code Section 10722.4(c)

<sup>7</sup> Water Code Section 10722.4(a)

3. The number of public supply wells that draw from the basin or subbasin.
4. The total number of wells that draw from the basin or subbasin.
5. The irrigated acreage overlying the basin or subbasin.
6. The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water.
7. Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation.
8. Any other information determined to be relevant by the department, *including adverse impacts on local habitat and local streamflows*.

DWR incorporated new data, to the extent data are available<sup>8</sup>, and the amended language of Water Code Section 10933(b)(8) (component 8) to include an analysis of adverse impacts on local habitat and local streamflows as part of the prioritization. Evaluation of groundwater basins at a statewide scale does not necessarily capture the local importance of groundwater resources within the smaller-size or lower-use groundwater basins. For many of California's low-use basins, groundwater provides close to 100 percent of the local beneficial uses. Thus, when reviewing the 2018 SGMA Basin Prioritization results, it is important to recognize the findings are not intended to characterize groundwater management practices or diminish the local importance of the smaller-size or lower-use groundwater basins; rather, the results are presented as a statewide assessment of the overall importance of groundwater resources in meeting beneficial uses.

The following information was deemed relevant and considered as part of component 8 for the 2018 SGMA Basin Prioritization based on SGMA:

- Adverse impacts on local habitat and local streamflows.
- Adjudicated areas.
- Critically overdrafted basins.
- Groundwater-related transfers.

Additional information about how each of these components were analyzed can be found in the process section of this document.

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<sup>8</sup> Water Code Section 10933(b)

## V. Process

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The 2014 CASGEM and 2018 SGMA Basin Prioritization used the basin's total priority points assigned to each of the eight components to determine the priority. Based the total accumulated priority points, the basin was assigned a very low, low, medium, or high priority. Both prioritization processes included additional evaluations of the basins that could alter the points assigned and thus the priority.

Additionally, the 2014 CASGEM Basin Prioritization used the Bulletin 118 - Update 2003 basin boundary shapefile (California Department of Water Resources 2003b) and the 2018 SGMA Basin Prioritization used the Bulletin 118 – Interim Update 2016 basin boundary shapefile (California Department of Water Resources 2016b). The data source, process, and steps used to evaluate each of the eight components of Water Code Section 10933(b) are described below.

### Component 1: The population overlying the basin or subbasin<sup>9</sup>

#### Data Source

- 2010 United States Census population block data (California)

#### Process

Population density was analyzed for the 2018 SGMA Basin Prioritization using the same methods and data relative to the 2014 CASGEM Basin Prioritization. The 2010 United States Census population block data (United States Census Bureau 2010a and b) was used to calculate the population overlying each groundwater basin using the following methods:

- For population blocks contained wholly within a basin boundary, all population in the block was included in the basin population total.
- For population blocks located partially within the basin, the proportion of the population included was equal to the proportion of the area of the block contained within the basin and was applied to the basin population total. For example, if 60% of the population block was within basin boundaries, then 60% of the reporting block total population was attributed to the total population of the basin.

**Step 1 – Calculate Basin's Total Population:** The basin's total population was calculated by summing all the included population blocks per the two methods described above.

**Step 2 – Calculate the Population Density:** The basin's 2010 population density was calculated by dividing the basin's total population (Step 1) by the basin's area (square miles – Appendix 6).

Table 1 lists the priority points and associated ranges of population density.

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<sup>9</sup> Water Code Section 10933(b)(1)

**Table 1 Component 1: Priority Points and Ranges for Population Density**

Priority Points	Population Density (people/square mile) 'x' = population density
0	$x < 7$
1	$7 \leq x < 250$
2	$250 \leq x < 1,000$
3	$1,000 \leq x < 2,500$
4	$2,500 \leq x < 4,000$
5	$x \geq 4,000$

## Component 2: The rate of current and projected growth of the population overlying the basin or subbasin<sup>10</sup>

### Data Source

- 2000 and 2010 United States Census population block data (California)
- California Department of Finance (DOF) current trend 2030 county population projections
- 2000 and 2010 county population estimates developed for the California Water Plan Update 2018 (California Department of Water Resources 2018a)

### Process

Population growth was analyzed for the 2018 SGMA Basin Prioritization using the same methods and data relative to the 2014 CASGEM Basin Prioritization.

#### Part A: Estimating Basin and Non-Basin Population within each County

**Step 1 – Calculate the 2000 and 2010 Basin Population:** The 2000 (United States Census Bureau 2000a and b) and 2010 population were estimated for all basins and portions of basins within each county using the methods described for component 1.

**Step 2 – Calculate the 2000 and 2010 Non-Basin Area Population by County:** For each county, the 2000 United States Census population block data (United States Census Bureau 2000a and b) and 2010 United States Census population block data were used to calculate the population overlying non-basin area in each county:

- For population blocks contained wholly outside of a basin boundary and within the county, all population in the block was included in the non-basin population total for the county.
- For population blocks located partially outside of a basin boundary and within the county, the proportion of the population block contained outside of a basin was applied to the non-basin population total for the county. For example, if 40 percent of the reporting block total population was located outside of a basin boundary, 40 percent of the population was attributed

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<sup>10</sup> Water Code Section 10933(b)(2)

to the total population of the non-basin area.

- For population blocks located outside of a basin boundary and partially outside of the county, the proportion of the population block contained within the county was applied to the non-basin population total. For example, if 60 percent of the population block was within county boundaries, then 60 percent of the reporting block total population was attributed to the total population of the non-basin area.

**Step 3 – Calculate the Difference Between the 2000 and 2010 Population:** The difference between the 2000 and 2010 population estimates for each of the basins, portions of basins, and non-basin areas was calculated within each county.

**Step 4 – Calculate the Share of the Basin’s Population Growth:** The total population difference for the county was determined by summing the values from Step 3. The share (percentage) of the basin’s population growth over the 2000 to 2010 decade was calculated by dividing the total basin population difference by the total county population difference.

**Step 5 – Calculate the Projected Population Change from 2010 to 2030:** The DOF current trend 2030 population projection for the county was used to determine the total change in county population between 2010 estimates and 2030 population projections.

**Step 6 – Calculate the 2030 Population Projection:** Each basin and non-basin share percentage (Step 4) was multiplied by the total 2030 projected change (Step 5) to produce a 2030 population projection for each basin and non-basin area within the 58 counties. For most basins located within a single county, the 2030 population projection was considered complete. Some low-population basins required minor adjustments when the projected population resulted in a negative value. In these situations, the population was adjusted to zero and the initial basin’s results were redistributed to the other basin and non-basin areas in the county. For basins located in more than one county, the 2030 population projections for each portion of a basin that crossed a county boundary were summed to produce a 2030 population projection for the entire basin.

Estimates of population growth obtained using the methods described above were evaluated and adjusted, as necessary, to conform with DOF current trend 2030 county projections per California Government Code Section 13073(c).

### **Part B: Determining the 2030 Population Growth (Percentage)**

The projected percent growth within each basin was determined by subtracting the 2010 population estimate (component 1) from the 2030 population projection (Step 6 of Part A) and dividing the result by the 2010 population estimate:

$$\text{Percent Growth} = \frac{(\text{Projected 2030 Basin Population} - \text{2010 Basin Population})}{\text{2010 Basin Population}} * 100$$

### **Part C: Determining the Priority Points for Population Growth**

Using the percent growth calculated in Step 4 of Part A, the basin was assigned the preliminary priority

points identified in Table 2. Before determining the priority points, additional analysis was completed to determine if the basin met the minimum requirements for population growth as defined in the 2014 CASGEM Basin Prioritization process (California Department of Water Resources 2014b):

- Does the basin have zero 2010 population?
- Does the basin have less than or equal to zero percent growth?
- Is the basin’s 2010 population (component 1) less than 1,000 people and does the basin have growth greater than zero?
- Is the basin’s 2010 basin population less than or equal to 25,000 and is the basin's 2010 population density less than 50 people per square mile?

If the answer was ‘yes’ to any of the four questions above, the priority points for component 2 were recorded as zero. If the answer was ‘no’ to all four questions above, the priority points were applied to each basin based on the percentage of population growth. Table 2 lists the priority points and associated ranges of population growth percentage.

**Table 2 Component 2: Priority Points and Ranges for Population Growth**

Priority Points	Population Growth (percent) ‘x’ = Population growth percentage
0	$x \leq 0$
1	$0 < x < 6$
2	$6 \leq x < 15$
3	$15 \leq x < 25$
4	$25 \leq x < 40$
5	$x \geq 40$

### Component 3: The number of public supply wells that draw from the basin or subbasin<sup>11</sup>

#### Data Source

- SWRCB, Division of Drinking Water - Public Supply Database, March 2016
- Local public supply well location and use information received through public comment process

#### Process

Public supply wells were analyzed for the 2018 SGMA Basin Prioritization using the same methods and updated data relative to the 2014 CASGEM Basin Prioritization.

<sup>11</sup> Water Code Section 10933(b)(3)

The SWRCB public supply well database (State Water Resources Control Board 2016) was used to calculate the number of public supply wells that draw from the basin, as it is the only statewide dataset that includes records associated with supply water for the public. The SWRCB public supply well database was accessed during March 2016 for the 2018 SGMA Basin Prioritization process. Each record in the database contains fields for active and inactive systems, water source (groundwater or surface water), and testing location. Different records for the same public supply system can exist due to separate testing locations for water quality. In most cases, the only distinction is in the location name.

During the comment period for the 2018 draft SGMA Basin Prioritization, supplemental data was supplied by local agencies that more accurately represented public supply wells. In cases when supplemental data was supplied by local agencies and approved, the supplemental data was used for that basin.

The public supply data was processed by taking the following steps:

**Step 1 – Query the Public Supply Well Database for Active Wells:** The individual public supply wells that draw from each basin were determined by querying the public supply well database for entries classified as ‘active,’ and ‘groundwater,’ and that contained the word ‘well’ in the location name. Only wells active as of the time the data was extracted (March 2016) were included in this analysis. The number of individual public supply wells determined in this manner is not intended to establish an absolute value for any given basin, but to provide a relative measure of such wells between basins.

**Step 2 – Perform Quality Control of Public Supply Well Coordinates:** Each record from Step 1 was reviewed to identify incomplete or blank coordinates. Incomplete coordinates did not include enough decimal places in the coordinates to reliably map. They were corrected, when possible, using available attributes provided with public supply data. Records with blank coordinates were also corrected, when possible, using available attributes provided with public supply data. Wells with corrected coordinates were identified as modified with a “DWR” tag.

**Step 3 – Compare Coordinates to County Codes:** Public supply well locations were compared to the two-digit County Code included in the Public Water System Identification Number. If the well location did not fall within the proper county and location information was not readily available in the public supply well attributes, the public supply well was not included in the dataset.

**Step 4 – Sum of Wells in Basin:** Using Geographic Information System (GIS) software, the number of wells in each basin were counted based on the reconciled information from Steps 2 and 3.

**Step 5 – Calculate the Public Supply Well Density:** To calculate the public supply well density, the number of public supply wells (Step 4) was divided by the basin area (square miles).

Priority points were applied to each basin based on the calculated public supply well density. Table 3 lists the priority points and associated ranges of public supply well density.

**Table 3 Component 3: Priority Points and Ranges for Public Supply Well Density**

Priority Points	Public Supply Well Density (x = wells per square mile)
0	$x = 0$
1	$0 < x < 0.1$
2	$0.1 \leq x < 0.25$
3	$0.25 \leq x < 0.5$
4	$0.5 \leq x < 1.0$
5	$x \geq 1.0$

## Component 4: The total number of wells that draw from the basin or subbasin<sup>12</sup>

### Data Source

- Online System for Well Completion Reports (OSWCR) (California Department of Water Resources 2017)
- Local well location and use information received through public comment process

### Process

Production wells were analyzed for the 2018 SGMA Basin Prioritization using updated methods and data relative to the 2014 CASGEM Basin Prioritization. Updated methods included defining production wells and improving the well location process. Both updated methods are further described below.

DWR’s new OSWCR database, which was not available at the time of the 2014 CASGEM Basin Prioritization, was used for the 2018 SGMA Basin Prioritization. The OSWCR database is a statewide dataset of well completion reports (WCRs). Each WCR contains useful information including well type, location, construction details, time of drilling, well performance, and aquifer characteristics.

During the comment period for the draft 2018 SGMA Basin Prioritization results, supplemental data was supplied by local agencies that more accurately represented production wells. In cases where supplemental data was supplied by local agencies and approved, the supplemental data was used for that basin.

### Part A – Identifying Production Wells

The OSWCR database was used to identify production wells whose well use type within the WCR is listed as agriculture, domestic, irrigation, municipal, commercial, stock, industrial, or other extraction. If the well use type was not provided on the WCR, the following information, if present, was evaluated to

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<sup>12</sup> Water Code Section 10933(b)(4)

determine if the WCR would be used for component 4.

- Many WCRs considered as ‘unknown’ well type provide information about the well casing size and total depth. Criteria for separating production from non-production wells based on well casing size and total depth was established by reviewing domestic and water quality monitoring WCRs. It was determined that screening for a well casing greater than or equal to 4 inches and a total depth greater than or equal to 22 feet to identify production wells would provide the best balance between the urban and rural well characteristics. If the criteria of a well casing greater than or equal to 4 inches and a total depth greater than or equal to 22 feet were met, the WCR was considered to be a production well.
- In some cases, the WCR only provided information on either well casing diameter or well depth information. For WCRs that only provided well casing size, the casing had to be greater than or equal to 4 inches to be considered a production well. For WCRs that only provided well depth, the well depth had to be greater than or equal to 22 feet to be considered a production well.

### **Part B – Determining the Location of Production Wells to the Highest Resolution**

Well locations were determined using information included on the WCRs. For WCRs that included latitude and longitude, the coordinates were used to determine well locations. The spatial resolution in these cases was assumed to be absolute.

For WCRs that provided a spatial reference location based on Public Land Survey System (PLSS) data, a centroid location was assigned. The spatial reference location for a well gives a general well location within a known area rather than the actual well location. The process for assigning a well location to a spatial reference location based on information provided in the WCRs is discussed below:

- **WCRs with township-range-section, baseline meridian, and county information:** For WCRs that included township-range-section, baseline meridian, and county information, a section centroid was used as the well location. If the given section was split by a county line, a county-section was created for each portion of the section, and WCRs that identified the county and PLSS location were assigned to that county-section. WCRs were assigned coordinates representing their respective county-section centroid. The spatial resolution in these cases was less than or equal to one square mile.
- **WCRs with incorrect or without baseline meridian:** For WCRs that either did not provide a baseline meridian or provided an incorrect baseline meridian, the county location information was relied upon to locate the well to a county-section and assign a respective centroid. The spatial resolution in these cases was less than or equal to one square mile.
- **WCRs with incorrect or without county:** For WCRs that either did not provide a county or provided an incorrect county, the township-range-section and baseline meridian information was relied on to locate the well to a section and assign a respective centroid. The spatial resolution in these cases was less than or equal to one square mile.
- **WCRs without township-range-section, baseline meridian, and county information:** All WCRs that did not provide township-range-section, baseline meridian, and county information were discarded from the analysis.

### Part C – Estimating Number of Production Wells within a Basin

The total number of production wells in a basin was estimated by considering all the wells actually and potentially located in the basin. Wells assigned a centroid location were proportionally counted because the exact location of the wells was unknown. The process for proportionally counting wells is described below:

**Step 1 – Map Wells using GIS Software:** All wells with coordinates (absolute or section centroid coordinates) were mapped using Geographic Information System (GIS) software.

**Step 2 – Sum Wells Wholly in Basin:** Based on results from Step 1, if a well’s absolute location or entire section’s area associated with the centroid was wholly within a basin boundary, it was counted as one well.

**Step 3 – Sum Wells Partially in Basin:** Based on results from Step 1, if a section’s area associated with the centroid was only partially located in a basin, all the wells within the section were proportionally counted based on the proportion of the spatial reference area located in the basin. For example, if only 50 percent of a section’s spatial reference area was located in a basin, then all the wells in the section’s spatial reference area were given a weighted value of 0.50 for that basin.

**Step 4 – Calculate Total Number of Production Wells:** The total number of production wells (Steps 2 and 3) in each basin was summed and then rounded down to the nearest whole number.

### Part D – Determining the Basin Production Well Density

Once production well totals were calculated for each basin (Part C), the production well density was calculated by dividing the basin’s total number of production wells by the basin’s area (square mile).

Table 4 lists the priority points and associated ranges of production well density.

**Table 4 Component 4: Priority Points and Ranges for Total Production Well Density**

Priority Points	Production Well Density (x = production wells per square mile)
0	$x = 0$
1	$0 < x < 2$
2	$2 \leq x < 5$
3	$5 \leq x < 10$
4	$10 \leq x < 20$
5	$x \geq 20$

## Component 5: The irrigated acreage overlying the basin or subbasin<sup>13</sup>

### Data Source

- Statewide Crop Mapping 2014 (California Department of Water Resources 2014c)
- Local land use information received through public comment process

### Process

The consideration of irrigated acreage as a component of the 2018 SGMA Basin Prioritization used the same methods with updated data as relative to the 2014 CASGEM Basin Prioritization. The 2014 CASGEM Basin Prioritization used DWR Land Use mapping data to determine irrigated acres. However, the land use data represented multiple years of survey efforts throughout the State. For the 2018 SGMA Basin Prioritization, the Statewide Crop Mapping 2014 dataset was used to provide statewide coverage for a single year. The Statewide Crop Mapping 2014 dataset is a statewide, comprehensive field-level assessment of summer-season agriculture, managed wetlands, and urban boundaries for the 2014 year.

For the purposes of basin prioritization, all agriculture identified in the Statewide Crop Mapping 2014 dataset was identified as irrigated unless an agricultural field had been previously identified by DWR as dry-farmed. Only irrigated acreage inside the basin boundaries was included in the calculation and analysis. This was accomplished by overlying the spatial crop mapping data on groundwater basin boundaries to determine total agricultural field acreage overlying the basin.

During the comment period for the draft 2018 SGMA Basin Prioritization results, supplemental data was supplied by local agencies that more accurately represented irrigated acreage. In cases where supplemental data was supplied by local agencies and approved, the supplemental data was used for that basin.

The basin's irrigated acreage density was calculated by dividing the basin's total irrigated acreage by the basin's area (square mile).

Table 5 lists the priority points and associated ranges of density of irrigated acres.

**Table 5 Component 5: Priority Points and Ranges for Density of Irrigated Acres**

Priority Points	Density of Irrigated Acres (x = acres of irrigation per square mile)
0	$x < 1$
1	$1 \leq x < 25$
2	$25 \leq x < 100$
3	$100 \leq x < 200$
4	$200 \leq x < 350$
5	$x \geq 350$

<sup>13</sup> Water Code Section 10933(b)(5)

## **Component 6: The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water<sup>14</sup>**

The groundwater reliance component in basin prioritization is comprised of two elements: total estimated groundwater use in the basin, referred to as Groundwater Use (sub-component 6.a), and the overall percent groundwater represents of the estimated total water use in the basin, referred to as Groundwater Reliance (sub-component 6.b).

### ***Sub-component 6.a: Evaluating Volume of Groundwater Use***

The consideration of groundwater use as a sub-component of the 2018 SGMA Basin Prioritization groundwater reliance component used updated methods and data relative to the 2014 CASGEM Basin Prioritization. The 2014 CASGEM Basin Prioritization used the DWR Agricultural model. For the 2018 SGMA Basin Prioritization, agricultural groundwater use was calculated by incorporating the crop types and total acreage from component 5 (above) into the California Simulation of Evapotranspiration of Applied Water (Cal-SIMETAW) v3.2 model (Morteza et al. 2013). The Cal-SIMETAW model was used for the 2018 SGMA Basin Prioritization to be consistent with the California Water Plan 2018. The model results were represented by evapotranspiration of applied water for each crop in the basin, representing total water demand not met by precipitation in Water Year 2014.

The updated process for this sub-component also included the use of Water Year 2014 (October 1, 2013 to September 30, 2014) data for both agricultural applied water and urban water used. Water Year 2014 was used because the Statewide Crop Mapping 2014 dataset was the best statewide land use information available at the time of analysis. The 2014 land use information also serves as a bench mark of water use prior to the enactment of SGMA.

The updated process for calculating urban groundwater use (Part B, below) included the use of local agency data provided in the SWRCB Public Water System Statistics (PWSS) database (California Department of Water Resources 2014d) and water purveyor boundaries.

During the comment period for the draft 2018 SGMA Basin Prioritization results, supplemental data was supplied by local agencies that more accurately represented groundwater reliance. In cases where supplemental data was supplied by local agencies and approved, the supplemental data was used for that basin.

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<sup>14</sup> Water Code Section 10933(b)(6)

## Part A: Estimating Agricultural Groundwater Use

### Data Source

- California Simulation of Evapotranspiration of Applied Water v3.2
- Statewide Crop Mapping 2014 (California Department of Water Resources 2014c)
- Irrigated Acres (component 5)
- Water balance data develop to support the California Water Plan
- Local Data – submitted through public comment and approved by DWR

### Process

Agricultural groundwater use was estimated using the most recent Statewide Crop Mapping 2014 survey for land use acreages and the Cal-SIMETAW model, which incorporates local soil information, growth dates, crop coefficients, and evapotranspiration data from the Spatial California Irrigation Management Information System for water use demand estimates. Estimates were calculated using the following steps:

**Step 1 – Determine Total Acres of Each Major Crop:** The DWR Statewide Crop Mapping 2014 acreage data were overlaid on groundwater basin boundaries to determine the total acres of each DWR-defined major crop class (see Appendix 1) within the groundwater basins.

**Step 2 – Determine Applied Water per Acre per Major Crop:** The Cal-SIMETAW model was used to determine the volume of applied water for the DWR-defined major crop classes within the groundwater basins. Applied water per single acre of each DWR-defined major crop class was then estimated within each basin.

**Step 3 – Calculate Total Applied Water for Each Crop:** The estimates of applied water per single acre for each major crop class (Step 2) were multiplied by the total acres of DWR-defined major crop classes (Step 1) to estimate the total applied water for each crop class. The total applied water for each crop class was added to determine the total applied water for agriculture in the basin. The total applied water for each crop represents the combination of surface water and groundwater.

**Step 4 – Calculate Total Groundwater Use:** The total groundwater use (acre-feet) for the basin was estimated by multiplying the total applied water (Step 3) by the groundwater percentage of total applied water provided in the California Water Plan Update 2018.

## Part B: Estimating Urban Groundwater Use

### Data Source

- Public Water System Statistics (PWSS) database (California Department of Water Resources 2014d)
- Water purveyor boundaries (multiple sources)
- United States Department of Agriculture (USDA) National Agricultural Statistics Service CropScope and Cropland data layers (Urban portion) 2014
- Land Use surveys (Urban portion) (2000 through 2014)
- Groundwater Basin population data (2014)

- Local Data – submitted through public comment and approved by DWR

## Process

Urban groundwater use was estimated within each groundwater basin using the data sources listed above. The data sources were processed using the following methods:

**Step 1 - Determine Groundwater Basin Population:** Actual census population block data and DOF population estimates are only available for years ending in a zero. DWR required 2014 population data to process the urban groundwater volumes. DWR accessed a third-party demographics software (Nielsen Claritas 2014) that estimated the population based on groundwater basin boundaries to determine the 2014 population.

**Step 2 - Refine Water Purveyor Service Area:** Service area boundaries were compiled using multiple sources including a DWR database, direct inquiries, and information included in Urban Water Management Plans. The service area boundaries were then refined based on the urban land use data (U.S. Department of Agriculture 2014; California Department of Water Resources 2000 through 2014) and overlaid on groundwater basin boundaries. The basin fraction value of the boundary that overlies each basin was used in subsequent steps.

**Step 3 – Determine Population Served Within Groundwater Basin:** Urban water purveyors' PWSS water use and population served data (California Department of Water Resources 2014d) were linked to their respective service area boundaries which had been refined in Step 2. The basin fraction value (Step 2) of the water purveyor boundary was applied to the total population served to determine the population served within the basin.

**Step 4 - Determine Self-Supplied Population:** The self-supplied population was determined by calculating the difference between population served in the basin (Step 3) and the basin population (Step 1).

**Step 5 – Determine Water Purveyor Per-Capita Water Use:** The water purveyors' PWSS water use and population served data were used to develop their respective per-capita water use.

**Step 6 – Determine Groundwater Basin Per-Capita Water Use:** The water purveyors that were identified as having all or part of their service area within a basin were used in this calculation. Each water purveyors' per-capita water use was averaged together using their respective population served and basin fraction value (Step 2).

**Step 7 – Calculate Population-Based Water Use:** Groundwater basin per-capita estimates (Step 6) were multiplied by the corresponding groundwater basin 2014 population (Step 1) to produce an estimated population-based urban water use. If the groundwater basin did not have any organized water purveyors, DWR provided an estimated average per-capita use to be used in the calculation.

**Step 8a – Calculate Groundwater Use for Population Served by Water Purveyor:** The urban water purveyors’ PWSS data also reports the source of water used in their systems. DWR used this information along with the basin fraction value (Step 2) to calculate the basin’s surface water and groundwater volume and the respective percent of total water supplied.

**Step 8b – Calculate Groundwater Use for Self-Supplied Population:** Self-supplied groundwater use was calculated by multiplying the per-capita value determined in Step 6 by the self-supplied population. DWR determined the source of supply for the self-supplied population to be groundwater in most cases.

**Step 9 – Estimate Additional Groundwater Use:** Additional urban water uses (such as golf courses, parks, and self-supplied industrial) were calculated if data were available from local sources such as Urban Water Management Plans.

**Step 10 – Calculate Total Urban Groundwater Use:** The groundwater amounts calculated in Steps 8a, 8b, and 9 were combined to obtain the total urban groundwater use.

### Part C: Calculating Total Groundwater Use

Total groundwater use was calculated by adding agricultural groundwater use (Part A, Step 4) and urban groundwater use (Part B, Step 10). Basin groundwater use per acre was calculated for each basin by dividing the total acre-feet of groundwater use by the basin area (acres). Table 6 lists the points and associated ranges of groundwater use per acre.

**Table 6 Component 6.a: Points and Ranges for Groundwater Use per Acre**

Points	Groundwater Use per Acre (x = acre-ft / acre)
0	$x < 0.03$
1	$0.03 \leq x < 0.1$
2	$0.1 \leq x < 0.25$
3	$0.25 \leq x < 0.5$
4	$0.5 \leq x < 0.75$
5	$x \geq 0.75$

### *Sub-component 6.b: Evaluating Overall Supply Met by Groundwater*

#### Data Source

- Sub-component 6.a

#### Process

The consideration of overall supply met by groundwater (percent) as a component of the 2018 SGMA Basin Prioritization used the same methods and updated data relative to the 2014 CASGEM Basin Prioritization.

After developing the total groundwater volume for the groundwater basin (see sub-component 6.a – Evaluation of Volume of Groundwater Use), the percentage of groundwater supply was derived as the ratio of total groundwater volume to total water use.

**Step 1 – Calculate Total Groundwater Use:** Agricultural groundwater use was added to urban groundwater use to determine the total groundwater use for each basin (sub-component 6.a, Part C).

**Step 2 – Calculate Total Water Use:** Agricultural applied water (surface water and groundwater) was added to urban total supply (surface water and groundwater) to determine total water used within each basin.

**Step 3 – Calculate Percent of Total Water Supply Met by Groundwater:** Total groundwater used (Step 1) was divided by total water used (Step 2) to calculate the groundwater portion of the total water supply.

Table 7 lists the points and associated ranges of percent of total water supply met by groundwater.

**Table 7 Component 6.b: Points and Ranges for Percent of Total Water Supply Met by Groundwater**

Points	Total Supply Met by Groundwater (x = Groundwater Percent)
0	x = 0
1	0 < x < 20
2	20 ≤ x < 40
3	40 ≤ x < 60
4	60 ≤ x < 80
5	x ≥ 80

### Calculating the Total Priority Points for Groundwater Reliance

Priority Points for the degree to which persons overlying the basin rely on groundwater as their primary source of water was calculated by averaging the points for groundwater volume density (6.a) and percent of total water supply met by groundwater (6.b).

$$\text{Average (6.a Points + 6.b Points)} = \text{Priority Points}$$

### Component 7: Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation<sup>15</sup>

Documented impacts on groundwater were analyzed for the 2018 SGMA Basin Prioritization using updated data and methods relative to the 2014 CASGEM Basin Prioritization. The 2014 CASGEM Basin Prioritization treated all four of the sub-components (overdraft, subsidence, saline intrusion, and other

<sup>15</sup> Water Code Section 10933(b)(7)

water quality degradation) as a single impact and assigned up to five priority points to the basin based on the effect of the combined documented impacts. The 2018 SGMA Basin Prioritization included separate evaluation of documented groundwater impacts for each of the four sub-components. Points were assigned based on the presence or absence of documented impacts for each sub-category, with the exception of water quality degradation for which points were assigned based on the magnitude and extent of the reported contaminate levels. The updated process is summarized below and described in detail in the following sections.

Each of the four sub-components in component 7 were assigned different maximum points based on the nature of the impact, and whether the impact was susceptible to avoidance or remediation through sustainable groundwater management practices.

- Basins with declining groundwater levels were assigned 7.5 points.
- Basins with active inelastic subsidence were assigned ten points.
- Basins with historical inelastic subsidence were assigned three points.
- Basins with saline intrusion were assigned five points.
- Basins with water quality measurements that exceed minimum contaminate levels (MCLs) were assigned zero to three points. Basins were assigned zero to five priority points depending on the sum of all the points assigned for the four sub-components.

During the comment period for the draft 2018 SGMA Basin Prioritization results, supplemental data was supplied by local agencies that more accurately represented the conditions within the basin. In cases where supplemental data was supplied by local agencies and approved, the supplemental data was used for that basin.

### ***Sub-component 7.a: Documented Overdraft or Groundwater Level Decline***

#### **Data Source**

Declining groundwater levels were evaluated by reviewing groundwater level data published over the last 20 years. Evaluation also consisted of reviewing available hydrographs; groundwater management plans; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies; Bulletin 118 – Update 2003; California Water Plan Update 2013 (California Department of Water Resources 2015); Alternatives submitted pursuant to SGMA; and published environmental documents.

#### **Process**

Based on available groundwater level data, hydrographs, or similar data for each basin, groundwater levels were classified as being stable, rising, or declining. To make this determination, each piece of data was viewed back in time as far as possible. In many cases, data limited the review time frames to six to ten years, while other data extended back 20 years or more. The entire basin did not have to show declining groundwater levels to be classified as having declining groundwater levels. In most cases, multiple hydrographs were used to support the overall basin determination concerning the status of groundwater levels.

Basins that exhibited declining groundwater levels were assigned 7.5 points.

### ***Sub-component 7.b: Documented Subsidence***

#### **Data Source**

Evaluation of subsidence consisted of reviewing hydrographs, extensometer data, and land use data; groundwater management plans submitted to DWR; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies, including those from the NASA Jet Propulsion Laboratory and United State Geological Survey (USGS); Interferometric synthetic aperture radar via Sentinel-1A satellite maps; UNAVCO Plate Boundary Observatory graphs; Bulletin 118 – Update 2003; California Water Plan Update 2013; Alternatives submitted pursuant to SGMA; and environmental documents.

#### **Process**

Water Code Section 10933(b)(7) identifies subsidence as one of the four documented impacts DWR needs to consider under 2018 SGMA Basin Prioritization, to the extent data are available. Subsidence data related to groundwater extractions were evaluated to determine if subsidence was current or historical. To reach one of these determinations, data was viewed back in time as far as possible. In many cases the time frames were six to ten years for current conditions, while historical analyses required going back 20 years or more. When both historical and current subsidence was identified, only the current subsidence was considered for this sub-component.

Points were assigned depending on the status of subsidence found in the basin:

- Basins with no observed subsidence were assigned zero points.
- Basins with current subsidence were assigned ten points.
- Basins with historical subsidence were assigned three points.

### ***Sub-component 7.c: Documented Saline Intrusion***

#### **Data Source**

Saline intrusion was evaluated by reviewing available data published over the last 20 years. Evaluation consisted of reviewing hydrographs; groundwater management plans; annual reports, such as from watermasters and urban water districts; grant applications submitted to DWR; professional studies; Bulletin 118 – Update 2003; California Water Plan Update 2013; Alternatives submitted pursuant to SGMA; county hazards reports; and environmental documents.

#### **Process**

Saline intrusion in the coastal and Sacramento-San Joaquin Delta groundwater basins, as defined in Bulletin 118 – Interim Update 2016, was determined by researching available documents for references of past or present excess salinity problems.

The primary source of information used was local reports and studies that focused on the challenges of

saline intrusion within individual basins. The reports and studies directed at managing or preventing saline intrusion were related to:

- Water quality analyses.
- Projects designed to stop or reverse current or past intrusions.
- Groundwater management re-operation that reduced or shifted current operations to other parts of the basin or invested in enhanced groundwater and surface water conjunctive management.

### *Sub-component 7.d: Documented Water Quality Degradation*

#### **Data Source**

- SWRCB, Division of Drinking Water – Public Supply Database, all active wells (March 2016)
- SWRCB – GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) secure database (Division of Drinking Water, reported Water Quality results (as of April 4, 2017)
- SWRCB – Maximum Contaminate Level (MCL) list (as of November 2017)

#### **Process**

The 2018 SGMA Basin Prioritization followed a multi-part process to analyze water quality degradation in a basin. Initially, the water quality data maintained by the SWRCB Division of Drinking Water was used to conduct a statewide assessment of a range of water quality constituents. Data were analyzed using the following methods:

- Water quality testing data were queried statewide in the GeoTracker GAMA secure database (State Water Resources Control Board 2017) for each constituent with a MCL (Appendix 2).
- Data with a sample date between January 1, 2000 and April 4, 2017 and a recorded constituent concentration were included in the evaluation.
- Each water quality sample record was assigned to a groundwater basin as defined in Bulletin 118 – Interim Update 2016 using the well location data associated with each sample record in the GeoTracker GAMA database.
- Constituent concentrations were compared to MCLs, secondary MCLs, and Public Health Goals as defined in the California Code of Regulations Title 22 Division 4 Chapter 15. Records with instances of constituent concentrations that exceeded water quality criteria were retained for further evaluation.

Data were evaluated for both the magnitude of documented groundwater contamination and prevalence of impact to public drinking water and assigned points as described in sub-components 7.d.1 and 7.d.2, below. The next step in the analysis was to determine whether the basin had one or more of the documented impacts identified in component 7 (i.e. subsidence, declining groundwater levels, and saline intrusion), which are relevant because of the potential to exacerbate water quality degradation in the basin. The purpose of this analysis was to only include water quality impacts that are redressable through sustainable groundwater management practices.

### ***Sub-component 7.d.1: Evaluating the Magnitude of Documented Groundwater Contamination***

To compare the magnitude of groundwater contamination across multiple constituents with varying MCL values, the relative MCL exceedance was calculated for each sample record that exceeded the MCL value.

**Step 1 – Calculate Relative MCL Exceedance for Each Constituent:** The relative MCL exceedance was calculated by dividing the measured constituent concentration by the regulatory MCL value. For example, a data value that exceeded the regulatory MCL value by twice the limit would have a relative MCL exceedance of two.

**Step 2 – Calculate Average Relative MCL Exceedance for Each Basin:** For each basin, relative MCL exceedances for all constituents were averaged to generate an average relative MCL exceedance for the entire basin.

Table 8 lists the points and associated ranges of average relative MCL exceedance values for sub-component 7.d.1.

**Table 8 Sub-component 7.d.1: Points and Ranges for Documented Impacts – Water Quality Degradation – Average Relative MCL Exceedance**

Points	Average Relative MCL Exceedance X = Average Exceedance
0	$x \leq 1$
1	$1 < x < 2$
2	$2 \leq x < 3$
3	$3 \leq x < 4$
4	$4 \leq x < 6$
5	$x \geq 6$

### ***Sub-component 7.d.2: Evaluating the Prevalence of Documented Groundwater Contamination***

The prevalence of contamination in groundwater used as public drinking water in each basin was evaluated by dividing the number of unique wells with MCL exceedances within each basin by the number of public water supply wells in the basin (component 3). Because the selected water quality data set spanned the years 2000 to 2017, the actual number of public water supply wells in a basin would likely have varied as new wells went into service and other wells went offline, but this is common to all basins and not expected to skew the results. The number of public water supply wells calculated for component 3 was determined to most accurately represent the number of public water supply wells for the purposes of this evaluation.

An exception to this method was made if the water quality data indicated an MCL was exceeded, but no active public water supply wells were indicated from the component 3 assessment. In these cases, it was assumed that one public water supply well was present, or had been reactivated, in the basin, and the calculation of groundwater quality contamination proceeded as previously described.

The calculated value for the basin was then assigned points. Table 9 lists the points and associated ranges of values for sub-component 7.d.2.

**Table 9 Sub-component 7.d.2: Points and Ranges for Documented Impacts – Water Quality Degradation – Prevalence of Groundwater Contamination**

Points	Prevalence of Groundwater Contamination
	X = Value
0	$x = 0$
1	$0 < x < 0.5$
2	$0.5 \leq x < 0.75$
3	$0.75 \leq x < 1$
4	$x = 1$
5	$x > 1$

***Sub-component 7.d: Calculating Total Points for Documented Water Quality Degradation***

To obtain the points for documented water quality degradation, the points for average relative MCL exceedance (7.d.1) and points for prevalence of groundwater contamination (7.d.2) were combined; the total was then assigned points. Table 10 lists the points and associated range of water quality degradation values.

**Table 10 Sub-component 7.d: Points and Ranges for Documented Impacts – Water Quality Degradation**

Points	Documented Impacts – Water Quality Degradation
	X = Water Quality Points
0	$x < 3$
1	$3 \leq x < 6$
2	$6 \leq x < 8$
3	$x \geq 8$

**Calculating the Total Priority Points for Documented Impacts**

After each of the four types of documented impacts were assigned a value, the cumulative total of points was calculated. Table 11 lists the priority points and associated ranges of cumulative totals for documented impacts.

**Table 11 Component 7: Priority Points and Ranges for Documented Impacts – Cumulative Total**

Priority Points	Cumulative Total – Documented Impacts
0	$x \leq 3$
1	$3 < x < 7$
2	$7 \leq x < 11$
3	$11 \leq x < 15$
4	$15 \leq x < 19$
5	$x \geq 19$

**Component 8: Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows<sup>16</sup>**

*Sub-component 8.a: Adverse Impacts on Local Habitat and Local Streamflows*

Adverse impacts on local habitat and local streamflows were not evaluated or required to be evaluated for the 2014 CASGEM Basin Prioritization. The 2018 SGMA Basin Prioritization used the methods and sources described below.

**Data Source**

- Natural Communities Commonly Associated with Groundwater Dataset (Natural Communities)
- USGS National Hydrography Dataset (NHD)
- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)
- Basin Prioritization 2018 Documented Impacts (sub-component 7.a)

Adverse impacts on local habitat and local streamflows were identified by the legislature as an example of information relevant to basin prioritization.<sup>17</sup> Impacts to habitat and streamflow are significant factors in the prioritization of basins for the purposes of sustainable groundwater management because such impacts could indicate the depletion of interconnected surface waters, which has significant and unreasonable adverse impacts on beneficial uses of the surface water.<sup>18</sup> In the case of adverse impacts on local habitat and local streamflows, DWR determined that there was not sufficient consistent, reliable, statewide information available for the initial 2015 SGMA Basin Prioritization. After the initial 2015 SGMA Basin Prioritization, DWR developed a statewide Natural Communities dataset that assembled information on the location of seeps, springs, wetlands, rivers, vegetation alliances, and habitat from multiple data sources. Utilizing that dataset, DWR determined sufficient data are available to include impacts to local habitat and local streamflows as a prioritization sub-component.

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<sup>16</sup> Water Code Section 10933(b)(8)

<sup>17</sup> Water Code Section 10933(b)(8)

<sup>18</sup> Water Code Section 10721(x)(6)

The following process was used to determine if there is a possibility of adverse impacts on local habitat and local streamflow occurring within the basin.

### Process

For the 2018 SGMA Basin Prioritization, DWR evaluated if habitat or streams exist in the basin. To do so, DWR used the Natural Communities and NHD datasets (California Department of Water Resources 2018b; United States Geological Survey 2016) to determine if one or more habitats commonly associated with groundwater or perennial or permanent streams exist within a groundwater basin. Habitat and streams were identified within the basins using the following method:

Point (Only if Yes)	Method
1 for Habitat	After consulting the Natural Communities dataset, are there one or more polygons consisting of an area greater than 0 acres representing vegetation, wetland, seep, or spring habitat in the basin?
1 for Streamflow	After consulting the NHD dataset, was it determined that one or more perennial or permanent streams are located within or adjacent to the basin?

If there was no habitat or streamflow identified in the basin, then zero priority points were assigned to subcomponent 8.a.

### Part B: Determining if Potential Adverse Impacts on Habitat and Streamflow are Occurring in the Basin

The habitat and/or streamflow point(s) were not applied to basin prioritization until it was determined that one or more of the habitats and/or streams were potentially being adversely impacted. No statewide measure of adverse impacts to habitat or streamflow exists that would allow DWR to rank the severity of those impacts. Potential adverse impacts to habitat and streamflow resulting from groundwater activities were determined by evaluating the amount of groundwater pumping and groundwater level monitoring occurring in each basin. Groundwater level monitoring status was a factor used to determine if there was a possible adverse impact to habitat and streamflows.

- **Groundwater Monitoring Occurs in the Basin:** If the basin’s groundwater use (acre-feet/acre) (sub-component 6.a) exceeded 0.16 acre-feet/acre and groundwater level monitoring indicated that groundwater levels were declining (sub-component 7.a), then the habitat and streamflow points assigned in Part A were applied to the basin’s priority points.

Or

- **Groundwater Monitoring Does Not Occur in the Basin:** If the basin’s groundwater use (acre-feet/acre) (sub-component 6.a) exceeded 0.16 acre-feet/acre and groundwater level monitoring was not being performed in the basin, the habitat and streamflow point(s) assigned in Part A were applied to the basin’s priority points.

## **Part C: Documenting Adverse Habitat and Streamflow Impacts**

If the results from Part B indicated that there were no potential adverse impacts to habitat or streamflow in the basin, but documentation indicated that habitat and/or streamflow were being adversely impacted by groundwater activities in the basin, the habitat and/or streamflow priority point(s) assigned in Part A were applied to the basin's priority points. Documentation reviewed included, but was not limited to, groundwater levels, hydrologic models, hydrologic studies, and court judgements.

### ***Sub-component 8.b – Basin-level Evaluation of “other information determined to be relevant by the department”***

The basin-level evaluation of “other information determined to be relevant by the department” as an element of the 2018 SGMA Basin Prioritization used the same analysis method and updated data relative to the 2014 CASGEM Basin Prioritization.

Each basin was reviewed based on the individual basin's hydrology, geology, land use, and challenges to determine if there are groundwater-related actual or potential impacts to unique features or actual or potential challenges for groundwater management within the basin. Basins with actual or potential impacts to unique features that could result in an unrecoverable loss, and basins facing groundwater management challenges that could be serious enough to impact the sustainability of the basin if the necessary groundwater management is not applied to the basin, were assigned three priority points. If these conditions did not apply, the basin was assigned zero priority points.

### ***Sub-components 8.c and 8.d: Statewide-level Evaluation of “other information determined to be relevant by the department”***

Sub-components 8.c and 8.d evaluations were applied uniformly to all basins during the prioritization process and included additional analysis of conditions that, if present, caused basin priority points to be adjusted, regardless of the accumulated priority points from components 1 through 8.b. The sections below (sub-components 8.c.1 through 8.d.2) describe the conditions analyzed prior to the prioritization. The purpose of this analysis was to evaluate other information that was determined to be relevant by DWR. Beginning with sub-component 8.c.1, the analyses were performed in the order listed in Table 12 until a condition was met. After the result was applied, the additional conditions analysis stopped, and the processing continued to section VI – Basin Priority below. Table 12 describes the basin to which the analysis was applied, the condition that was analyzed, and the resulting priority points.

**Table 12 Sub-components 8.c and 8.d: Additional Conditions Analyzed Prior to Priority Determination**

Sub-Component	Basin Applicability	Condition	If True, Result
8.c.1	All	Less than or equal to 2,000 acre-feet of groundwater per year	Total Priority Points = 0
8.c.2	All	Greater than 2,000 and less than or equal to 9,500 acre-feet with no documented impacts	Total Priority Points = 0
8.c.3	Basins with Adjudications	Basin's non-adjudicated portion extract less than or equal to 9,500 acre-feet of groundwater	Total Priority Points = 0
8.d.1	Critically Overdrafted basins	Basin considered to be in Critical Overdraft per Bulletin 118 – Interim Update 2016	Total Priority Points = 42
8.d.2	All	Groundwater related transfers greater than 2,000 acre-feet (groundwater substitution transfers, out of basin groundwater transfers not part of adjudicated activities)	Add 2 Priority Points

The analyses above were performed in the order listed in Table 12 and only continued until they reached a condition where the result was true. When the true condition was reached, the remaining analysis steps listed in Table 12 were bypassed and the processing for the basin proceeded to Basin Priority with the adjusted priority points. The points accumulated during analysis of components 1 through 8.b were retained.

If a basin that did not meet a true condition for sub-components 8.c or 8.d listed in Table 12, the basin was prioritized based on the accumulated priority points from components 1 through 8.b.

### ***Sub-component 8.c.1: Does the Basin or Subbasin Use Less Than or Equal to 2,000-acre feet of Groundwater?***

#### **Data Source**

- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)

#### **Process**

The consideration of “Does the basin use less than or equal to 2,000-acre feet of groundwater?” as an element of the 2018 SGMA Basin Prioritization used the same method and updated data relative to the 2014 CASGEM Basin Prioritization.

Using an approach similar to the GAMA Program, DWR selected the groundwater volume portion of the groundwater reliance component data (sub-component 6.a) as the primary component for the initial review and screening in the groundwater basin prioritization process. DWR considers any basin that uses less than or equal to 2,000 acre-feet of groundwater per year to be low priority with respect to sustainable groundwater management. Total priority points were adjusted to zero for basins that pump less than or equal to 2,000 acre-feet of groundwater per year.

## ***Sub-component 8.c.2: Does the Basin Use Greater Than 2,000-acre feet and Less Than or Equal to 9,500-acre feet AND Have No Documented Impacts (component 7 and 8)?***

### **Data Source**

- Basin Prioritization 2018 Volume of Groundwater Use (sub-component 6.a)
- Basin Prioritization 2018 Documented Impacts (component 7)
- Basin Prioritization 2018 Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows (sub-components 8.a and 8.b)

### **Process**

The consideration of “Does the basin use greater than 2,000-acre feet and less than or equal to 9,500-acre feet and have no documented impacts?” as an element of the 2018 SGMA Basin Prioritization used the same method and updated data relative to the 2014 CASGEM Basin Prioritization.

**Step 1 – Check How Much Groundwater is Pumped:** If the basin’s groundwater volume (6.a) was greater than 2,000 and less than or equal to 9,500 acre-feet, the analysis proceeded to Step 2. Otherwise, sub-component 8.c.2 did not apply to the basin.

**Step 2 – Check if Documented Impacts Exist:** If the basin did not have any of the documented impacts listed below, the analysis proceeded to Step 3. Otherwise, sub-component 8.c.2 did not apply to the basin.

1. Documented impacts (component 7)
2. Documented adverse impacts to habitat and streamflow (sub-component 8.a, Part C)
3. Other basin-specific impacts or challenges (sub-component 8.b)

**Step 3 – Assign Priority Points:** If the basin met the criteria of Step 1 and Step 2, the basin’s priority points were adjusted to zero.

## ***Sub-component 8.c.3: For Basins That Have Adjudicated Area Within the Basin, Does the Basin’s Non-Adjudicated Portion Pump Less Than or Equal To 9,500-acre feet of Groundwater?***

### **Data Source**

- California Department of Water Resources, (2018). Adjudicated Areas (shapefile)
- Basin Prioritization Groundwater Volume for non-groundwater extraction adjudicated areas, 2018 (Appendix 3)
- Basin Prioritization 2010 Population for non-groundwater extraction adjudicated areas, 2018

With the exception of an annual reporting requirement, SGMA does not apply to the adjudicated areas identified in the Act. Because these adjudicated areas are not required to develop and adopt a GSP or Alternative, DWR determined that SGMA prioritization should evaluate those portions of the basin that are non-adjudicated. The non-adjudicated areas remain subject to SGMA, but DWR evaluated the non-adjudicated portion of the basin to determine the extent that these areas are independently significant

based on the prioritization criteria developed for an entire basin, or to determine the potential to affect groundwater management in the entire basin, in accordance with the consideration of components 1 through 8 of Water Code Section 10933(b).

## Process

The results of the 2018 SGMA Basin Prioritization were based on the analysis of the entire basin, including the adjudicated area. If the basin was determined to be medium or high priority under the 2018 SGMA Basin Prioritization, the full requirements of SGMA only applied to the non-adjudicated portion of the basin. Appendix 4 provides a complete listing of the 37 basins that are covered completely or partially by adjudicated areas.

The adjudication analysis was only performed on basins with adjudicated areas (Appendix 4) and was only applied to the portion or combined portions of the basin that are not covered by a groundwater adjudication. The following steps were applied when evaluating sub-component 8.c.3:

**Step 1 – Create Shapefile:** A shapefile was created to represent the non-adjudicated portion or portions of the basins listed in Appendix 4 by cutting out the portion(s) of the basin that are adjudicated.

**Step 2 – Calculate Urban Groundwater Use:** Using the shapefile from Step 1, the 2010 population in the non-adjudicated portion or portions was determined, and the urban water demands and ultimately the urban groundwater volume was processed, as calculated for sub-component 6.a.

**Step 3 – Calculate Agricultural Groundwater Use:** Using the shapefile from Step 1, the 2014 land use in the non-adjudicated portion or portions was determined and the agricultural water demand and groundwater volume were processed, as calculated for sub-component 6.a.

**Step 4 – Calculate Total Groundwater Use:** The urban (Step 2) and agricultural (Step 3) groundwater use amounts were combined to establish the total groundwater used in the non-adjudicated portion of the basin (see Appendix 3).

**Step 5 – Determine Priority Points:** If the groundwater volume computed in Step 4 was less than or equal to 9,500-acre feet, the basin total priority points were adjusted to zero.

### *Sub-component 8.d.1: Is the Basin Considered to be in Critical Overdraft?*

## Data Source

- Bulletin 118 - Interim Update 2016, Table 2

Critically overdrafted basins were analyzed for the 2018 SGMA Basin Prioritization using updated methods and data relative to the 2014 CASGEM Basin Prioritization. Critical conditions of overdraft have been identified in 21 groundwater basins as described in Bulletin 118 – Interim Update 2016.<sup>19</sup> A basin is

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<sup>19</sup> Water Code Section 12924

subject to critical conditions of overdraft when continuation of current water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts.<sup>20</sup> Additionally, chronic lowering of groundwater levels (indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon) is an undesirable result.<sup>21</sup> For these reasons, DWR has determined that critical overdraft of a basin is a relevant factor in the prioritization of basins for the purposes of achieving sustainable groundwater management.

The 2018 SGMA Basin Prioritization process flagged each of the 21 basins in critical overdraft, as determined in Bulletin 118 – Interim Update 2016, and adjusted the overall basin priority points for these basins by assigning the maximum total priority points of 42.

### ***Sub-component 8.d.2: Does the Basin Participate in Groundwater-Related Transfers?***

#### **Data Source**

- Bulletin 132 - Management of the California State Water Project

Groundwater-related transfers (groundwater substitution transfers or out-of-basin groundwater transfers) were not evaluated as part of the 2014 CASGEM Basin Prioritization. Groundwater-related transfers were deemed relevant to basin prioritization for the purposes of achieving sustainable groundwater management and were analyzed for the 2018 SGMA Basin Prioritization. Groundwater-related transfers, if unmanaged, could lead to impacts to groundwater levels and interconnected surface water, and subsidence, among others. Groundwater-related transfers were considered significant if they exceeded 2,000 acre-feet of groundwater-related transfers or exports from a basin in single year, which was the threshold utilized in the 2014 CASGEM Basin Prioritization for a basin to be classified as very low priority.

The consideration of groundwater-related transfers (groundwater substitution transfers or out-of-basin groundwater transfers) included reviewing groundwater substitution records since 2009. Data from the most recent (10) years is consistent with the Water Budget requirements within the GSP regulation.<sup>22</sup>

The two types of groundwater transfer are described as follows:

- *Groundwater substitution transfers* occur when surface water is made available for transfer by reducing surface water diversions and replacing that water with groundwater pumping. The rationale is that surface water demands are reduced because a like amount of groundwater is used to meet the demands. The resulting increase in available surface water supplies can be transferred to other users. DWR only considered those groundwater substitution transfers that are out-of-basin. The 2018 SGMA Basin Prioritization refers to these transfers as Type A.
- *Out-of-basin groundwater transfers* are transfers that pump percolating groundwater from a

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<sup>20</sup> Bulletin 118 – Update 2003

<sup>21</sup> Water Code Section 10721(x)(1)

<sup>22</sup> California Code of Regulations 354.18

source basin and convey the pumped water to a location outside the source basin. DWR only considered groundwater transfers that are or would be under the decision-making authority of a GSA. The 2018 SGMA Basin Prioritization refers to these transfers as Type B.

Groundwater-related transfers were evaluated by reviewing available data published annually from 2009 through 2015 in DWR Bulletin 132: Management of the California State Water Project (California Department of Water Resources 2009 through 2015). Additionally, SGMA watermaster annual reports, basin annual reports, and hydrologic studies were consulted to determine if groundwater-related transfers occurred.

Appendix 5 identifies the basins that participate in Type A or B groundwater transfers and volume of groundwater pumped in years with transfers.

Basins shown in Appendix 5 were evaluated using the following steps for sub-component 8.d.2:

**Step 1 – Determine Maximum Groundwater Pumped:** Using appendix 5, determine maximum groundwater volume pumped to meet the requirements of groundwater substitution transfers or groundwater exports out of basin in any year since 2009.

**Step 2 – Check Groundwater Pumped:** If the groundwater pumped was greater than 2,000 acre-feet, the analysis proceeded to Step 3. Otherwise, sub-component 8.d.2 did not apply to the basin.

**Step 3 – Assign Priority Points:** The basin was assigned two priority points for sub-component 8.d.2.

**Step 4 – Adjust Sub-Component 6.a:** Volume of groundwater pumped in 2014 for groundwater substitution transfers or out-of-basin groundwater transfers was added to the overall groundwater (“other” groundwater) in sub-component 6a. In the cases of groundwater substitution transfers, the equal volume was subtracted from the overall surface water (“other” surface water).

## VI. Basin Priority

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All basins were processed for all eight components. Prior to determining the basins' priority, adjustments were made, as described above (see sub-components 8c and 8d), that would automatically result in a very low or high priority determination. In cases where basins were automatically assigned very low or high priority, the calculation of priority points was completed and retained.

The basin priority determination for each basin as an element of the 2018 SGMA Basin Prioritization used the same data and an updated method relative to the 2014 CASGEM Basin Prioritization. For the 2014 CASGEM Basin Prioritization, the threshold value between low and medium priority was set at 13.42 and was based on a maximum of 40 points. For the 2018 SGMA Basin Prioritization, DWR adjusted the threshold value to account for the two additional points added for the adverse impacts on local habitat and local streamflow (sub-component 8.a). The approach was a simple ratio calculation that increased the medium priority threshold value to 14.1.

The total possible points for the 2018 SGMA Basin Prioritization range from zero to 42 in increments of 0.5 points. The new priority threshold value for medium priority was set to greater than 14. The other threshold values were evenly distributed from the 14-point value in multiples of 7. The basin priority ranks were determined using the value ranges listed in Table 13, including basins that had their total priority points adjusted to zero (very low) or 42 (high).

**Table 13 2018 SGMA Basin Prioritization Priority Based on Total Priority Points**

Priority	Total Priority Point Ranges X = Cumulative Priority Points
Very Low	$0 \leq x \leq 7$
Low	$7 < x \leq 14$
Medium	$14 < x \leq 21$
High	$21 < x \leq 42$

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## Appendix 1 – DWR standard land use legend (adapted for remote sensing crop mapping) (component 6.a)

Type	Crop
G – GRAIN & HAY CROPS	Wheat Miscellaneous grain and hay
R – RICE	Rice Wild rice
F – FIELD CROPS	Cotton Safflower Corn (field & sweet), sorghum and Sudan Beans (dry) Sunflowers
P - PASTURE	Alfalfa & alfalfa mixtures Mixed pasture Miscellaneous grasses (includes Bermuda grass, ryegrass, turf grass, etc.)
Y – YOUNG PERRENIAL	Young perennial fruits and nuts (includes young orchards and vineyards)
T – TRUCK, NURSERY, AND BERRY CROPS	Cole crops (includes broccoli, cauliflower, cabbage, brussel sprouts, mixed cole crops or cole crops not specifically listed in the legend) Carrots Lettuce/leafy greens Melons, squash, and cucumbers (all types) Onions and garlic Potatoes and sweet potatoes Tomatoes (processing and fresh) Flowers, nursery & Christmas tree farms Bush berries (includes blueberries, blackberries, raspberries, and other bush berries) Strawberries Peppers (chili, bell, etc.) Miscellaneous truck (a truck crop not specifically listed in the legend)
D – DECIDUOUS FRUITS AND NUTS	Apples Cherries Peaches/nectarines Pears Plums, prunes, and apricots Almonds Walnuts Pistachios Pomegranates Miscellaneous deciduous (a type of deciduous orchard not specifically listed in the legend)
C – CITRUS AND SUBTROPICAL	Citrus Dates Avocados Olives Kiwis Miscellaneous subtropical fruits
V – VINEYARDS	Grapes
I – IDLE	Idle (recent and longer-term fallow/idle)

## Appendix 2 – List of chemicals used in the evaluation of documented water quality degradation (component 7.d)

GAMA Storenum	Units	MCL	Chemical Name	GAMA Storenum	Units	MCL	Chemical Name
<b>Primary MCL</b>							
TCA111	UG/L	200	1,1,1-Trichloroethane	ENDOTHAL	UG/L	100	Endothal
PCA	UG/L	1	1,1,2,2-Tetrachloroethane	ENDRIN	UG/L	2	Endrin
FC113	MG/L	1.2	1,1,2-Trichloro-1,2,2-Trifluoroethane	EBZ	UG/L	300	Ethylbenzene
TCA112	UG/L	5	1,1,2-Trichloroethane	F	MG/L	2	Fluoride (F)
DCA11	UG/L	5	1,1-Dichloroethane	ALPHA	pCi/L	15	Gross Alpha
DCE11	UG/L	6	1,1-Dichloroethylene	HEPTACHLOR	UG/L	0.01	Heptachlor
TCB124	UG/L	5	1,2,4-Trichlorobenzene	HCLBZ	UG/L	1	Hexachlorobenzene
DCBZ12	UG/L	600	1,2-Dichlorobenzene	HCCP	UG/L	50	Hexachlorocyclopentadiene
DCA12	UG/L	0.5	1,2-Dichloroethane	PB	UG/L	15	Lead
DCPA12	UG/L	5	1,2-Dichloropropane	BHCGAMMA	UG/L	0.2	Lindane
DCP13	UG/L	0.5	1,3-Dichloropropene (Total)	HG	UG/L	2	Mercury
DCBZ14	UG/L	5	1,4-Dichlorobenzene	MTXYCL	UG/L	30	Methoxychlor
SILVEX	UG/L	50	2,4,5-Tp (Silvex)	MTBE	UG/L	13	Methyl-Tert-Butyl-Ether (Mtbe)
24D	UG/L	70	2,4-D	MOLINATE	UG/L	20	Molinate
ALACL	UG/L	2	Alachlor	NI	UG/L	100	Nickel
AL	UG/L	1000	Aluminum	NO3N	MG/L	10	Nitrate (As N)
SB	UG/L	6	Antimony	OXAMYL	UG/L	50	Oxamyl
AS	UG/L	10	Arsenic	PCP	UG/L	1	Pentachlorophenol
ATRAZINE	UG/L	1	Atrazine	PCATE	UG/L	6	Perchlorate
BA	MG/L	1	Barium	PICLORAM	MG/L	0.5	Picloram
BTZ	UG/L	18	Bentazon	PCB1016	UG/L	0.5	Polychlorinated Biphenyls
BZ	UG/L	1	Benzene	SE	UG/L	50	Selenium
BZAP	UG/L	0.2	Benzo (A) Pyrene	SIMAZINE	UG/L	4	Simazine
BE	UG/L	4	Beryllium	SR-90	pCi/L	8	Strontium-90
BRO3	UG/L	10	Bromate	STY	UG/L	100	Styrene
CD	UG/L	5	Cadmium	PCE	UG/L	5	Tetrachloroethylene
CTCL	UG/L	0.5	Carbon Tetrachloride	TL	UG/L	2	Thallium
CHLORITE	MG/L	1	Chlorite	THIOBENCARB	UG/L	70	Thiobencarb
CLBZ	UG/L	70	Chlorobenzene (Monochlorobenzene)	BZME	UG/L	150	Toluene
CR	UG/L	50	Chromium (Total)	THM	UG/L	80	Total Trihalomethanes

<b>GAMA Storenum</b>	<b>Units</b>	<b>MCL</b>	<b>Chemical Name</b>	<b>GAMA Storenum</b>	<b>Units</b>	<b>MCL</b>	<b>Chemical Name</b>
DCE12C	UG/L	6	Cis-1,2-Dichloroethylene	DCE12T	UG/L	10	Trans-1,2-Dichloroethylene
CN	UG/L	150	Cyanide	TCE	UG/L	5	Trichloroethylene
DALAPON	UG/L	200	Dalapon	FC11	UG/L	150	Trichlorofluoromethane
DOA	MG/L	0.4	Di(2-Ethylhexyl)Adipate	H-3	pCi/L	20000	Tritium
BIS2EHP	UG/L	4	Di(2-Ethylhexyl)Phthalate	U	pCi/L	20	Uranium
DCMA	UG/L	5	Dichloromethane	VC	UG/L	0.5	Vinyl Chloride
DINOSEB	UG/L	7	Dinoseb	XYLENES	UG/L	1750	Xylenes (Total)
<b>Secondary MCL</b>							
CU	MG/L	1	Copper	ZN	MG/L	5	Zinc
FOAMAGENTS	MG/L	0.5	Foaming Agents (Mbas)	CL	MG/L	500	Chloride
FE	UG/L	300	Iron	SO4	MG/L	500	Sulfate
MN	UG/L	50	Manganese	TDS	MG/L	1000	Total Dissolved Solids
AG	UG/L	100	Silver				

Source: State Water Resources Control Board 2017

Key: GAMA = groundwater ambient monitoring and assessment; UG/L = microgram per liter; MG/L = milligram per liter; pCi/L = picocuries per liter

Note: The water quality data query of the SWRCB GAMA database and the initial basin prioritization water quality analysis was performed on and soon after April 4, 2017. Hexavalent chromium (CR6) was included on the above list as a Primary MCL and used in the initial analysis. In September 2017, CR6 was removed from the MCL Primary list on court order. The water quality analysis for basin prioritization was corrected to reflect this change and consequently does not include any CR6 records.

### Appendix 3 – Computed groundwater volume for non-adjudicated portion(s) of basins with adjudicated area used during evaluation (component 8.c.3)

Basin Number	Basin/Subbasin Name	Groundwater volume (acre-feet) of non-adjudicated portion of basin (from Step 4 of component #8.c.3)
1-005	Scott River Valley	27,496
3-004.08	Salinas Valley/Seaside	0
3-008	Los Osos Valley	1,027
3-012	Santa Maria	13,137
3-016	Goleta	557
4-004.04	Santa Clara River Valley/ Santa Paula	497
4-011.03	Coastal Plain of Los Angeles/ West Coast	60
4-011.04	Coastal Plain of Los Angeles/ Central	0
4-012	San Fernando Valley	1,025
4-013	San Gabriel Valley	7,000
4-023	Raymond	1
5-027	Cummings Valley	63
5-028	Tehachapi Valley West	222
5-080	Brite Valley	8
6-012.01	Owens Valley/Owens Valley	24,228
6-037	Coyote Lake Valley	1
6-038	Caves Canyon Valley	2
6-040	Lower Mojave River Valley	0
6-041	Middle Mojave River Valley	0
6-042	Upper Mojave River Valley	5
6-043	El Mirage Valley	526
6-044	Antelope Valley	2,631
6-045	Tehachapi Valley East	55
6-047	Harper Valley	7
6-089	Kane Wash Area	0
7-012	Warren Valley	698
7-019	Lucerne Valley	0
8-002.01	Upper Santa Ana Valley/ Chino	2,553
8-002.02	Upper Santa Ana Valley/ Cucamonga	1
8-002.03	Upper Santa Ana Valley/ Riverside-Arlington	7,778
8-002.04	Upper Santa Ana Valley/ Rialto-Colton	2,349
8-002.06	Upper Santa Ana Valley/ Bunker Hill	216
8-002.08	Upper Santa Ana Valley/ San Timoteo	4,526
8-005	San Jacinto	33,935
9-004	Santa Margarita Valley	0
9-005	Temecula Valley	29
9-006	Cahuilla Valley	10

## Appendix 4 – Breakdown of area in basins with adjudications used during evaluation (component 8.c.3)

Basin	Basin /Subbasin Name	Basin Area (Acres)	Adjudicated Acres	Percent Adjudicated	Non-Adjudicated Acres	Percent Non-Adjudicated
1-005	Scott River Valley	63,831	10,015	15.69%	53,816	84.31%
3-004.08	Salinas Valley/Seaside	14,489	14,489	100.00%	0	0.00%
3-008	Los Osos Valley	7,008	4,592	65.52%	2,417	34.48%
3-012	Santa Maria	184,072	162,036	88.03%	22,036	11.97%
3-016	Goleta	9,217	8,034	87.16%	1,183	12.84%
4-004.04	Santa Clara River Valley/ Santa Paula	22,845	19,945	87.31%	2,900	12.69%
4-011.03	Coastal Plain of Los Angeles/ West Coast	92,997	92,532	99.50%	465	0.50%
4-011.04	Coastal Plain of Los Angeles/ Central	177,770	149,067	83.85%	28,703	16.15%
4-012	San Fernando Valley	144,837	143,363	98.98%	1,474	1.02%
4-013	San Gabriel Valley	126,379	122,603	97.01%	3,776	2.99%
4-023	Raymond	26,049	26,047	99.99%	2	0.01%
5-027	Cummings Valley	10,019	9,213	91.95%	807	8.05%
5-028	Tehachapi Valley West	14,803	13,085	88.40%	1,718	11.60%
5-080	Brite Valley	3,170	2,845	89.73%	326	10.27%
6-012.01	Owens Valley/Owens Valley	660,935	231,276	34.99%	429,659	65.01%
6-037	Coyote Lake Valley	88,102	80,890	91.81%	7,212	8.19%
6-038	Caves Canyon Valley	72,962	27,201	37.28%	45,761	62.72%
6-040	Lower Mojave River Valley	285,486	260,561	91.27%	24,925	8.73%
6-041	Middle Mojave River Valley	211,321	206,613	97.77%	4,707	2.23%
6-042	Upper Mojave River Valley	412,841	405,091	98.12%	7,750	1.88%
6-043	El Mirage Valley	75,896	70,298	92.62%	5,598	7.38%
6-044	Antelope Valley	1,010,269	904,447	89.53%	105,822	10.47%
6-045	Tehachapi Valley East	23,967	11,658	48.64%	12,310	51.36%
6-047	Harper Valley	409,502	351,094	85.74%	58,408	14.26%
6-089	Kane Wash Area	5,954	5,954	100.00%	0	0.00%
7-012	Warren Valley	23,751	14,029	59.07%	9,722	40.93%
7-019	Lucerne Valley	147,432	145,964	99.00%	1,468	1.00%
8-002.01	Upper Santa Ana Valley/ Chino	153,762	146,652	95.38%	7,110	4.62%
8-002.02	Upper Santa Ana Valley/ Cucamonga	9,028	9,012	99.82%	17	0.18%
8-002.03	Upper Santa Ana Valley/ Riverside-Arlington	56,563	37,217	65.80%	19,346	34.20%
8-002.04	Upper Santa Ana Valley/ Rialto-Colton	24,794	23,636	95.33%	1,158	4.67%
8-002.06	Upper Santa Ana Valley/ Bunker Hill	92,488	87,485	94.59%	5,003	5.41%
8-002.08	Upper Santa Ana Valley/ San Timoteo	66,433	14,374	21.64%	52,059	78.36%
8-005	San Jacinto	181,455	60,109	33.13%	121,346	66.87%
9-004	Santa Margarita Valley	5,215	5,191	99.54%	24	0.46%
9-005	Temecula Valley	87,753	87,386	99.58%	367	0.42%
9-006	Cahuilla Valley	18,202	17,850	98.07%	351	1.93%

## Appendix 5 – Groundwater Basins Identified with Groundwater-Related Transfers (component 8.d.2)

Groundwater Basin ID	Groundwater Basin / Subbasin Name	Type of Groundwater-Related Transfer	Year	Total Groundwater Pumped (AF)
4-003.01	Ventura River Valley / Upper Ventura River	B	2015	1,314
5-006.03	Redding Area / Anderson	A	2013	2,314
			2014	3,526
			2015	3,785
5-021.52	Sacramento Valley / Colusa	A	2013	5,000
			2014	6,838
			2015	13,969
5-021.58	Sacramento Valley / West Butte	A	2009	5,501
			2013	8,082
			2014	1,360
			2015	2,346
5-021.59	Sacramento Valley / East Butte	A	2009	4,100
			2010	3,846
			2013	3,839
			2014	5,350
5-021.60	Sacramento Valley / North Yuba	A	2009	8,262
			2013	8,270
			2014	2,102
5-021.61	Sacramento Valley / South Yuba	A	2014	3,637
			2015	2,000
5-021.62	Sacramento Valley / Sutter	A	2009	10,783
			2010	10,473
			2013	11,426
			2014	12,051
			2015	8,658
5-021.64	Sacramento Valley / North American	A	2009	12,303
			2010	2,801
			2013	8,902
			2014	17,333
			2015	22,358
5-021.66	Sacramento Valley/Solano	A	2011	409
5-021.67	Sacramento Valley / Yolo	A	2009	6,326
			2013	7,155
			2014	16,995
			2015	20,256

## Appendix 6 – Summary of 2018 SGMA Basin Prioritization Results

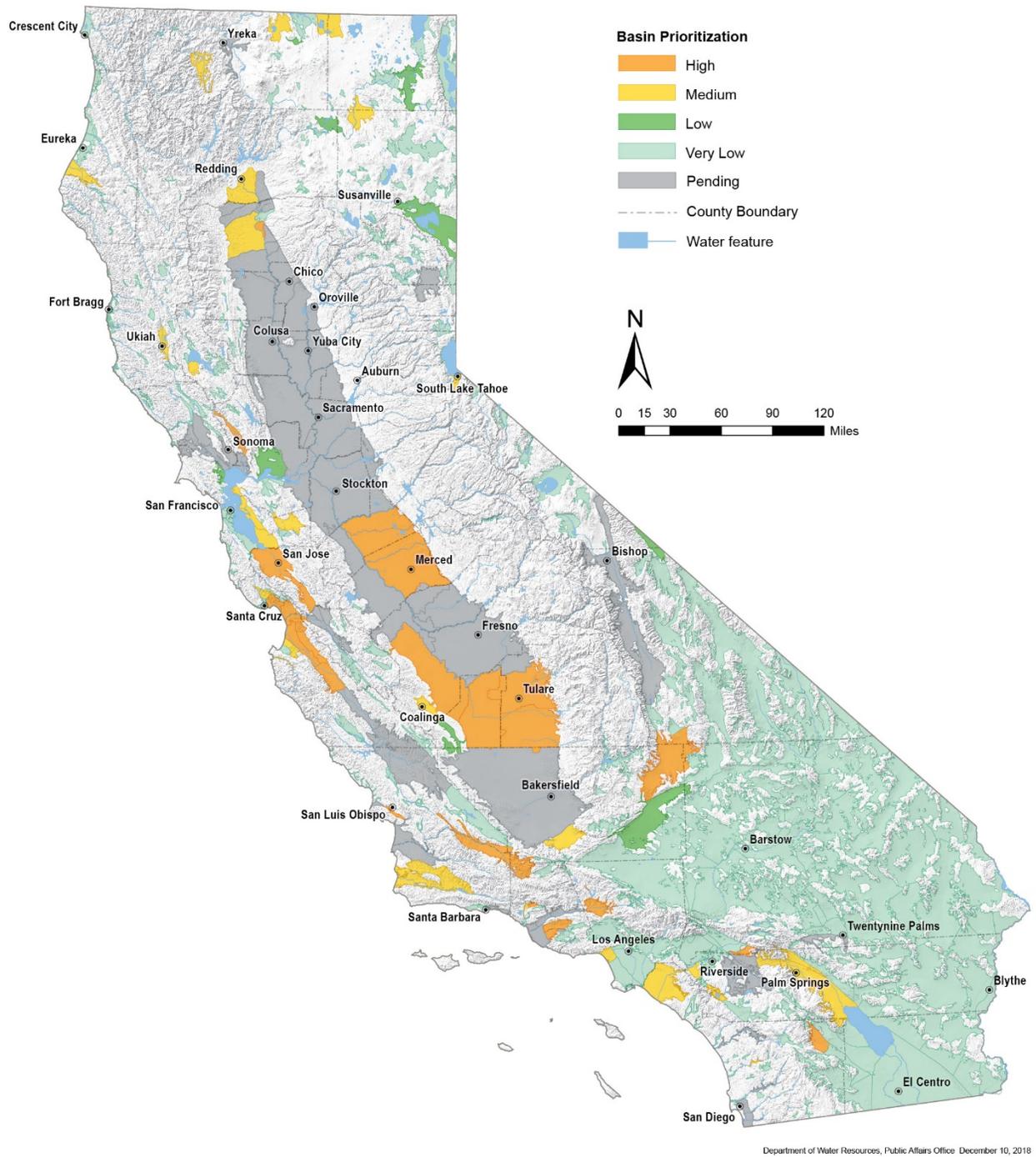
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Of the 517 groundwater basins, 109 are prioritized as high and medium and 408 are prioritized as low and very low (Figure 6-1). Basins newly identified as high- or medium-priority in the 2018 Basin Prioritization are required to form a GSA within two years from the date the basin's priority is finalized and are required to submit a GSP five years from the same finalization date.

The groundwater contribution of these basins to California's 2014 water supply was 58%, while the surface water contribution was 42%. Based on the 2010 Statewide census data and the results found with component 1 (Basin Population), approximately 30 million people, or nearly 82 percent of Californians, live in areas overlying groundwater basins (United States Census Bureau 2010). At the local level, many municipal, agricultural, and disadvantaged communities rely on groundwater for nearly 100 percent of their water supply needs. Readily available quantities of high-quality groundwater have provided long-term economic benefits to California and enabled the Central Valley to become a world leader in agricultural production.

DWR created a web application that spatially and graphically presents the 2018 SGMA Basin Prioritization data and results for each basin. This application can be accessed at <https://gis.water.ca.gov/app/bp2018-dashboard>. Additional information related to 2018 SGMA Basin Prioritization can be accessed at the following website: <https://www.water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization>.

**Figure A-1** Statewide Map of 2018 SGMA Basin Prioritization Results, Phase 1



**Table A-1 Basin Prioritization Results – January 2019**

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
1-001	Smith River Plain	40,434.5	63.2	Very Low
1-002.01	Tulelake	110,521.4	172.7	Medium
1-002.02	Lower Klamath	75,330.3	117.7	Very Low
1-003	Butte Valley	79,739.0	124.6	Medium
1-004	Shasta Valley	52,629.8	82.2	Pending
1-005	Scott River Valley	63,831.4	99.7	Medium
1-006	Hayfork Valley	3,297.5	5.2	Very Low
1-007	Hoopla Valley	3,897.2	6.1	Very Low
1-008.01	Mad River Lowland	24,663.2	38.5	Very Low
1-008.02	Dows Prairie School Area	15,416.1	24.1	Very Low
1-009	Eureka Plain	38,795.4	60.6	Very Low
1-010	Eel River Valley	72,956.7	114.0	Medium
1-011	Covelo Round Valley	16,408.9	25.6	Very Low
1-012	Laytonville Valley	5,023.7	7.8	Very Low
1-013	Little Lake Valley	10,025.5	15.7	Very Low
1-014	Lower Klamath River Valley	7,022.1	11.0	Very Low
1-015	Happy Camp Town Area	2,773.3	4.3	Very Low
1-016	Seiad Valley	2,245.1	3.5	Very Low
1-017	Bray Town Area	8,032.4	12.6	Very Low
1-018	Red Rock Valley	9,000.7	14.1	Low
1-019	Anderson Valley	4,972.8	7.8	Very Low
1-020	Garcia River Valley	2,199.5	3.4	Very Low
1-021	Fort Bragg Terrace Area	23,897.8	37.3	Very Low
1-022	Fairchild Swamp Valley	3,277.9	5.1	Very Low
1-025	Prairie Creek Area	20,848.8	32.6	Very Low
1-026	Redwood Creek Area	2,009.4	3.1	Very Low
1-027	Big Lagoon Area	13,217.0	20.7	Very Low
1-028	Mattole River Valley	3,160.0	4.9	Very Low
1-029	Honeydew Town Area	2,369.9	3.7	Very Low
1-030	Pepperwood Town Area	6,292.0	9.8	Very Low
1-031	Weott Town Area	3,655.2	5.7	Very Low
1-032	Garberville Town Area	2,113.2	3.3	Very Low
1-033	Larabee Valley	967.2	1.5	Very Low
1-034	Dinsmores Town Area	2,277.9	3.6	Very Low
1-035	Hyampom Valley	1,354.8	2.1	Very Low
1-036	Hettenshaw Valley	847.0	1.3	Very Low
1-037	Cottoneva Creek Valley	762.1	1.2	Very Low
1-038	Lower Laytonville Valley	2,153.1	3.4	Very Low
1-039	Branscomb Town Area	1,382.1	2.2	Very Low

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Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
1-040	Ten Mile River Valley	1,491.3	2.3	Very Low
1-041	Little Valley	812.5	1.3	Very Low
1-042	Sherwood Valley	1,150.7	1.8	Very Low
1-043	Williams Valley	1,643.4	2.6	Very Low
1-044	Eden Valley	1,377.5	2.2	Very Low
1-045	Big River Valley	1,685.9	2.6	Very Low
1-046	Navarro River Valley	768.5	1.2	Very Low
1-048	Gravelly Valley	2,976.3	4.7	Very Low
1-049	Annapolis Ohlson Ranch Fm Highlands	8,653.0	13.5	Very Low
1-050	Knights Valley	4,089.5	6.4	Very Low
1-051	Potter Valley	8,243.0	12.9	Very Low
1-052	Ukiah Valley	37,537.4	58.7	Medium
1-053	Sanel Valley	5,572.4	8.7	Very Low
1-054.01	Alexander Area	24,484.4	38.3	Very Low
1-054.02	Cloverdale Area	6,530.1	10.2	Very Low
1-055.01	Santa Rosa Plain	80,123.8	125.2	Pending
1-055.02	Healdsburg Area	15,412.7	24.1	Very Low
1-055.03	Rincon Valley	5,553.2	8.7	Very Low
1-056	Mcdowell Valley	1,487.6	2.3	Very Low
1-057	Bodega Bay Area	2,668.7	4.2	Very Low
1-059	Wilson Grove Formation Highlands	86,470.2	135.1	Pending
1-060	Lower Russian River Valley	6,645.0	10.4	Very Low
1-061	Fort Ross Terrace Deposits	8,360.9	13.1	Very Low
1-062	Wilson Point Area	710.0	1.1	Very Low
2-001	Petaluma Valley	46,078.4	72.0	Pending
2-002.01	Napa Valley	45,928.2	71.8	High
2-002.02	Sonoma Valley	44,659.8	69.8	Pending
2-002.03	Napa-Sonoma Lowlands	40,483.8	63.3	Pending
2-003	Suisun-Fairfield Valley	133,586.2	208.7	Low
2-004	Pittsburg Plain	11,613.3	18.1	Very Low
2-005	Clayton Valley	17,846.6	27.9	Very Low
2-006	Ygnacio Valley	15,469.0	24.2	Very Low
2-007	San Ramon Valley	7,057.4	11.0	Very Low
2-008	Castro Valley	1,821.7	2.8	Very Low
2-009.01	Niles Cone	65,214.5	101.9	Medium
2-009.02	Santa Clara	189,581.0	296.2	High
2-009.03	San Mateo Plain	37,865.0	59.2	Very Low
2-009.04	East Bay Plain	71,315.1	111.4	Medium
2-010	Livermore Valley	69,567.1	108.7	Medium
2-011	Sunol Valley	16,632.0	26.0	Very Low
2-019	Kenwood Valley	5,139.0	8.0	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
2-022	Half Moon Bay Terrace	9,155.9	14.3	Very Low
2-024	San Gregorio Valley	1,074.9	1.7	Very Low
2-026	Pescadero Valley	2,912.4	4.6	Very Low
2-027	Sand Point Area	1,444.8	2.3	Pending
2-028	Ross Valley	1,764.7	2.8	Very Low
2-029	San Rafael Valley	874.8	1.4	Very Low
2-030	Novato Valley	20,535.1	32.1	Low
2-031	Arroyo Del Hambre Valley	786.3	1.2	Very Low
2-032	Visitation Valley	5,831.1	9.1	Very Low
2-033	Islais Valley	5,941.3	9.3	Very Low
2-035	Westside	25,392.4	39.7	Very Low
2-036	San Pedro Valley	710.4	1.1	Very Low
2-037	South San Francisco	2,176.5	3.4	Very Low
2-038	Lobos	2,360.8	3.7	Very Low
2-039	Marina	2,187.7	3.4	Very Low
2-040	Downtown	7,640.1	11.9	Very Low
3-001	Santa Cruz Mid-County	36,289.7	56.7	High
3-002.01	Pajaro Valley	75,055.1	117.3	High
3-002.02	Purisima Highlands	12,932.0	20.2	Very Low
3-003.01	Llagas Area	47,370.9	74.0	High
3-003.02	Bolsa Area	20,777.1	32.5	Pending
3-003.03	Hollister Area	32,539.9	50.8	Pending
3-003.04	San Juan Bautista Area	74,324.8	116.1	Pending
3-004.01	180/400 Foot Aquifer	89,706.3	140.2	High
3-004.02	East Side Aquifer	57,474.3	89.8	High
3-004.04	Forebay Aquifer	94,052.2	147.0	High
3-004.05	Upper Valley Aquifer	98,171.8	153.4	Pending
3-004.06	Paso Robles Area	577,349.5	902.1	Pending
3-004.08	Seaside Area	14,488.7	22.6	Very Low
3-004.09	Langley Area	17,618.5	27.5	High
3-004.10	Corral De Tierra Area	30,854.9	48.2	Medium
3-004.11	Atascadero Area	19,734.9	30.8	Very Low
3-005	Cholame Valley	39,824.6	62.2	Very Low
3-006	Lockwood Valley	59,941.0	93.7	Very Low
3-007	Carmel Valley	4,321.7	6.8	Medium
3-008	Los Osos Valley	7,008.2	11.0	Pending
3-009	San Luis Obispo Valley	12,720.6	19.9	High
3-012	Santa Maria	184,071.8	287.6	Pending
3-013	Cuyama Valley	241,729.9	377.7	High
3-014	San Antonio Creek Valley	67,437.4	105.4	Medium
3-015	Santa Ynez River Valley	203,050.6	317.3	Medium

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Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
3-016	Goleta	9,217.1	14.4	Very Low
3-017	Santa Barbara	6,183.1	9.7	Very Low
3-018	Carpinteria	8,107.8	12.7	Pending
3-019	Carrizo Plain	210,627.5	329.1	Very Low
3-020	Ano Nuevo Area	1,995.2	3.1	Very Low
3-022	Santa Ana Valley	2,724.3	4.3	Very Low
3-023	Upper Santa Ana Valley	1,430.9	2.2	Very Low
3-024	Quien Sabe Valley	4,707.0	7.4	Very Low
3-025	Tres Pinos Valley	3,386.2	5.3	Pending
3-026	West Santa Cruz Terrace	7,306.4	11.4	Very Low
3-027	Santa Margarita	22,249.0	34.8	Medium
3-028	San Benito River Valley	24,227.0	37.9	Very Low
3-029	Dry Lake Valley	1,416.3	2.2	Very Low
3-030	Bitter Water Valley	32,224.8	50.4	Very Low
3-031	Hernandez Valley	2,864.5	4.5	Very Low
3-032	Peach Tree Valley	9,790.0	15.3	Very Low
3-033	San Carpoforo Valley	1,042.6	1.6	Very Low
3-034	Arroyo De La Cruz Valley	1,015.9	1.6	Very Low
3-035	San Simeon Valley	547.0	0.9	Very Low
3-036	Santa Rosa Valley	3,507.5	5.5	Very Low
3-037	Villa Valley	1,355.9	2.1	Very Low
3-038	Cayucos Valley	333.5	0.5	Very Low
3-039	Old Valley	1,178.4	1.8	Very Low
3-040	Toro Valley	720.0	1.1	Very Low
3-041	Morro Valley	644.1	1.0	Very Low
3-042	Chorro Valley	1,549.6	2.4	Very Low
3-043	Rinconada Valley	2,577.8	4.0	Very Low
3-044	Pozo Valley	6,848.6	10.7	Very Low
3-045	Huasna Valley	4,703.0	7.3	Very Low
3-046	Rafael Valley	2,993.2	4.7	Very Low
3-047	Big Spring Area	7,324.1	11.4	Very Low
3-049	Montecito	6,279.9	9.8	Pending
3-051	Majors Creek	478.7	0.7	Very Low
3-052	Needle Rock Point	839.9	1.3	Very Low
3-053	Foothill	3,282.3	5.1	Very Low
4-001	Upper Ojai Valley	3,806.3	5.9	Very Low
4-002	Ojai Valley	5,913.4	9.2	High
4-003.01	Upper Ventura River	5,278.1	8.2	Medium
4-003.02	Lower Ventura River	5,262.1	8.2	Very Low
4-004.02	Oxnard	57,348.3	89.6	Pending
4-004.03	Mound	14,787.0	23.1	Pending

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
4-004.04	Santa Paula	22,845.4	35.7	Pending
4-004.05	Fillmore	21,711.8	33.9	Pending
4-004.06	Piru	8,889.2	13.9	Pending
4-004.07	Santa Clara River Valley East	67,687.6	105.8	High
4-005	Acton Valley	8,268.4	12.9	Very Low
4-006	Pleasant Valley	19,840.0	31.0	High
4-007	Arroyo Santa Rosa Valley	3,737.0	5.8	Pending
4-008	Las Posas Valley	44,622.0	69.7	High
4-009	Simi Valley	12,155.2	19.0	Very Low
4-010	Conejo	18,796.0	29.4	Very Low
4-011.01	Santa Monica	31,779.2	49.7	Medium
4-011.02	Hollywood	10,070.2	15.7	Very Low
4-011.03	West Coast	92,996.7	145.3	Very Low
4-011.04	Central	177,770.3	277.8	Very Low
4-012	San Fernando Valley	144,837.1	226.3	Very Low
4-013	San Gabriel Valley	126,379.0	197.5	Very Low
4-015	Tierra Rejada	4,597.8	7.2	Very Low
4-016	Hidden Valley	2,210.7	3.5	Very Low
4-017	Lockwood Valley	21,789.5	34.0	Very Low
4-018	Hungry Valley	5,309.2	8.3	Very Low
4-019	Thousand Oaks Area	3,106.0	4.9	Very Low
4-020	Russell Valley	3,078.3	4.8	Very Low
4-022	Malibu Valley	610.8	1.0	Very Low
4-023	Raymond	26,048.8	40.7	Very Low
5-001.01	Goose Valley	35,954.4	56.2	Very Low
5-001.02	Fandango Valley	18,443.0	28.8	Very Low
5-002.01	South Fork Pitt River	114,136.7	178.3	Low
5-002.02	Warm Springs Valley	68,007.9	106.3	Very Low
5-003	Jess Valley	6,705.4	10.5	Very Low
5-004	Big Valley	92,067.1	143.9	Medium
5-005	Fall River Valley	54,824.6	85.7	Low
5-006.01	Bowman	79,685.6	124.5	Pending
5-006.02	Rosewood	42,848.2	67.0	Pending
5-006.03	Anderson	98,704.6	154.2	Medium
5-006.04	Enterprise	61,288.3	95.8	Medium
5-006.05	Millville	66,780.0	104.3	Pending
5-006.06	South Battle Creek	32,552.3	50.9	Pending
5-007	Lake Almanor Valley	7,154.1	11.2	Very Low
5-008	Mountain Meadows Valley	8,145.9	12.7	Very Low
5-009	Indian Valley	29,413.2	46.0	Very Low
5-010	American Valley	6,799.3	10.6	Very Low

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Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-011	Mohawk Valley	18,983.1	29.7	Very Low
5-012.01	Sierra Valley	117,623.3	183.8	Pending
5-012.02	Chilcoot	7,545.7	11.8	Very Low
5-013	Upper Lake Valley	7,265.9	11.4	Very Low
5-014	Scotts Valley	7,326.1	11.4	Very Low
5-015	Big Valley	24,231.3	37.9	Medium
5-016	High Valley	2,357.9	3.7	Very Low
5-017	Burns Valley	2,875.1	4.5	Very Low
5-018	Coyote Valley	6,533.2	10.2	Very Low
5-019	Collayomi Valley	6,501.6	10.2	Very Low
5-020	Berryessa Valley	1,376.1	2.2	Very Low
5-021.50	Red Bluff	271,793.9	424.7	Medium
5-021.51	Corning	206,886.1	323.3	Pending
5-021.52	Colusa	705,169.7	1,101.8	Pending
5-021.53	Bend	22,676.4	35.4	Very Low
5-021.54	Antelope	19,090.8	29.8	High
5-021.55	Dye Creek	28,027.0	43.8	Pending
5-021.56	Los Molinos	30,993.8	48.4	Pending
5-021.57	Vina	126,027.9	196.9	Pending
5-021.58	West Butte	180,428.7	281.9	Pending
5-021.59	East Butte	267,457.5	417.9	Pending
5-021.60	North Yuba	56,455.6	88.2	Pending
5-021.61	South Yuba	109,660.8	171.3	Pending
5-021.62	Sutter	233,085.8	364.2	Pending
5-021.64	North American	342,265.1	534.8	Pending
5-021.65	South American	248,435.2	388.2	Pending
5-021.66	Solano	390,504.6	610.2	Pending
5-021.67	Yolo	504,201.1	787.8	Pending
5-021.69	Wyandotte Creek	48,024.1	75.0	Pending
5-022.01	Eastern San Joaquin	772,472.7	1,207.0	Pending
5-022.02	Modesto	245,252.7	383.2	High
5-022.03	Turlock	348,187.1	544.0	High
5-022.04	Merced	512,959.1	801.5	High
5-022.05	Chowchilla	145,939.6	228.0	Pending
5-022.06	Madera	347,572.2	543.1	Pending
5-022.07	Delta-Mendota	764,247.5	1,194.1	Pending
5-022.08	Kings	982,806.9	1,535.6	Pending
5-022.09	Westside	621,823.2	971.6	High
5-022.10	Pleasant Valley	48,195.6	75.3	Medium
5-022.11	Kaweah	441,003.9	689.1	High
5-022.12	Tulare Lake	535,869.1	837.3	High

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-022.13	Tule	477,646.4	746.3	High
5-022.14	Kern County	1,813,630.5	2,833.8	Pending
5-022.15	Tracy	338,984.3	529.7	Pending
5-022.16	Cosumnes	210,275.9	328.6	Pending
5-022.17	Kettleman Plain	63,754.6	99.6	Low
5-022.18	White Wolf	107,546.3	168.0	Medium
5-023	Panoche Valley	33,086.6	51.7	Very Low
5-025	Kern River Valley	79,388.9	124.0	Very Low
5-026	Walker Basin Creek Valley	7,667.6	12.0	Very Low
5-027	Cummings Valley	10,019.3	15.7	Very Low
5-028	Tehachapi Valley West	14,803.1	23.1	Very Low
5-029	Castac Lake Valley	3,563.6	5.6	Very Low
5-030	Lower Lake Valley	2,405.8	3.8	Very Low
5-031	Long Valley	2,801.5	4.4	Very Low
5-035	Mccloud Area	21,334.5	33.3	Very Low
5-036	Round Valley	7,266.3	11.4	Very Low
5-037	Toad Well Area	3,357.5	5.2	Very Low
5-038	Pondosa Town Area	2,082.9	3.3	Very Low
5-040	Hot Springs Valley	2,405.1	3.8	Very Low
5-041	Egg Lake Valley	4,102.3	6.4	Very Low
5-043	Rock Prairie Valley	5,739.1	9.0	Very Low
5-044	Long Valley	1,087.0	1.7	Very Low
5-045	Cayton Valley	1,306.7	2.0	Very Low
5-046	Lake Britton Area	14,061.2	22.0	Very Low
5-047	Goose Valley	4,210.4	6.6	Very Low
5-048	Burney Creek Valley	2,352.9	3.7	Very Low
5-049	Dry Burney Creek Valley	3,076.0	4.8	Very Low
5-050	North Fork Battle Creek	12,761.9	19.9	Very Low
5-051	Butte Creek Valley	3,227.6	5.0	Very Low
5-052	Grays Valley	5,440.8	8.5	Very Low
5-053	Dixie Valley	4,867.0	7.6	Very Low
5-054	Ash Valley	6,007.1	9.4	Very Low
5-056	Yellow Creek Valley	2,311.7	3.6	Very Low
5-057	Last Chance Creek Valley	4,657.1	7.3	Very Low
5-058	Clover Valley	16,778.0	26.2	Very Low
5-059	Grizzly Valley	13,438.0	21.0	Very Low
5-060	Humbug Valley	9,976.2	15.6	Very Low
5-061	Chrome Town Area	1,409.2	2.2	Very Low
5-062	Elk Creek Area	1,439.4	2.2	Very Low
5-063	Stonyford Town Area	6,441.6	10.1	Very Low

California Department of Water Resources

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
5-064	Bear Valley	9,110.8	14.2	Very Low
5-065	Little Indian Valley	1,269.5	2.0	Very Low
5-066	Clear Lake Cache Formation	29,740.4	46.5	Very Low
5-068	Pope Valley	7,182.5	11.2	Very Low
5-069	Yosemite Valley	7,454.9	11.6	Very Low
5-070	Los Banos Creek Valley	4,835.4	7.6	Very Low
5-071	Vallecitos Creek Valley	15,107.4	23.6	Very Low
5-080	Brite Valley	3,170.2	5.0	Very Low
5-082	Cuddy Canyon Valley	3,299.3	5.2	Very Low
5-083	Cuddy Ranch Area	4,202.6	6.6	Very Low
5-084	Cuddy Valley	3,465.3	5.4	Very Low
5-085	Mil Potrero Area	2,308.9	3.6	Very Low
5-086	Joseph Creek	4,456.4	7.0	Very Low
5-087	Middle Fork Feather River	4,341.3	6.8	Very Low
5-088	Stony Gorge Reservoir	1,065.6	1.7	Very Low
5-089	Squaw Flat	1,294.4	2.0	Very Low
5-090	Funks Creek	3,014.1	4.7	Very Low
5-091	Antelope Creek	2,040.9	3.2	Very Low
5-092	Blanchard Valley	2,222.9	3.5	Very Low
5-094	Middle Creek	705.2	1.1	Very Low
5-095	Meadow Valley	5,734.9	9.0	Very Low
6-001	Surprise Valley	228,661.5	357.3	Very Low
6-002	Madeline Plains	156,097.3	243.9	Very Low
6-003	Willow Creek Valley	11,695.9	18.3	Very Low
6-004	Honey Lake Valley	311,716.0	487.1	Low
6-005.01	Tahoe South	14,800.3	23.1	Medium
6-005.02	Tahoe West	6,168.4	9.6	Very Low
6-005.03	Tahoe North	1,929.7	3.0	Very Low
6-006	Carson Valley	10,721.5	16.8	Very Low
6-007	Antelope Valley	20,078.1	31.4	Very Low
6-008	Bridgeport Valley	32,485.6	50.8	Very Low
6-009	Mono Valley	172,843.2	270.1	Very Low
6-010	Adobe Lake Valley	39,866.2	62.3	Very Low
6-011	Long Valley	71,843.8	112.3	Very Low
6-012.01	Owens Valley	660,935.0	1,032.7	Pending
6-012.02	Fish Slough	3,221.6	5.0	Very Low
6-013	Black Springs Valley	30,766.9	48.1	Very Low
6-014	Fish Lake Valley	48,003.9	75.0	Low
6-015	Deep Springs Valley	29,930.4	46.8	Very Low
6-016	Eureka Valley	128,759.7	201.2	Very Low
6-017	Saline Valley	146,182.8	228.4	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-018	Death Valley	920,379.9	1,438.1	Very Low
6-019	Wingate Valley	71,285.4	111.4	Very Low
6-020	Middle Amargosa Valley	389,763.4	609.0	Very Low
6-021	Lower Kingston Valley	239,740.3	374.6	Very Low
6-022	Upper Kingston Valley	176,749.2	276.2	Very Low
6-023	Riggs Valley	87,515.1	136.7	Very Low
6-024	Red Pass Valley	96,315.4	150.5	Very Low
6-025	Bicycle Valley	89,458.5	139.8	Very Low
6-026	Avawatz Valley	27,612.1	43.1	Very Low
6-027	Leach Valley	61,175.5	95.6	Very Low
6-028	Pahrump Valley	92,926.7	145.2	Very Low
6-029	Mesquite Valley	88,157.1	137.7	Very Low
6-030	Ivanpah Valley	198,129.1	309.6	Very Low
6-031	Kelso Valley	254,686.6	397.9	Very Low
6-032	Broadwell Valley	91,878.2	143.6	Very Low
6-033	Soda Lake Valley	380,056.3	593.8	Very Low
6-034	Silver Lake Valley	35,202.1	55.0	Very Low
6-035	Cronise Valley	126,299.9	197.3	Very Low
6-036.01	Langford Well Lake	19,312.1	30.2	Very Low
6-036.02	Irwin	10,480.3	16.4	Very Low
6-037	Coyote Lake Valley	88,101.8	137.7	Very Low
6-038	Caves Canyon Valley	72,962.3	114.0	Very Low
6-040	Lower Mojave River Valley	285,485.5	446.1	Very Low
6-041	Middle Mojave River Valley	211,320.7	330.2	Very Low
6-042	Upper Mojave River Valley	412,841.0	645.1	Very Low
6-043	El Mirage Valley	75,896.1	118.6	Very Low
6-044	Antelope Valley	1,010,268.8	1,578.5	Very Low
6-045	Tehachapi Valley East	23,967.3	37.4	Very Low
6-046	Fremont Valley	335,234.1	523.8	Low
6-047	Harper Valley	409,501.8	639.8	Very Low
6-048	Goldstone Valley	28,090.5	43.9	Very Low
6-049	Superior Valley	120,319.7	188.0	Very Low
6-050	Cuddeback Valley	94,901.9	148.3	Very Low
6-051	Pilot Knob Valley	138,605.1	216.6	Very Low
6-052	Searles Valley	197,011.4	307.8	Very Low
6-053	Salt Wells Valley	29,473.9	46.1	Very Low
6-054	Indian Wells Valley	381,708.6	596.4	High
6-055	Coso Valley	25,561.6	39.9	Very Low
6-056	Rose Valley	42,524.8	66.4	Very Low
6-057	Darwin Valley	44,160.9	69.0	Very Low

California Department of Water Resources

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-058	Panamint Valley	259,290.7	405.1	Very Low
6-061	Cameo Area	9,303.4	14.5	Very Low
6-062	Race Track Valley	14,113.3	22.1	Very Low
6-063	Hidden Valley	17,943.3	28.0	Very Low
6-064	Marble Canyon Area	10,363.5	16.2	Very Low
6-065	Cottonwood Spring Area	3,896.7	6.1	Very Low
6-066	Lee Flat	20,282.8	31.7	Very Low
6-067	Martis Valley	36,357.0	56.8	Very Low
6-068	Santa Rosa Flat	16,779.9	26.2	Very Low
6-069	Kelso Lander Valley	11,164.7	17.4	Very Low
6-070	Cactus Flat	7,025.1	11.0	Very Low
6-071	Lost Lake Valley	23,253.6	36.3	Very Low
6-072	Coles Flat	2,946.0	4.6	Very Low
6-073	Wild Horse Mesa Area	3,320.5	5.2	Very Low
6-074	Harrisburg Flats	24,928.3	39.0	Very Low
6-075	Wildrose Canyon	5,151.3	8.0	Very Low
6-076	Brown Mountain Valley	21,726.6	33.9	Very Low
6-077	Grass Valley	9,974.8	15.6	Very Low
6-078	Denning Spring Valley	7,231.6	11.3	Very Low
6-079	California Valley	58,111.7	90.8	Very Low
6-080	Middle Park Canyon	1,741.4	2.7	Very Low
6-081	Butte Valley	8,797.6	13.7	Very Low
6-082	Spring Canyon Valley	4,800.4	7.5	Very Low
6-084	Greenwater Valley	59,813.8	93.5	Very Low
6-085	Gold Valley	3,210.7	5.0	Very Low
6-086	Rhodes Hill Area	15,578.5	24.3	Very Low
6-088	Owl Lake Valley	22,242.3	34.8	Very Low
6-089	Kane Wash Area	5,954.1	9.3	Very Low
6-090	Cady Fault Area	7,949.2	12.4	Very Low
6-091	Cow Head Lake Valley	5,617.4	8.8	Very Low
6-092	Pine Creek Valley	9,526.9	14.9	Very Low
6-093	Harvey Valley	4,503.2	7.0	Very Low
6-094	Grasshopper Valley	17,663.8	27.6	Very Low
6-095	Dry Valley	6,497.5	10.2	Very Low
6-096	Eagle Lake Area	12,699.5	19.8	Very Low
6-097	Horse Lake Valley	3,826.3	6.0	Very Low
6-098	Tuledad Canyon Valley	5,149.9	8.0	Very Low
6-099	Painters Flat	6,374.2	10.0	Very Low
6-100	Secret Valley	33,663.7	52.6	Very Low
6-101	Bull Flat	18,117.1	28.3	Very Low
6-104	Long Valley	46,846.2	73.2	Very Low

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
6-105	Slinkard Valley	4,511.2	7.0	Very Low
6-106	Little Antelope Valley	2,487.7	3.9	Very Low
6-107	Sweetwater Flat	4,719.8	7.4	Very Low
6-108	Olympic Valley	702.0	1.1	Very Low
7-001	Lanfair Valley	156,540.3	244.6	Very Low
7-002	Fenner Valley	452,482.5	707.0	Very Low
7-003	Ward Valley	557,586.4	871.2	Very Low
7-004	Rice Valley	188,094.1	293.9	Very Low
7-005	Chuckwalla Valley	601,573.1	940.0	Very Low
7-006	Pinto Valley	182,439.4	285.1	Very Low
7-007	Cadiz Valley	269,847.9	421.6	Very Low
7-008	Bristol Valley	496,816.2	776.3	Very Low
7-009	Dale Valley	212,533.3	332.1	Very Low
7-010	Twentynine Palms Valley	62,260.0	97.3	Very Low
7-011	Copper Mountain Valley	30,279.7	47.3	Very Low
7-012	Warren Valley	23,751.1	37.1	Pending
7-013.01	Deadman Lake	89,012.4	139.1	Very Low
7-013.02	Surprise Spring	29,253.2	45.7	Very Low
7-014	Lavic Valley	102,278.3	159.8	Very Low
7-015	Bessemer Valley	39,067.7	61.0	Very Low
7-016	Ames Valley	108,438.1	169.4	Very Low
7-017	Means Valley	14,941.5	23.3	Very Low
7-018.01	Soggy Lake	77,277.4	120.7	Very Low
7-018.02	Upper Johnson Valley	34,782.1	54.3	Very Low
7-019	Lucerne Valley	147,431.5	230.4	Very Low
7-020	Morongo Valley	7,228.1	11.3	Very Low
7-021.01	Indio	297,156.4	464.3	Medium
7-021.02	Mission Creek	48,571.7	75.9	Medium
7-021.03	Desert Hot Springs	100,947.6	157.7	Very Low
7-021.04	San Gorgonio Pass	38,545.1	60.2	Medium
7-022	West Salton Sea	105,382.3	164.7	Very Low
7-024.01	Borrego Springs	62,749.2	98.0	High
7-024.02	Ocotillo Wells	90,086.8	140.8	Very Low
7-025	Ocotillo-Clark Valley	222,280.2	347.3	Very Low
7-026	Terwilliger Valley	8,017.4	12.5	Very Low
7-027	San Felipe Valley	23,376.4	36.5	Very Low
7-028	Vallecito-Carrizo Valley	121,816.0	190.3	Very Low
7-029	Coyote Wells Valley	145,659.9	227.6	Very Low
7-030	Imperial Valley	957,774.4	1,496.5	Very Low
7-031	Orocopia Valley	96,223.5	150.3	Very Low
7-032	Chocolate Valley	129,107.2	201.7	Very Low

California Department of Water Resources

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
7-033	East Salton Sea	194,844.2	304.4	Very Low
7-034	Amos Valley	129,920.8	203.0	Very Low
7-035	Ogilby Valley	133,170.1	208.1	Very Low
7-036	Yuma Valley	123,880.6	193.6	Very Low
7-037	Arroyo Seco Valley	256,477.9	400.7	Very Low
7-038	Palo Verde Valley	72,934.1	114.0	Very Low
7-039	Palo Verde Mesa	224,910.8	351.4	Very Low
7-040	Quien Sabe Point Valley	25,173.3	39.3	Very Low
7-041	Calzona Valley	80,545.6	125.9	Very Low
7-042	Vidal Valley	137,660.1	215.1	Very Low
7-043	Chemehuevi Valley	272,014.5	425.0	Very Low
7-044	Needles Valley	88,053.9	137.6	Very Low
7-045	Piute Valley	175,192.4	273.7	Very Low
7-046	Canebrake Valley	5,411.5	8.5	Very Low
7-047	Jacumba Valley	2,475.7	3.9	Very Low
7-048	Helendale Fault Valley	2,617.2	4.1	Very Low
7-049	Pipes Canyon Fault Valley	3,382.0	5.3	Very Low
7-050	Iron Ridge Area	5,243.0	8.2	Very Low
7-051	Lost Horse Valley	17,299.6	27.0	Very Low
7-052	Pleasant Valley	9,642.6	15.1	Very Low
7-053	Hexie Mountain Area	11,131.9	17.4	Very Low
7-054	Buck Ridge Fault Valley	6,914.5	10.8	Very Low
7-055	Collins Valley	7,062.2	11.0	Very Low
7-056	Yaqui Well Area	14,966.6	23.4	Very Low
7-059	Mason Valley	5,520.5	8.6	Very Low
7-061	Davies Valley	3,570.9	5.6	Very Low
7-062	Joshua Tree	27,173.4	42.5	Pending
7-063	Vandeventer Flat	6,732.0	10.5	Very Low
8-001	Coastal Plain Of Orange County	224,226.3	350.4	Medium
8-002.01	Chino	153,762.3	240.3	Very Low
8-002.02	Cucamonga	9,028.0	14.1	Very Low
8-002.03	Riverside-Arlington	56,563.1	88.4	Very Low
8-002.04	Rialto-Colton	24,794.1	38.7	Very Low
8-002.05	Cajon	23,134.6	36.1	Very Low
8-002.06	Bunker Hill	92,488.2	144.5	Very Low
8-002.07	Yucaipa	22,218.8	34.7	High
8-002.08	San Timoteo	66,433.4	103.8	Pending
8-002.09	Temescal	22,963.6	35.9	Medium
8-004.01	Elsinore Valley	23,601.2	36.9	Medium
8-004.02	Bedford-Coldwater	7,025.7	11.0	Very Low
8-005	San Jacinto	181,454.8	283.5	Pending

Basin Number	Basin/Subbasin Name	Area (Acres)	Area (Square Miles)	Priority
8-006	Hemet Lake Valley	16,679.9	26.1	Very Low
8-007	Big Meadows Valley	14,162.1	22.1	Very Low
8-008	Seven Oaks Valley	4,075.2	6.4	Very Low
8-009	Bear Valley	19,170.1	30.0	Very Low
9-001	San Juan Valley	16,712.4	26.1	Very Low
9-002	San Mateo Valley	2,993.5	4.7	Very Low
9-003	San Onofre Valley	1,238.1	1.9	Very Low
9-004	Santa Margarita Valley	5,214.7	8.1	Very Low
9-005	Temecula Valley	87,752.6	137.1	Very Low
9-006	Cahuilla Valley	18,201.6	28.4	Very Low
9-007	San Luis Rey Valley	29,666.3	46.4	Pending
9-008	Warner Valley	23,963.5	37.4	Very Low
9-009	Escondido Valley	2,886.9	4.5	Very Low
9-010	San Pasqual Valley	3,498.4	5.5	Medium
9-011	Santa Maria Valley	12,289.9	19.2	Very Low
9-012	San Dieguito Creek	3,547.9	5.5	Very Low
9-013	Poway Valley	2,467.9	3.9	Very Low
9-014	Mission Valley	7,302.5	11.4	Very Low
9-015	San Diego River Valley	9,873.4	15.4	Pending
9-016	El Cajon Valley	7,152.1	11.2	Very Low
9-022	Batiquitos Lagoon Valley	740.8	1.2	Very Low
9-023	San Elijo Valley	882.3	1.4	Very Low
9-024	Pamo Valley	1,502.5	2.3	Very Low
9-025	Ranchita Town Area	3,119.9	4.9	Very Low
9-027	Cottonwood Valley	3,838.5	6.0	Very Low
9-028	Campo Valley	3,538.5	5.5	Very Low
9-029	Potrero Valley	2,018.9	3.2	Very Low
9-032	San Marcos Area	2,129.8	3.3	Very Low
9-033	Coastal Plain Of San Diego	54,980.9	85.9	Pending



# White Wolf Groundwater Sustainability Agency

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

## AGENDA MEMORANDUM

**Date:** 26 February 2019

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

**From:** Angelica Martin, Secretary, White Wolf GSA

**Item:** 5d. Proposition 68 Sustainable Groundwater Planning (SGWP) Grant

### SUMMARY

**Recommendation:** Continue to track Proposition 68 SGWP Grant Proposal Solicitation Package (PSP) release, and authorize EKI Environment and Water, Inc. (EKI) to prepare a grant application once available, under the direction of the Ad-hoc technical committee

**Fiscal Impact:** \$20,000

### BACKGROUND

On 16 January 2019, EKI staff spoke with California Department of Water Resources (DWR) representative Kelly List regarding additional SGWP Grant funding. Proposition 68 approved through the 2018 Senate Bill SB-5 approved at least \$45 million for Groundwater Sustainability Plan (GSP) planning grants. Additionally, funds left over from the 2017 Proposition 1 SGWP Grant process will be rolled into the Proposition 68 SGWP Grant funds. The Proposition 68 SGWP Grant funds will be awarded to three priority groups:

1. Grantees who did not apply for any GSP funding in the previous Proposition 1 rounds;
2. Grantees who applied for Proposition 1 funds but did not ask for the full grant amount (\$1 million or \$1.5 million for critically overdrafted basins); and
3. Severely disadvantaged community projects.

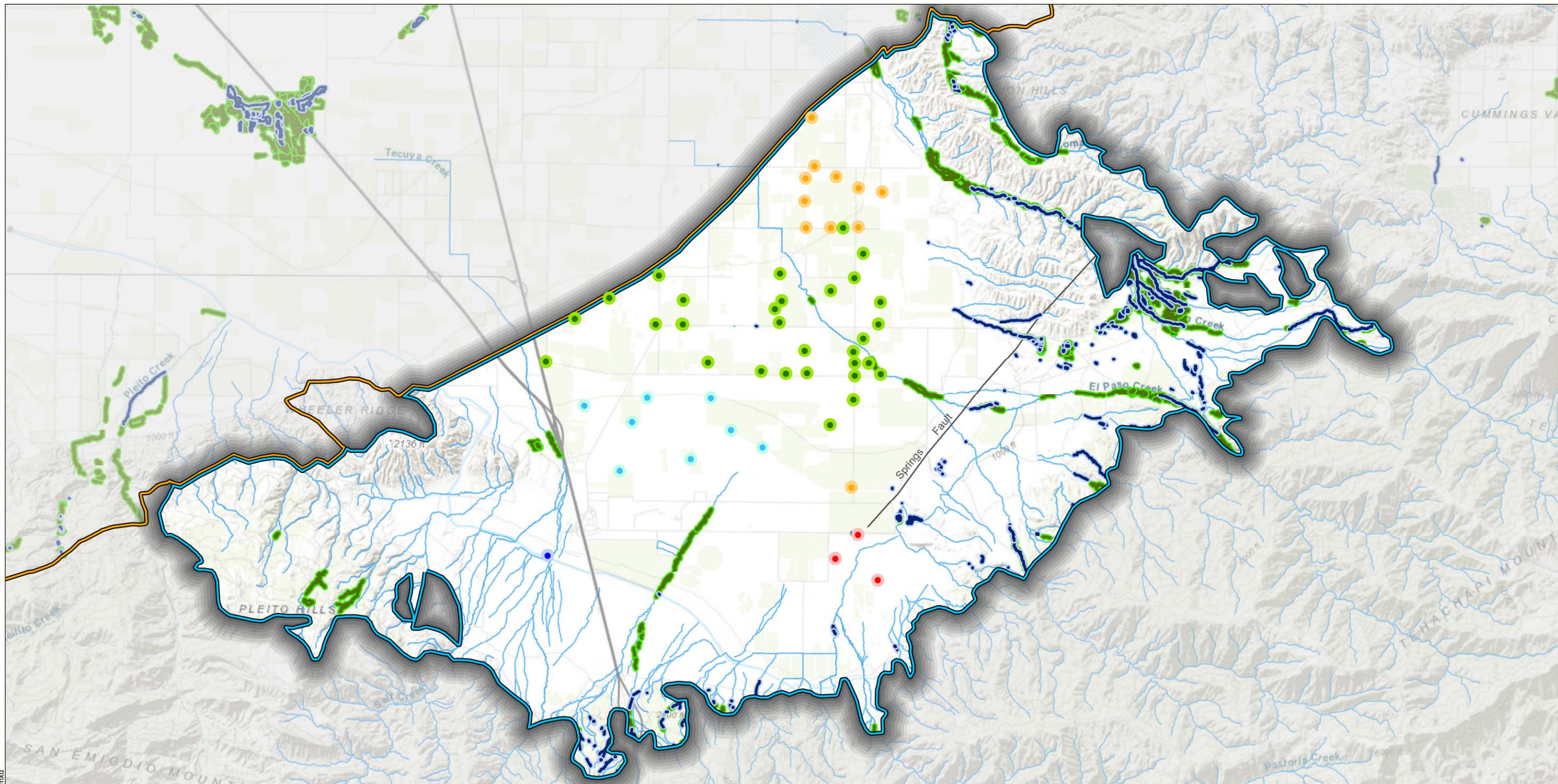
DWR has drafted a draft PSP that is currently going through management review. Ms. List anticipates there will be a draft PSP released for public comment by early March 2019, with the solicitation round beginning mid-2019. The draft PSP currently looks very similar to the previous Proposition 1 PSP, however it is anticipated that there will be less detail required in the forthcoming applications in hopes of reducing the required level of effort to prepare the Grant application.

## **DISCUSSION**

The White Wolf GSA requested and was awarded \$557,998 under the 2017 Proposition 1 SGWP Grant to support GSP preparation, which is less than the \$1 million that the GSA could have potentially applied for. Therefore, based on our understanding of the current eligibility requirements, it appears that the GSA could apply for additional Proposition 68 funds based on priority group #2. Through work with the Ad-hoc technical committee, EKI has identified three potential areas in which additional funding could be utilized to support GSP development in the White Wolf Subbasin (WWB):

1. **Groundwater Dependent Ecosystems (GDEs) verification and field mapping** (approximately \$35,000). Several areas of potential GDEs have been preliminarily identified in the WWB and further assessment is needed to understand how these areas and ecosystems do or do interact with the local groundwater system.
2. **GDEs monitoring** (TBD pending number of locations and depth). GDEs identified from the field mapping exercise may require adjacent shallow depth-to-groundwater monitoring.
3. **Groundwater Modeling** (approximately \$75,000 to \$300,000). As documented in GSA correspondence to DWR, Todd Groundwater and the Kern Groundwater Authority, the current version of the C2VSIM-FG model developed for the WWB by Todd Groundwater as part of its work for the Kern County Subbasin does not provide a very accurate depiction of conditions in the WWB. Additional modeling work is needed to support groundwater planning and management in the WWB. This modeling work could either take the form of: (1) making refinements to the existing C2VSim-FG model, or (2) development of an alternative model specifically for the WWB.

**Attached:** Draft Figure GWC-15 Natural Communities Commonly Associated with Groundwater and Spring 2015 Depth to Groundwater



Path: X:\B50001.05\Maps\GSP\2018\12\Fig\GWC-15\_NCCAG.mxd

**Legend**

**Groundwater Subbasin**

- White Wolf (DWR 5-022.18)
- Kern County (DWR 5-022.14)

**NCCAG**

- Wetland
- Vegetation
- Fault
- Stream into White Wolf Subbasin

**Spring 2015 Depth to Groundwater (ft bgs)**

- < 200
- 200 - 400
- 400 - 600
- 600 - 800
- > 800

**Abbreviations**

DWR = California Department of Water Resources  
 NCCAG = Natural Communities Commonly Associated with Groundwater  
 NHD = National Hydrography Dataset

**Notes**

1. All locations are approximate.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 12 December 2018.
2. DWR NCCAG dataset was obtained from NC Datasr Viewer <https://gis.water.ca.gov/app/NCDataSetViewer/>
3. Springs Fault from Goodman, E.D., and P.E. Malin, 1992, Evolution of the Southern San Joaquin Basin and Mid-Tertiary "Transitional" Tectonics, Central California, Tectonics, Vol. 11, No. 3, pages 478-498.
4. Surface water features and watersheds from NHD (<https://viewer.nationalmap.gov/basic/>).



**Natural Communities Commonly Associated with Groundwater and Spring 2015 Depth to Groundwater**

**DRAFT**



Tejon-Castac Water District  
 Kern County, CA  
 December 2018  
 B50001.05

**Figure GWC-15**



# White Wolf Groundwater Sustainability Agency

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

## AGENDA MEMORANDUM

**Date:** 26 February 2019

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

**From:** Angelica Martin, Secretary, White Wolf GSA

**Item:** 7. Discuss and consider approval of remaining Task Order tasks

### SUMMARY

**Recommendation:** Approve Tasks 3 and 4 of EKI Environment and Water, Inc. (EKI)'s Task Order to develop a Groundwater Sustainability Plan (GSP)

**Fiscal Impact:** GSA cost match of \$171,793 of approved Proposition 1 Grant budget

### BACKGROUND

On 11 April 2018, the Board approved Tasks 1, 2 and 5 of EKI's Task Order. The Board decided to approve only portions of EKI's Task Order as the GSA was simultaneously pursuing efforts to change the White Wolf Subbasin (WWB) status to Low Priority. If the request to the California Department of Water Resources (DWR) had been successful, the WWB would no longer be mandated to submit a GSP.

### DISCUSSION

On 4 January 2019, DWR released the final basin prioritizations, in which the WWB was prioritized as Medium. Therefore, the GSA is still required to submit a GSP by January 2022. Task 3 "Develop Sustainability Management Criteria" and Task 4 "Prepare and Submit GSP" are required next steps for GSP completion.

Based on discussions with EKI, approval of Tasks 3 and 4 is preferred at this time because certain tasks (e.g., Task 3 Develop Sustainable Management Criteria) can be more efficiently completed if coupled with the evaluation that will be conducted pursuant to already approved scope items (e.g., the subtask of Task 2 entitled "Monitoring Network Evaluation").

**Attached:** EKI's Task Order to Initial Groundwater Sustainability Plan Development

13 April 2018

To: Allen Lyda, Tejon-Castac Water District (TCWD)

Cc: Tito Martinez, White Wolf Groundwater Sustainability Agency (WWGSA)  
Angelica Martin, TCWD  
Jeevan Muhar, Arvin-Edison Water Storage District (AEWSD)  
Steve Collup, AEWSD  
Sheridan Nicholas, Wheeler Ridge-Maricopa Water Storage District (WRMWSO)  
Robert Kunde, WRMWSO  
Alan Christensen, Kern County

From: Anona Dutton, P.G., C.Hg., EKI Environment & Water, Inc. (EKI)

Subject: **Task Order to Initiate Groundwater Sustainability Plan Development**  
Tejon-Castac Water District  
Kern County, CA  
(EKI B8-045)

Dear Mr. Lyda,

Tejon-Castac Water District (TCWD, District, or Client) has requested that EKI Environment and Water, Inc. (EKI) provide a scope to develop a Groundwater Sustainability Plan (GSP) for the White Wolf Subbasin (Basin) as part of compliance with the Sustainable Groundwater Management Act (SGMA).

EKI understands that the White Wolf Groundwater Sustainability Agency (GSA) intends to develop a GSP for the Basin by the submission deadline of 31 January 2022<sup>1</sup>, and that the GSA intends to accelerate the development of certain portions of the GSP to foster effective communication and collaboration with the adjacent Kern County Subbasin (Kern Basin).

The GSA submitted an application for a Proposition 1 Sustainable Groundwater Planning Grant for the development of a GSP for the Basin. In April 2018 the California Department of Water Resources (DWR) released Final Funding Recommendations that included a recommendation that the GSA's application be fully funded. This Proposition 1 application, prepared by EKI with

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<sup>1</sup> The GSP submission deadline is 31 January 2022 for basins designated as high or medium priority and not designated as "critically over-drafted" in Bulletin 118 [CWC §10720.7], and the implementation deadline is 20 years thereafter.

significant input from the GSA, included a Work Plan, Budget, and Schedule for GSP development for the Basin (Attachment A).

The following Tasks (equivalent to the “Phases” articulated in the Proposition 1 application) summarize the effort

required to develop a GSP; additional details are more fully described in the attached Proposition 1 Work Plan.

A detailed schedule and budget that itemize the proposed Tasks and Subtasks (equivalent to the “Tasks” in the Proposition 1 application) are also included herein (Attachments B and C, respectively).

On 11 April 2018, the GSA Board of Directors approved Tasks 1, 2, and 5 to initiate GSP development and keep the GSA on schedule for the January 2022 GSP submission deadline. Future Tasks 3 and 4 are noted as part of an intended future scope that will be presented to the GSA Board of Directors for approval at a later date.

## SCOPE OF WORK

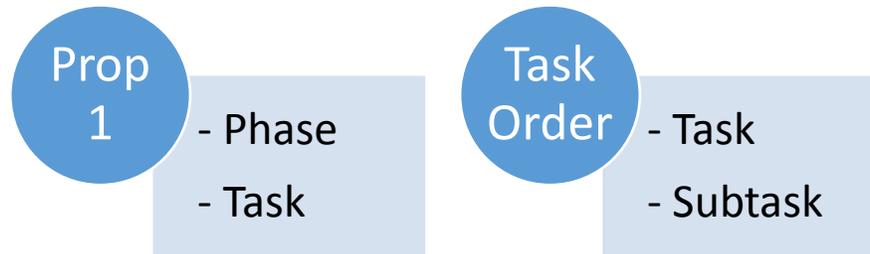
### Task 1 – Conduct Foundational GSP Development Efforts<sup>2</sup>

Task 1 consists of preparing the data, information, technical tools, and funding and outreach plans needed to successfully perform subsequent tasks. Efforts under Task 1 align with portions of Articles 3, 4, 5-1, 5-2, and 8 of the GSP Regulations (23-California Code of Regulations [CCR] §352-354.18, §357-357.4). Key work efforts within this task will include development of a functional Data Management System (DMS); assessment of key data gaps for GSP development and suggestions for how to fill them; evaluation of numerical groundwater modeling options; and development of a stakeholder communication and engagement plan that will fulfill the SGMA requirements and is suited to the interested parties in the Basin.

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<sup>2</sup> Foundational SGMA compliance efforts completed by EKI to date, which were included in the Proposition 1 application Work Plan, including supporting the White Wolf GSA’s formation, development of a California Statewide Groundwater Elevation Monitoring (CASGEM) monitoring program, and preparation of the GSA’s Proposition 1 application, are not included in this scope, as they were completed pursuant to another task order.

## Prop 1 Application vs. Task Order Terminology



## **Task 2 – Develop Basin Setting Information**

Task 2 focuses on developing a foundational understanding of the Basin to support SGMA compliance and to inform the sustainability planning efforts under Task 3. Efforts under Task 2 align with the Basin Setting and Monitoring Network sections of the GSP Regulations (23-CCR §354.12-18, §354.32-40). Key work efforts within this task will include filling of selected data gaps identified in Task 1; development of a Hydrogeologic Conceptual Model (HCM); definition of groundwater conditions; development of a basin-wide water budget; coordination with the Kern County Subbasin on modeling; and assessment of the existing monitoring network.

## **Task 5 – Project Management and Grant Administration**

Task 5 includes efforts related to general management of the entire GSP development process (i.e., through the January 2022 submission deadline). These efforts will be carried out concurrently with the execution of Tasks 1 through 4, and includes efforts consistent, where applicable, with the grant administration requirements outlined in the Proposition 1 Proposal Grant Agreement Template and the technical and reporting standards outlined in the GSP Regulations (23-CCR §352-352.6). Key work efforts within this task will include the development of a Quality Assurance/Quality Control (QA/QC) Plan; support of the GSA in submission of required quarterly progress reports and a grant completion report; and project management of the full GSP development effort.

## **POTENTIAL FUTURE SCOPE TO COMPLETE GSP DEVELOPMENT**

### **Task 3 – Develop Sustainable Management Criteria**

Task 3 focuses on planning for the continued sustainable management of the Basin and aligns with portions of the Sustainable Management Criteria, Monitoring Network, and Project and Management Actions sections of the GSP Regulations (23-CCR §354.20-44). Key work efforts within this task will include the development of Sustainable Management Criteria; identification of potential projects and management actions; development of a GSP implementation plan; and finalization of a SGMA-compliant monitoring network and protocols.

### **Task 4 – Prepare and Submit GSP**

Task 4 involves preparation of the GSP for submittal to DWR and aligns with requirements for GSP submission outlined in the GSP Regulations and in the California Water Code (CWC §10727-10728.6). Key work efforts within this task will include the compilation of the complete draft GSP; distribution of the draft GSP to stakeholders and revision based on feedback received; and submission of the final GSP to DWR.

## **PERSONNEL**

EKI's staff members who will be available to work on this project include Anona Dutton, P.G., C.Hg. (Officer), Christopher Heppner, Ph.D., P.G. (Senior 1), Tori Klug, E.I.T (Grade 4), and

Mauricio Osorio-Gonzalez (Grade 5); grades in parentheses are for purposes of billing in accordance with the attached Schedule of Charges (see Attachment D). Other EKI staff members may be assigned to assist with the performance of the tasks as required to meet project commitments.

## SCHEDULE

EKI is prepared to start work on the above Scope of Work immediately upon authorization to proceed. As shown in Attachment B, we anticipate that Tasks 1 and 2 will be largely complete by early 2020 to support GSP submission by 31 January 2022. Task 5 will be carried out through the end of the GSP development process. We will inform the GSA of any issues that arise that may affect the schedule for completion or impact the anticipated level of effort.

## TERMS AND CONDITIONS

All work performed by EKI under this Task Order is anticipated to be performed pursuant to the Terms and Conditions of our existing Agreement with Tejon-Castac Water District.

## COMPENSATION

Inasmuch as the exact level of effort required to complete the above Scope of Work cannot be known precisely, EKI proposes to perform the work on a time and materials expense reimbursement basis in accordance with our current Schedule of Charges. A breakdown of the estimated budget is provided in Table 1 below, and a detailed budget estimate is included as Attachment C.

**Table 1. Estimated Budget for Tasks 1, 2, and 5<sup>3</sup>**

Task	Estimated Budget	Grant Reimbursable Amount <sup>4</sup>	White Wolf GSA Amount
Task 1 – Conduct Foundational GSP Development Efforts	\$134,300	\$77,100	\$57,100
Task 2 – Develop Basin Setting Information	\$292,600	\$120,000	\$172,700
Task 5 – Project Management and Grant Administration	\$85,700	\$48,900	\$38,900
<b>TOTAL:</b>	<b>\$512,700</b>	<b>\$246,000</b>	<b>\$266,700</b>

<sup>3</sup> Budget numbers are rounded to the nearest hundred; precise numbers by task and subtask can be found in Attachment C. Attachment C includes all Tasks to develop a GSP, including Tasks 3 and 4, which EKI intends to present to the GSA Board for approval at a later date to complete GSP development.

<sup>4</sup> Grant reimbursable amount assumes full funding of the White Wolf GSA's Proposition 1 grant as recommended by DWR on 6 February 2018.

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

We are pleased to have the opportunity to work with you on this very important project. Please call if you have any questions or wish to discuss this proposal in greater detail.

Very truly yours,

EKI Environment & Water, Inc.



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

AUTHORIZATION

TEJON-CASTAC WATER DISTRICT  
(CLIENT)

By \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

**Attachments**

- |              |  |
|--------------|--|
| Attachment A | White Wolf GSA Proposition 1 Work Plan                             |
| Attachment B | Project Schedule   |
| Attachment C | Cost Estimate to Develop a Groundwater Sustainability Plan Chapter |
| Attachment D | 2018 Schedule of Charges   |

## **Attachment A**

### **White Wolf GSA Proposition 1 Work Plan**

## BACKGROUND

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The White Wolf Groundwater Subbasin (DWR 5-022.18, hereinafter “Basin”) is a high priority basin and as such is required to comply with the Sustainable Groundwater Management Act (SGMA). Specifically, the Basin is required to be managed by one or more Groundwater Sustainability Agency (GSA) and to submit a Groundwater Sustainability Plan (GSP) by January 2022.

The Basin is collectively represented by one exclusive GSA, the White Wolf GSA (hereinafter “the GSA”), composed of Arvin-Edison Water Storage District (AEWSD), Tejon-Castac Water District (TCWD), Wheeler Ridge-Maricopa Water Storage District (WRMWS), and Kern County. The Basin, GSA, and other relevant jurisdictional boundaries are shown in Figure 1. The GSA is governed by a Board of Directors (hereinafter “GSA Board”) with two representatives each from AEWSD, TCWD, and WRMWS, and one representative from Kern County. The GSA Board will select an ad hoc Technical Committee (hereinafter “TC”) to guide and contribute to the efforts outlined in this Work Plan.

This Work Plan assumes that the GSA will do the work described herein directly through in-kind services of the TC or through contracts with a specialized consultant team. Specifically, this Work Plan assumes that the GSA will retain a qualified consultant team to complete the technical and stakeholder engagement work described herein and will be an active participant in the GSP development effort. This effort will include the TC providing data and in-kind support for Plan development, the GSA Board engaging in proactive and informed decision-making during GSA Board meetings, and both the GSA Board and the TC providing constructive feedback and timely reviews of work products produced by the consultant team.

Kern County received funding through the Sustainable Groundwater Planning (SGWP) Proposition 1 *Counties with Stressed Basins* solicitation for GSA formation, stakeholder outreach, water budget refinement, and coordination efforts in the Kern County Groundwater Subbasin (DWR 5-022.14, hereinafter “Kern Subbasin”) and the Indian Wells Valley Groundwater Subbasin (DWR 6-054). The effort included in this Work Plan is being conducted for the White Wolf Subbasin and is not duplicative with efforts in the larger Kern Subbasin. All interbasin coordination efforts outlined herein will complement those being conducted by Kern agencies for the Kern Subbasin.

## PROJECT OVERVIEW

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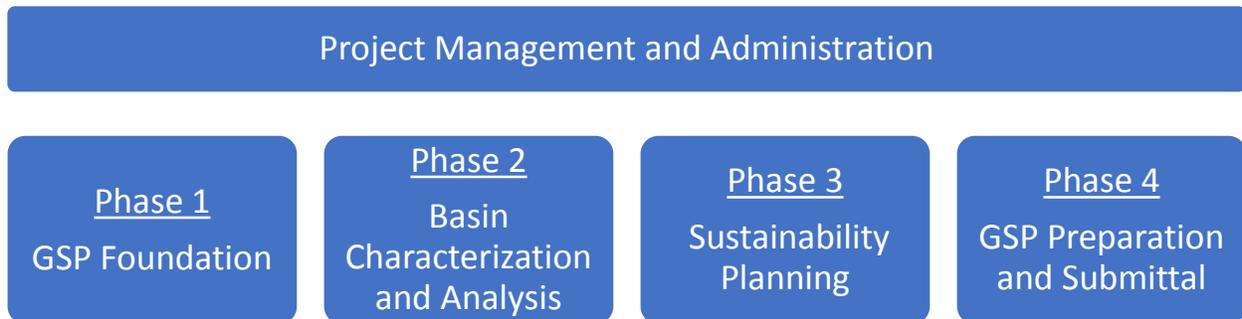
For the purposes of this Proposition 1 Grant Application, the “Project” is the development of a SGMA-compliant GSP for the Basin.

## PROJECT OBJECTIVES

The main objective of this Project is to develop a complete GSP for the Basin that will comply with and meet all requirements of the GSP Emergency Regulations (23-CCR §350-358.4) and will provide a reasonable path forward for demonstrating sustainable groundwater management in the Basin by the SGMA implementation deadline of 2042. The Project is designed to meet all requirements for a Category 2, Tier 2 SGWP Proposition 1 grant outlined in the Groundwater Sustainability Plans and Projects Proposal Solicitation Package (PSP).

## PROJECT PHASING

The Work Plan (and associated Budget and Schedule) divides the overall effort for GSP Development into four phases with a Project Management and Administration Phase (PM Phase) covering the entire GSP development process. As shown in the graphic below the four phases are: (1) GSP Foundation, (2) Basin Characterization and Analysis, (3) Sustainability Planning, and (4) GSP Preparation and Submittal. Each phase builds off efforts and results of the previous phases.



As shown in the attached Project Schedule, the four phases overlap temporally in cases where activities in a later phase can be initiated while activities in a previous phase are still ongoing. The work efforts of Phases 1 through 3 are accelerated with the objectives of

- **Keeping pace with SGMA efforts in the adjacent Kern Subbasin** (which is in critical overdraft condition and thus subject to an accelerated SGMA compliance schedule); and
- **Supporting effective interbasin coordination**, particularly with respect to critical factors such as the water budget and numerical groundwater model development (Phase 2) and the development and vetting of sustainability criteria (Phase 3).

## INTERIM WORK PRODUCTS

The Work Plan will be implemented in a transparent and collaborative fashion to ensure the GSA and other Basin stakeholders, groundwater users, and the general public will be informed about the Project progress and will have ample opportunity to provide timely input. Specifically, the work effort of each major task described herein will be documented as follows:

- **Technical Presentations** that will be made on a regular basis to the GSA and Basin stakeholders to provide for an open and transparent process and significant opportunity for input as key elements of the GSP are being developed. This approach ensures that there is sufficient outreach when the Draft Technical Memoranda (see below) are reviewed and will streamline the review and revision process as major issues will have been vetted during the development stage by all parties; and
- **Draft Technical Memoranda (TM)** and associated tables and figures that will be submitted for review and comment by the GSA and in some cases additional key stakeholders. The TMs will reflect input received during the related technical presentations and will be drafted to support key elements of the GSP. The Draft TMs will not be finalized; rather the suggested revisions to the Draft TMs will be incorporated into chapters of the Draft GSP.

Selected work products, resources and underlying data will be made available for public review on the GSA website (<http://www.whitewolfgsa.org/>).

## PROJECT DELIVERABLES

The deliverable for this Project is a complete and fully SGMA-compliant GSP, including all associated data and informational components (i.e., a functional Data Management System containing all preliminary data and a bibliography of sources used to develop the GSP; Numerical Model input/output files and documentation, project feasibility studies, etc.), submitted to the California Department of Water Resources (DWR) by the January 2022 deadline.

Additionally, the Project Applicant will submit all required grant administration-related reports to DWR – including quarterly progress reports and a final report – as established in the Grant Agreement that will be entered into by the Project Applicant and DWR.

## SUMMARY WORK PLAN FOR GRANT ADMINISTRATION PURPOSES

Although the Project Work Plan has been developed in significant detail, it is assumed that, for purposes of grant administration, the Project Applicant will work with DWR to manage the grant at the Phase level. As such, a brief summary Work Plan that describes each Phase and the associated tasks and associated work products and deliverables is provided below. This information supports and is consistent with the level of detail presented in the Project Budget and Schedule.

A more detailed description of each Phase and Task follows thereafter in the “Detailed Project Work Plan”.

### PM PHASE - PROJECT MANAGEMENT AND ADMINISTRATION (0% COMPLETE)

The Project Management and Administration Phase (PM Phase) includes tasks related to general management of the entire GSP development process (i.e., through the January 2022 submission deadline). The PM Phase efforts will be carried out concurrently with the execution of Phases 1 through 4, and includes the following Tasks consistent, where applicable, with the grant administration requirements outlined in the PSP Grant Agreement Template and the technical and reporting standards outlined in the GSP Regulations (23-CCR §352-352.6):



- Task 1. Proposition 1 Grant (Grant) Management, Administration, and Reporting
- Task 2. Project Management (for GSP Development)
- Task 3. Quality Assurance/Quality Control

Anticipated work products under the PM Phase will include:

- Project Meeting agendas, minutes and presentations, as applicable;
- Project schedule, budget tracking and other management tools; and
- Draft and Final QA/QC Plan.

Deliverables to DWR under the PM Phase will include all submittals required by Proposition 1 grant requirements and agreed to in the Grant Agreement, including:

- Quarterly progress and accountability reports;
- A final Project Completion Report;
- A Grant Completion Report; and
- A Coordination Agreement (*as necessary*).

## PHASE 1 – GSP FOUNDATION (15% COMPLETE)

Phase 1 of the Work Plan involves the following Tasks consistent, where applicable, with portions of Articles 3, 4, 5-1, 5-2, and 8 of the GSP Regulations (23-CCR §352-354.18, §357-357.4):



Task 4. Conduct Preliminary GSP Development Efforts

Task 5. Provide Initial Notification of GSP Development

Task 6. Select or Design a Data Management System (DMS)

Task 7. Gather and Compile Available Data into the DMS

Task 8. Gather and Compile Information on the Plan Area and Basin Management Activities

Task 9. Conduct Data Gaps Assessment

Task 10. Evaluate Numerical Groundwater Model Options

Task 11. Update GSP development Funding Plan

Task 12. Develop Stakeholder Communication and Engagement Plan (SCEP)

Task 13. Conduct Stakeholder Engagement Related to the GSP Foundation Phase

Task 14. Participate in Intrabasin and Interbasin Coordination Efforts

Efforts under Phase 1 will prepare the GSA with the data, information, technical tools (i.e., a selected numerical model), and funding and outreach plans needed to successfully perform the subsequent Basin Characterization and Analysis efforts under Phases 2 and 3. Anticipated work products from Phase 1 efforts include:

- A functional DMS containing all preliminary data and a living bibliography;
- Draft TM #1 – Data Management System Evaluation and Selection;
- Draft TM #2 – Data Compilation and Data Gaps Assessment;
- Draft TM #3 – Numerical Groundwater Model Evaluation and Selection;
- Draft TM #4 – GSP Development Funding Plan; and
- Draft TM #5 – Stakeholder Communication and Engagement Plan

Phase 1 will extend from the grant award date through July 2018<sup>1</sup>. Focused technical presentations will be made to the GSA Board and TC to present the data, methodology, and results from each task and to solicit feedback prior to drafting and submitting each Draft TM for review.

<sup>1</sup> Cost-sharing activities associated with Phase 1 efforts will encompass relevant work undertaken by the GSA and the entities comprising the GSA since January 2015 (the effective date of SGMA).

## PHASE 2 - BASIN CHARACTERIZATION AND ANALYSIS (0% COMPLETE)

Phase 2 of the Work Plan focuses on technical analysis of Basin conditions, and includes the following Tasks consistent, where applicable, with portions of the Basing Setting and Monitoring Network sections of the GSP Regulations (23-CCR §354.12-18, §354.32-40):



- Task 15. Implement Plan for Filling Data Gaps Needed for GSP Preparation
- Task 16. Assess Groundwater Conditions and Develop Hydrogeologic Conceptual Model
- Task 17. Coordinate Regarding C2VSim Modeling
- Task 18. Develop a Basin-Wide Water Budget
- Task 19. Assess Existing Monitoring Programs and Develop SGMA-Compliant Monitoring Network
- Task 20. Conduct Stakeholder Engagement Related to Basin Characterization and Analysis
- Task 21. (Continue to) Implement GSP Development Funding Plan
- Task 22. (Continue to) Participate in Intrabasin and Interbasin Coordination Efforts

Efforts under Phase 2 will build towards a complete and coherent understanding of the Basin that will serve as the foundation for sustainability planning efforts under Phase 3. Anticipated work products from Phase 2 efforts include:

- Draft TM #6 – Groundwater Conditions and Hydrogeologic Conceptual Model;
- Draft TM #7 – Model Development and Calibration;
- Draft TM #8 – Water Budget and Preliminary Estimate of Sustainable Yield; and
- Draft TM #9 – Summary of Monitoring Network Assessment and Preliminary Monitoring Plan.

Phase 2 will extend from July 2018 to July 2019. Focused technical presentations will be made to the GSA and TC to present the data, methodology, and results from each task and to solicit feedback prior to drafting and submitting each Draft TM for review.

## PHASE 3 - SUSTAINABILITY PLANNING (0% COMPLETE)

Phase 3 of the Work Plan focuses on planning for the sustainable management of the Basin, and includes the following Tasks consistent, where applicable, with portions of the Basin Setting, Sustainable Management Criteria, Monitoring Network, and Project and Management Actions sections of the GSP Regulations (23-CCR §354.20-44):



- Task 23. Evaluate Potential Management Areas
- Task 24. Develop Sustainable Management Criteria
- Task 25. Identify Projects and Management Actions
- Task 26. Create GSP Implementation Plan

- Task 27. Finalize Monitoring Network and Protocols
- Task 28. Conduct Stakeholder Engagement Related to Sustainability Planning
- Task 29. (Continue to) Implement GSP Development Funding Plan
- Task 30. (Continue to) Participate in Intrabasin and Interbasin Coordination Efforts

Anticipated work products from Phase 3 efforts include:

- Draft TM #10 – Establishment of Sustainability Criteria;
- Draft TM #11 – Proposed Projects and Management Actions;
- Draft TM #12 – GSP Implementation Plan; and
- Draft TM #13 – Proposed Monitoring Network and Protocols.

Phase 3 will extend from July 2019 to July 2020. Focused technical presentations will be made to the GSA and TC to present the data, methodology, and results from each task and to solicit feedback prior to drafting and submitting each Draft TM for review.

## PHASE 4 - GSP PREPARATION AND SUBMITTAL (0% COMPLETE)

Phase 4 of the Work Plan involves preparation of the GSP for submittal to DWR, and includes the following Tasks consistent, where applicable, with requirements for GSP submission outlined in the GSP Regulations and in the California Water Code (CWC §10727-10728.6):



- Task 31. Compile Complete Draft GSP
- Task 32. Distribute Draft GSP and Revise (if necessary) per Stakeholder Feedback
- Task 33. Submit Final GSP to DWR
- Task 34. (Continue to) Participate in Intrabasin and Interbasin Coordination Efforts

Anticipated work products from Phase 4 efforts include:

- A Final (written) GSP;
- Coordination Agreements (as applicable);
- A Data Management System, integrated with all existing data; and
- Numerical Model Inputs/Outputs.

It is anticipated that Phase 4 will extend from July 2020 through the GSP submission deadline of January 2022.

## DETAILED PROJECT WORK PLAN

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### PM PHASE - PROJECT MANAGEMENT AND ADMINISTRATION (0% COMPLETE)

The Project Management and Administration Phase (PM Phase) includes tasks related to general management of the entire GSP development process (i.e., through the January 2022 submission deadline). The PM Phase efforts will be carried out concurrently with the execution of Phases 1 through 4.



#### **Task 1: Proposition 1 Grant Management, Administration, and Reporting (0% complete)**

This task includes all work efforts needed to comply with the Grant reporting and administration requirements, including accounting of expenditures of allocated grant monies, preparation of progress reports, invoices, and associated documentation, and as-needed communications with DWR Sustainable Groundwater Planning (SGWP) grant administration staff.

As specified in the PSP Grant Agreement Template, deliverables to DWR will include:

- Quarterly progress and accountability reports;
- A final Project Completion Report;
- A Grant Completion Report; and
- A Coordination Agreement (*as necessary*).

The requirements for this reporting shall be established in the grant agreement that will be entered into by the GSA and DWR.

#### **Task 2: Project Management (0% complete)**

This task includes overall project management activities, including management of project budgets, schedule, staff assignments, subconsultant/subcontractor management, records management, contract compliance, etc. This task will also cover routine communication between the consultant team and the TC and GSA, including the preparation of Project meeting agendas, presentations, minutes, etc.

#### **Task 3: Quality Assurance/Quality Control (0% complete)**

Under this task, the GSA will develop and implement a QA/QC Plan to ensure that all work projects, deliverables, are developed using standardized methodologies appropriate to each individual work product, and undergo review for conformance with applicable standards. The methodologies covered under the QA/QC Plan will include those related to:

- Data collection and compilation;
- Maintenance of a project bibliography (i.e., document repository);
- Technical analyses including water budgets and numerical modeling;
- Preparation of graphics including map-based figures and others;
- Preparation of written work products (i.e., technical memoranda and reports); and
- Performance of project management activities.

## PHASE 1 - GSP FOUNDATION (15% COMPLETE)

Efforts under Phase 1 will prepare the GSA with the data, information, technical tools (i.e., a selected numerical model), and funding and outreach plans needed to successfully perform the subsequent Basin Characterization and Analysis efforts under Phases 2 and 3. Phase 1 will extend through July 2018.



### Task 4: Conduct Preliminary GSP Development Efforts (100% complete)

After SGMA was adopted on January 1, 2015, entities in the Basin initiated efforts to comply with SGMA. The following are specific efforts that have already been carried out:

- GSA formation;
- Basin Boundary Modification, which included the assessment and compilation of basin-wide data on geology, groundwater levels, aquifer properties, and boundary flows, and other information relevant to GSP preparation and basin characterization analyses;
- Efforts by the agencies that comprise the GSA to characterize the portions of the Basin that underlie their service area, including the development of preliminary Hydrogeologic Conceptual Models (HCMs), water budgets, and groundwater conditions assessments by AEWSD (completed) and WRMWSD (upcoming);
- Development and initiation a CASGEM monitoring program for the entire White Wolf Subbasin, an effort which involved assessing available groundwater level data and wells suitable for monitoring data collection;
- Initial assessment of potential undesirable results and data gaps based off publicly available data sources (see Figures 2 through 5);
- Modeling efforts planning;
- Stakeholder workshops;
- Development of SGMA/GSP Website (<http://www.whitewolfgsa.org/>); and
- Preparation of a grant application.

These efforts are included in the budget for this project, as they constitute foundational technical efforts that have contributed to GSP development for the White Wolf Subbasin. For example, for the HCM developed for AEWSD, the portion of the total cost of this effort that can be attributed to GSP

development for the White Wolf Subbasin is estimated using a proportion of the total AEWS service area that overlies the White Wolf Subbasin.

### **Task 5: Provide Initial Notification of GSP Development (0% complete)**

The GSP Regulations (23-CCR §353.6) require that each GSA shall notify DWR of their process for developing the GSP, including how interested parties can contact the GSA and participate in the development and implementation of the GSP. The GSA will prepare the required initial notification documentation and submit it to DWR via the online SGMA portal to commence GSP development. Additionally, the GSA will post all initial notification documentation on the GSA website (<http://www.whitewolfgsa.org/>).

### **Task 6: Select or Design Data Management System (0% complete)**

The GSP Regulations (23-CCR §352.6) require that each GSA develop a DMS to enable the storage and reporting of information relevant to GSP implementation and monitoring of basin conditions. DWR's *BMP 2 Monitoring Networks and Identification of Data Gaps* briefly discusses DMS requirements, and indicates that DWR intends to update BMP 2 with a suggested DMS data structure to facilitate data consistency, transparency, and sharing amongst basins and with DWR. Data to be included in the DMS must conform to the Data and Reporting Standards described in §352.4 of the GSP Regulations and must be consistent with the requirements of any inter- or intra-basin coordination agreements that address data consistency.

#### ***Evaluate Data Management Systems***

The GSA will select or develop a DMS in accordance with the forthcoming update to the DWR's BMP guidance. The various options for the DMS will be evaluated and summarized for review and consideration by the GSA. The review will include potential "off-the-shelf" data management tools, or the development of a customized DMS. It is anticipated that the DMS will include both spatial and temporal data, and that the two data types will be linked through use of a Geographic Information System (GIS) geodatabase. Specifically, it is anticipated that:

- **Spatial data** will generally be stored as shapefiles or other graphical formats, as appropriate, and will include but not be limited to surficial soils and geology; topography; natural and artificial surface water features (i.e., rivers and streams, lakes, reservoirs, springs, wetlands, canals, recharge basins, etc.); wells, stream gauges, subsidence monitoring stations, and other monitoring sites, as applicable; various boundaries (i.e., basin, agency, GSA, Disadvantaged Community [DAC], and parcel boundaries); and
- **Temporal data** will be stored in a set of cross-referenced tables, and will include, but not be limited to climate and meteorological data; hydrology/streamflow; well-specific data on groundwater levels and quality; land use/cropping data; water use information (including groundwater pumping, imports and deliveries by water suppliers); and demographic/population data.

The DMS will be constructed to include QA/QC checks, in accordance with the QA/QC Plan developed under Task 3, so that all data entered into the DMS are valid and compatible for subsequent analyses necessary for GSP preparation and implementation. The DMS will be designed to allow for the accurate

and efficient export of information for GSP analysis as well as on-going reporting purposes. Also, the DMS shall readily provide for future addition of new data and GSA staff will be trained on use of the DMS as a part of Task 26.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

The options for DMS selection and/or development will be summarized in technical presentation(s) made to the GSA Board and TC and summarized in *Draft TM #1 – Data Management System Evaluation and Selection* for consideration by the GSA, which will then decide on what approach to utilize.

## **Task 7: Gather Available Data and Compile into DMS (40% complete)**

Under Task 7, the GSA will gather and compile available existing data in support of subsequent GSP analyses (e.g., groundwater conditions assessment, hydrogeologic conceptual model [HCM], water budget analysis) into the Basin DMS.

The districts comprising the GSA have already compiled data from many of the above sources identified below as a part of the Basin Boundary Modification effort. These already compiled data will form the foundation of the data to be compiled into the DMS and will be updated and augmented with more recent data as available.

### ***Compile Publicly Available Data***

DWR has compiled many useful data sources and tools on its website, including the “*Sustainable Groundwater Management - Data, Tools, and Reports*” webpage. The GSA intends to frequently revisit DWR webpages and data repositories to ensure compilation of all applicable, publicly available data. Statewide or federal (i.e., non-local) public data sources that will also be mined for the purposes of populating the DMS for subsequent GSP analysis include the following:

- Groundwater Level Data:
  - DWR California Statewide Groundwater Elevation Monitoring Program (CASGEM);
  - DWR Groundwater Information Center (GIC); and
  - DWR Water Data Library (WDL).
- Surface Water Flow Data:
  - DWR California Data Exchange Center (CDEC);
  - DWR WDL;
  - United States Geological Survey (USGS) National Water Information System (NWIS); and
  - United States Bureau of Reclamation (USBR).
- Surface Water Diversion and Permitting Data:
  - State Water Resources Control Board (SWRCB) Electronic Water Rights Information Management System (eWRIMS) data
- Climatological / Meteorological Data:
  - DWR CDEC;
  - DWR California Irrigation Management Information System (CIMIS);
  - National Oceanic and Atmospheric Administration (NOAA) data; and
  - PRISM climate data.
- Groundwater Quality Data:

#### Attachment 4 – Work Plan

- SWRCB Groundwater Ambient Monitoring and Assessment (GAMA) program;
  - SWRCB GeoTracker program;
  - SWRCB Division of Drinking Water (DDW); and
  - USGS NWIS.
- Topography: USGS
- Surficial Soils: United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)
- Surficial Geology:
  - USGS reports; and
  - California Division of Mines and Geology (CDMG) reports.
- Land Use:
  - GSA districts Land Use Surveys
  - DWR Land Use Surveys;
  - USGS National Land Cover Database (NLCD);
  - USDA; and
  - Any publicly available city- and/or county- wide land use surveys.
- Population:
  - DWR;
  - State Department of Finance; and
  - United States Census Bureau
- Water Use:
  - DWR Agricultural Land and Water Use Estimates; and
  - ITRC Evapotranspiration (ET) Data.
- Well Construction information
  - DWR Well Completion Report Map (*forthcoming*); and
  - California Department of Oil, Gas, and Geothermal Resources (DOGGR) logs.

#### **Compile Local and Basin-Specific Data**

To supplement the above public data sources, additional information from local sources (i.e., agencies within the Basin) will be gathered and compiled under Task 7. It is anticipated that this local information may include more detailed information on land use, water use, groundwater levels, and water quality in the Basin. Information will be entered into the Basin DMS and/or a document repository established in support of GSP development using the QA protocols established during DMS construction under Task 6. These local data sources include, but are not limited to, the following:

- Groundwater Management Plans (GWMPs) prepared by WRMWSD (2007) and AEWS (2003) and accompanying annual updates;
- CASGEM Monitoring Network Plans prepared by AEWS (2010) and the White Wolf GSA (2017);
- The Basin Boundary Modification Request submitted by AEWS, TCWD, and WRMWSD and approved by DWR in 2016, and the associated White Wolf Subbasin Technical Study (EKI, 2016);
- AEWS's recently developed HCM, water budget, and definition of groundwater conditions for its service area;
- WRMWSD's upcoming HCM, water budget, and definition of groundwater conditions for its service area;

- Agricultural Water Management Plans (AWMPs) prepared by WRMWSD (2015) and AEWS (2015) and submitted to DWR;
- General Plans (discussed further under Task 8 below);
- Databases of well records, water level data, water quality data, operational data (e.g., deliveries of water to customers of each water supplier);
- Relevant data and information being developed in the adjacent Kern Subbasin as part of SGMA efforts (e.g., numerical flow model data inputs, etc.);
- Results of studies and investigations by individual entities within the Subbasin; and
- Any other available and relevant data and/or information.

Additionally, outreach to agencies and other stakeholders in the Basin will be conducted to collect additional relevant local data sources not yet identified by the GSA.

### ***Prepare Technical Presentations(s) and Draft Technical Memorandum***

Results of Task 7 will be presented pursuant to Task 9.

## **Task 8: Compile Information on the Plan Area and Basin Management Activities** *(0% complete)*

The GSP Regulations (23-CCR §354.8) require that each GSP contain information on the Plan Area, including the following:

- Maps depicting the area covered by GSP, adjudicated areas, other agencies within the basin, and areas covered by an Alternative, jurisdictional boundaries of federal, state, tribal, city, county, and agencies with water management responsibilities, areas covered by relevant General Plans, existing land use designations, the density of wells per square mile, and locations of communities dependent on groundwater;
- A written description of the Plan area describing the features depicted on the above maps;
- Identification and description of water resource monitoring and management programs, how those programs may be incorporated into the Plan, and how they may limit operational flexibility in the basin;
- A description of conjunctive use programs, if any;
- A description of land use elements or topic categories of applicable General Plans, including a summary of those plans, how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects, how implementation of the GSP may affect the water supply assumptions of relevant land use plans and how land use plans outside the basin could affect the ability to achieve sustainable groundwater management within the basin;
- A summary of the permitting process for new or replacement wells in the basin; and
- Any additional elements determined to be relevant and appropriate.

### ***Review Information on the Plan Area and Basin Management Activities***

Under Task 8, the above information will be compiled, reviewed and summarized to the extent applicable. In addition, the required set of maps will be prepared. An extensive bibliography will be developed and maintained of relevant reports, documents, and web-based resources. The review will be necessary at

this stage to inform the subsequent basin analyses and sustainability planning to be performed under Phases 2 and 3 (i.e., the water budget, development of management actions and criteria, etc.).

### ***Prepare Technical Presentations(s) and Draft Technical Memorandum***

Results of Task 8 will be presented pursuant to Task 9.

### **Task 9: Conduct Data Gaps Assessment (0% complete)**

The GSA has performed an initial compilation of existing, publicly available data on groundwater conditions in the Basin.<sup>2</sup> The results of this preliminary assessment are shown in Figure 2 through Figure 5 and are summarized as follows:

- **Groundwater Elevations / Storage Change.** CASGEM Spring 2013 data included approximately 18 water level records within the Basin; water level data were noticeably absent along in the southern, western, and eastern portions of the Basin (see Figure 2); additionally, no aquifer-specific groundwater level information was readily available.
- **Seawater Intrusion.** No publicly available data exist regarding seawater intrusion conditions in the Basin; this is likely due to the Basin's location on the southern edge of the Central Valley, where seawater intrusion is not anticipated to occur at any significant rate.
- **Water Quality.** Water quality data from AEWS for calendar year 2016 are shown on Figures 3a through 3g, but are isolated to the AEWS service area within the Basin. GAMA water quality data are minimal (only five wells for which there are few samples) and thus not included. For these 2016 data, Figure 3a shows that several wells near I-5 exceeded the Secondary Maximum Contaminant Level (MCL) for Total Dissolved Solids (TDS); Figure 3b shows that over half of the wells tested exceeded the Primary MCL for nitrate; Figure 3c shows that five of the wells tested exceeded the Primary MCL for arsenic; Figure 3d shows that several wells near I-5 had high boron levels that may reduce agricultural productivity; Figure 3e shows that several wells close to the boundary with the Kern Subbasin exceeded the Secondary MCL for iron; and Figure 3f shows that one well exceeded the Secondary MCL for manganese. GeoTracker records indicated the presence of two open contamination sites and another eight closed sites within the Basin (see Figure 3g). These limited data indicate that collection of additional water quality data will be necessary to characterize groundwater quality throughout the Basin.
- **Land Subsidence.** DWR's May 2015-May 2016 survey of *Land Subsidence in the San Joaquin Valley*<sup>3</sup> covers only a small portion of the Basin along the northern border. Two University Navigation Satellite Timing & Ranging Consortium (UNAVCO) continuous GPS stations are located in the Basin – one in the northwest and one along the southern border of the Basin (see Figure 4). These UNAVCO stations indicate that there has been little to no subsidence in the Basin since the stations were installed in 1999 and 2000.

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<sup>2</sup> These data relate to potential Undesirable Results, which are defined and discussed in Task 24.

- **Streamflow Depletion.** One USGS streamflow gauge is installed along the section of Tejon Creek in the eastern portion of the Basin (see Figure 5).

While some data exist near the boundary of the Basin with the Kern Subbasin, data are sparse further south, west, and east of the boundary for most sustainability indicators. These data gaps will need to be addressed to monitor for all sustainability indicators throughout the Basin; near-term efforts to address these data gaps are included in Task 15.

### ***Refine Preliminary Data Gaps Assessment***

Upon completion of data and information compilation tasks described above (Task 7 and Task 8), the GSA will conduct a more complete assessment of data gaps under Task 9. The purpose of this data gaps assessment will be to identify high priority data gaps that will need to be filled in the near term in order to prepare the GSP. The assessment will therefore focus on information pertinent to requirements under the GSP Regulations for the Plan area description, the HCM, the groundwater conditions, and the water budget. The assessment will generally be performed in accordance with GSP Regulations (23-CCR §354.38) and the flow chart included as Figure 4 of BMP 2.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from this task (and prior Task 7 and Task 8) will be summarized in technical presentation(s) made to the GSA and TC and summarized in *Draft TM #2 – Data Compilation and Data Gaps Assessment* that includes a description of the data gaps analysis effort, a table summarizing and prioritizing the identified data gaps, and a description of potential activities that may be undertaken to address the data gaps. The potential plans to fill data gaps will describe the intended benefits/rationale, data collection methods, estimated costs, permitting and regulatory requirements, and other relevant considerations for each potential data gap filling activity. Costs to fill data gaps that have already been identified by the GSA are provided under Task 15 of the Project Budget, but are not included in the actual grant request as these may potentially warrant solicitation of DWR’s Technical Support Services. Data gaps that the GSA has yet to identify may also warrant solicitation of DWR’s Technical Support Services and/or any other applicable future funding sources that may become available throughout the course of GSP development and implementation.

## **Task 10: Evaluate Numerical Groundwater Model Options (0% complete)**

The GSP Regulations require that the “best available science” be used to quantify the water budget for the Basin (23-CCR §354.18) and to support the definition of management actions (23-CCR §354.44). DWR’s review of GSPs will include consideration of whether the “best available science” supports the assumptions, criteria, findings, and objectives of the Plan. While the use of a numerical groundwater and surface water model is not *required* under the GSP Regulations, the 23-CCR §354.18 states that “If a numerical groundwater and surface water model is not used to quantify and evaluate the projected water budget conditions and the potential impacts to beneficial uses and users of groundwater, the Plan shall identify an equally effective method, tool, or analytical model to evaluate projected water budget conditions.”

### **Conduct Groundwater Model Evaluation**

It is likely that a numerical groundwater/surface water model will be required in order to develop future water budgets and to more fully represent and understand complexities inherent to certain conditions and fluxes within the Basin. These complexities include subsurface flows across the boundary with the Kern Subbasin along the White Wolf Fault.

Known numerical groundwater and surface water model options for GSP development for the White Wolf Subbasin include, but are not limited to:

- DWR’s California Central Valley Groundwater and Surface Water Simulation Model (C2VSim);
- USGS’s Central Valley Hydrologic Model (CVHM);
- WRMWSD’s Bookman-Edmonston Model (specific to the White Wolf Subbasin); and
- A custom model developed for the White Wolf Subbasin for SGMA purposes.

The White Wolf GSA understands that GSAs in the adjacent Kern Subbasin are planning to use DWR’s C2VSim Fine Grid Model. The White Wolf GSA intends to participate in the Kern Subbasin shared modeling effort to assist with water budget analysis for the Basin, assuming that the C2VSim model results are reasonably reflective of conditions within the Basin.

Since the new C2VSim Fine Grid Model has not yet been released, it is currently unknown how well it represents conditions in the Basin. Upon release of the model by DWR, the GSA will review the C2VSim Fine Grid Model with respect to the assumptions and parameterization in the White Wolf Subbasin, as well as review the other model options identified above, and make a final recommendation as to how to proceed with respect to modeling.

### **Prepare Technical Presentation(s) and Draft Technical Memorandum**

The results of this numerical model evaluation task will be summarized in technical presentation(s) to the GSA and TC and *Draft TM #3 – Model Evaluation and Selection* for consideration by the GSA, which will then decide on which, if any, numerical modeling approach to use for GSP development.

### **Task 11: Update GSP Development Funding Plan (0% complete)**

As a part of preparing this Work Plan and corresponding budget, the GSA has conducted a funding needs assessment that accounts for the estimated budget to develop the GSP, and the estimated amount of funding allocated from DWR through this SWGP Grant Solicitation, as well as estimates of local funding and in-kind services. If awarded a SGWP Grant, the GSA will update the funding plan as needed to account for the actual grant award amount.

To the extent that local funds are needed to fulfill the cost share requirements for this Project, the GSA will follow the required process for public notice and public hearings as documented in California Water Code 10730 and/or Proposition 218. To the extent that costs (e.g., for filling data gaps) exceed that which

is anticipated at the time of this Proposal, the GSA will investigate other options for financial or in-kind assistance, including DWR’s Technical Assistance Program.

The results of this updated funding plan will be summarized in technical presentation(s) and in a *Draft TM #4 – Updated GSP Development Funding Plan* to document the GSA’s final funding approach for GSP development.

## **Task 12: Develop Stakeholder Communication and Engagement Plan (0% complete)**

The GSP Regulations (23-CCR §354.10) require a summary of the engagement and communication by the GSA leadership with other agencies and interested parties in the Basin. Specifically, the GSP Regulations (23-CCR § 354.10) prescribe “notice and communication” requirements for agencies preparing GSPs which require that a GSP include, among other things, a communication section that explains the GSA’s decision-making process; describes opportunities for public engagement and how public input and response will be used; encourages active involvement of diverse social, cultural, and economic elements of the population within the Basin; and describes the methods for informing the public on GSP implementation progress. The GSA will develop a Stakeholder Communication and Engagement Plan (SCEP) to guide stakeholder engagement throughout the GSP development and implementation process.

The GSA intends to continue to engage with stakeholders in a similar process as demonstrated through the Basin Boundary Modification process carried out by WRMWSD, AEWS, and TCWD and the GSA formation process carried out by the GSA. During the GSA formation process, beneficial users of groundwater were identified (as summarized below); an approach for engaging these specific stakeholders will be included in the SCEP.

- **Water suppliers** - AEWS, TCWD, and WRMWSD are the key public agencies with water supply and management authority in the Basin; these agencies are actively involved in GSP development as entities that formed the GSA and through the presence of representatives on the GSA Board. The primary land use in the Basin is irrigated agriculture, comprising 41% of the total land area in the Basin in 2013. Collectively, WRMWSD and AEWS provide water service to the majority of the agricultural water users in the Basin. Each water district maintains a list of landowners within its service area, and letters have been sent to the landowners with an invite to participate in GSP development for the Basin.
- **Commercial and industrial water users** - The Basin includes the Pastoria Energy Facility, Griffith Company, Tejon Ranch Company (TRC), and the oil and gas industry. A process for engaging with individuals from these entities will be included in the SCEP. Additionally, the TRC holds appropriate water rights to several of the ephemeral tributaries in the Basin. As a landowner, commercial water user, and water rights holder in the Basin, the TRC will be engaged during the development and implementation of the GSP.
- **Disadvantaged Communities** - The GSA notes that portions of Census Tracts 33.06 and 62.02, which are recognized as Disadvantaged Community Tracts, overly a portion of the Basin. Also, a portion of a census block group (a statistical division of a census tract) partially overlying the basin is identified as a Severely Disadvantaged Community Census Block Group and another census block group partially overlying the Basin is identified as a Disadvantaged Community Census Block

Group. There are no Disadvantaged Community Places identified within the Basin. Disadvantaged Communities (DACs) are identified based on having an average household income less than 80% of the State median, and Severely Disadvantaged Communities (SDACs) are identified based on having an average household income less than 60% of the State median (US Census American Community Survey, 2014). The White Wolf GSA will ensure within its SCEP that stakeholders in disadvantaged communities are invited and encouraged to participate in the GSP development and implementation process.

- **Federal / Tribal** - There are no identified federal lands or California Native American tribal lands within the Basin.

### ***Develop an SCEP to Encompass GSP Development***

Specifically, under Task 12, the GSA will develop its SCEP to include the specific sections required by the GSP regulations and to guide stakeholder engagement throughout the GSP development and implementation process.

In developing its SCEP, the GSA intends to document and frame its approach to engaging relevant stakeholders in the Basin with the goal of developing and implementing a GSP with broad support and improved groundwater-related outcomes for relevant stakeholders. The GSA's approach to stakeholder engagement will focus on open and effective communication, fostering constructive dialogues, and maximizing GSA and stakeholder time and resources through coordinated engagement opportunities and meetings. The SCEP will describe specific activities for informing interested members of the public, including periodic workshops, development of a website (already active) and mailings (email and post). Additionally, the GSA Board meetings are open to the public and include multiple opportunities for public comment and written meetings minutes are posted to the website (<http://www.whitewolfgsa.org/>).

The GSA will use the following as resources in refining its SCEP:

- *DWR's Guidance Document for Groundwater Sustainability Plan: Stakeholder Communication and Engagement;*
- *The Community Water Center's Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation;*
- *DWR's Outreach and Engagement: A Resource Management Strategy of the California Water Plan*
- The Institute for Local Government's (ILG) resources on public engagement; and
- Feedback from public workshops designed to generate input on effective outreach strategies and preferences among affected stakeholders.

The SCEP will identify a series of public meetings to be held throughout the GSP development process during which the GSA will present information and provide progress updates. These meetings will be venues for public dialogue and for receiving input on the work efforts and results of each phase. Meetings will also be used to outline and receive initial input on the tasks to be completed in the upcoming phase(s).

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

The results of this updated SCEP will be summarized in technical presentation(s) and in a *Draft TM #5 – Stakeholder Communication and Engagement Plan* for consideration by the GSA, which will then authorize implementation of the SCEP. The SCEP will be managed adaptively throughout GSP development as the

GSA discern which activities are most effective in engaging interested public and identify gaps in outreach efforts.

### **Task 13: Conduct Stakeholder Engagement Related to the GSP Foundation Phase** *(0% complete)*

Under Task 13, the GSA will begin to implement the SCEP. As a first step, the GSA will invite the beneficial users identified during the GSA formation processes (i.e., agricultural water users, TRC, DAC representatives, municipalities, etc.) to participate in an initial stakeholder workshop focused on identifying their interests, concerns, and priorities; the best tools for communicating with them (i.e., e-mail, direct mail, newsletters, social media, etc.); what issues or concerns they would like to see addressed in the GSP development process; and who else they think should be involved in the GSP development and implementation process.

Stakeholder engagement during Phase 1 is anticipated to include dissemination of information (through appropriate modes of communication, as discussed above) regarding the data compilation, numerical model evaluation, and data gaps assessment efforts. Additionally, the GSA will communicate and accept input on the tasks to be completed in Phase 2.

### **Task 14: Participate in Intrabasin and Interbasin Coordination Efforts** *(0% complete)*

Successful GSP development hinges on effective intra- and inter-basin coordination, and the GSA has made such coordination a priority.

#### ***Participate in Intrabasin Coordination***

Coordination amongst the public agencies comprising the GSA (AEWSD, TCWD, WRMWS, and Kern County) will be essential throughout the GSP development process. The GSA Board will appoint the TC, composed of staff from each public agency that will meet regularly to coordinate GSP development and implementation in the Basin. Currently, the GSA meets quarterly, and it is assumed that the TC will meet monthly. During the GSP Foundation Phase, intrabasin coordination will be conducted related to decisions regarding the DMS selection and development, compilation of data and information into the DMS and document repository, numerical model options and selection, data gap filling efforts, development of a GSP funding plan, and stakeholder engagement activities.

#### ***Participate in Interbasin Coordination***

To support SGMA implementation, the GSA may want to enter into formal or informal agreements with GSAs in the adjacent Kern County Subbasin (DWR 5-022.14) to “establish compatible sustainability goals and understanding regarding fundamental elements of the Plans of each Agency as they relate to sustainable groundwater management” (CCR § 357.2). Interbasin coordination will be especially useful when deriving water budget components relating to cross-boundary surface/subsurface flows (see Task 18 for further clarification).

The GSA has expressed an interest in accelerating the development of certain portions of the GSP development to foster effective communication with the neighboring Kern Subbasin, which is critically

overdrafted and thus has an accelerated SGMA compliance timeline. This accelerated timeline is reflected in the Project Schedule.

A key factor in this on-going coordination will be the attendance at pertinent meetings and review of technical documents produced by entities in adjacent basins. It is anticipated that the following coordination activities will occur:

- Attendance at regularly, scheduled SGMA-related public meetings in the Kern Subbasin, assumed to occur monthly;
- As-needed meetings between technical counterparts in the Kern Subbasin; and
- Review and comment on significant work products produced in the Kern Subbasin.

AEWSD, WRMWSD, and Kern County all overlie both the White Wolf Subbasin and the Kern Subbasin. Due to this connection, the GSA will be able to easily stay abreast of key developments in the Kern Subbasin.

## PHASE 2 - BASIN CHARACTERIZATION AND ANALYSIS

As described further below, Phase 2 of the Work Plan focuses on technical analysis of Basin conditions and will build towards a complete and coherent understanding of the Basin that will serve as the foundation for sustainability planning efforts under Phase 3. Phase 2 will extend from July 2018 to July 2019.



### **Task 15: Implement Plan for Filling Data Gaps Needed for GSP Preparation (0% complete)**

Based on results from the data gaps assessment performed under Task 9 above, the GSA will perform selected data collection activities to fill high-priority data gaps in support of improving the Phase 2 work effort.

Based on the preliminary data gaps assessment that has already been initiated as a part of Task 9 (see Figure 2 through Figure 5), the GSA has identified the following data gap filling actions to be taken:

- Processing and analysis of DWR well completion reports for in-Basin wells;
- Pump tests to better understand principal aquifer characteristics and boundary conditions;
- Groundwater quality sampling and analysis; and
- Groundwater elevation data collection.

These efforts will be focused on filling data gaps relevant to understanding the Basin setting during Phase 2, which will set the groundwork for Phase 3 efforts to develop sustainable management criteria and identify projects and management actions that will be instrumental to achieve the Basin’s sustainability goal. The technical consultant will work with the GSA and landowners to identify and gain access to desired wells for testing. Results from this analysis will be incorporated into the DMS and will support subsequent work efforts in Task 16 through Task 18.

### **Process and Analyze DWR Well Completion Reports**

As part of Task 15, the GSA will compile, digitize, process, and analyze all available well completion reports provided by DWR in its Well Completion Report Map Application (*forthcoming*). Data extracted from well reports will include:

- General well information (type, location, capacity, status, etc.);
- Well screening intervals; and
- Well log data (i.e. lithologic units), as available.

This information will be used to bolster understanding of subsurface lithology under the Basin, to help characterize wells by the principal aquifer(s) they pump from, to identify candidate wells to include in a SGMA compliant monitoring network (further discussed in Task 19 and Task 27), and to perform selected data gap filling analyses (see below).

### **Conduct Pumping Tests**

In order to understand key characteristics of the principal aquifers in the Basin, the GSA will conduct up to three (3) pump tests at select locations throughout the Basin. These pump tests will utilize existing well infrastructure and will be designed and implemented to achieve various objectives, such as:

- Quantifying aquifer parameters (hydraulic conductivity, transmissivity, storativity, etc.); and
- Testing boundary conditions and verifying the lateral/ vertical extent of discrete aquifer units.

### **Sample and Analyze Groundwater Quality**

As shown on Figure 3a through Figure 3g, groundwater quality data are not readily available throughout the Basin. In order to more comprehensively understand water quality in the principal aquifers and throughout the Basin, a “snap shot” of water quality samples will be collected from 10 wells and analyzed for general chemistry and minerals, metals, as well as stable and reactive isotopes for conducting recharge source and age dating analyses.

### **Collect Groundwater Elevation Data**

As shown on Figure 2, groundwater elevation data are only available near the northern boundary of the Basin and are not well characterized by aquifer unit. In order to more comprehensively understand groundwater elevation in principal aquifers and throughout the Basin, two “snap shots” of groundwater elevation data will be collected from 10 wells.

## **Task 16: Assess Groundwater Conditions and Develop Hydrogeologic Conceptual Model (0% complete)**

The GSP Regulations (23-CCR §354.14 and §354.16) require the assessment of groundwater conditions in the Basin and the development of a HCM. The efforts described in Task 16 will be coordinated given that insight related to the Basin’s groundwater conditions and the HCM are interconnected.

As noted in Task 4, AEWS has already developed and WRMWSD is currently developing HCMs and definitions of groundwater conditions for their service areas. The service areas of these two districts collectively overlie the majority of the White Wolf Subbasin, with substantial overlap. These work

products and the data supporting their development will form the basis of the efforts of the GSA to assess groundwater conditions and develop a HCM for the White Wolf Subbasin.

### ***Assess Groundwater Conditions***

The GSP Regulations (23-CCR §354.16) require each GSP to include a description of groundwater conditions in the Basin, including the following:

- Groundwater elevations, spatially, with depth, and over time;
- Estimated change in storage by water year type and cumulatively over time;
- Seawater intrusion conditions;
- Groundwater quality issues, including known contamination sites and plumes;
- Land subsidence;
- Interconnected surface water; and
- Groundwater dependent ecosystems.

Under Task 16, the GSA will assess groundwater conditions with respect to the above topics. This assessment will be based on the data compiled into the Basin DMS under Phase 1 and Task 15. The assessment will include preparation of representative maps and graphs (i.e., groundwater elevation contour maps and hydrographs, graph(s) of change in groundwater storage, and map(s) showing groundwater quality issues, subsidence, interconnected surface water, and groundwater dependent ecosystems). Updated data sources from DWR shall be incorporated into the groundwater conditions assessment as they become available.

### ***Develop Hydrogeologic Conceptual Model***

The GSP Regulations (23-CCR §354.14) describe the requirements for a HCM to be included in a GSP. Further guidance is contained within *BMP 3 Hydrogeologic Conceptual Model*. An HCM is a conceptual representation of the physical basin characteristics that affect and/or control the occurrence, movement, and quality of groundwater in a basin. The HCM describes how a basin functions and how water moves through the system, and serves as a foundation for further quantitative and data-driven analyses of sustainability and planning efforts. The HCM necessarily includes both narrative and graphical components.

Building upon the data compilation efforts completed under Phases 1 and Task 15, and upon work completed to date within the Basin (e.g., through the development of GWMPs, AWMPs, UWMPs, and CASGEM Monitoring Network Plans), a preliminary HCM will be developed under Task 16 that includes all elements required under the GSP Regulations, including:

- Regional geologic setting;
- Basin boundaries, both laterally and vertically;
- Principle aquifers, including formation names, physical properties, general water quality, primary uses of each aquifer and data gaps/uncertainty;
- Two scaled cross sections depicting major stratigraphic and structural features; and
- A set of maps depicting topography, surficial geology, soil characteristics, recharge areas, surface water bodies, and points of delivery for imported water supplies.

BMP 3 describes data sources that may be of use in developing the HCM. These data include, but are not limited to DWR, USGS, and CDMG maps and reports on geology; USCEPA, USGS, SWRCB, and DOGGR maps

and information on the base of fresh water and definable bottom of the Basin; and USGS and SWRCB information on physical properties and water quality within principle aquifers, supplemented by local information from aquifer testing and sampling, as available. The HCM will cover all required aspects listed in the GSP Regulations, but will also aim to focus on the most significant issues and questions facing the White Wolf Subbasin (based on GSA's current understanding of the Basin), including

- Assessment of aquifer parameters and their spatial and vertical extent, hydrogeologic flow barriers, and the degree of confinement in the aquifer system;
- Identification of potential sites for groundwater recharge projects;
- Identification of potential land subsidence areas; and
- Analysis of groundwater quality for each principal aquifer in the Basin.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from Task 16 will be summarized in technical presentation(s) to the GSA and TC and in a *Draft TM#6 – Groundwater Conditions and Hydrogeologic Conceptual Model* that includes narrative/descriptive and graphical components of the HCM and groundwater conditions, including maps, charts and other graphics, tables, and supporting documentation as appendices, as appropriate.

### **Task 17: Coordinate Regarding C2VSim Modeling (0% complete)**

As stated above under Task 10, the White Wolf GSA intends to participate in the Kern Subbasin shared modeling effort which will use the C2VSim Fine Grid Model, assuming that upon release of that model by DWR and review by the White Wolf GSA it is determined to be reasonably representative of conditions in the White Wolf Subbasin. Under Task 2.3, the White Wolf GSA will coordinate with the GSAs in the Kern Subbasin regarding the use of C2VSim for SGMA purposes. This coordination will entail the following:

- Communication with Kern Subbasin GSAs regarding the modeling effort, including defining the historical and current water budget scenarios;
- Provision of key data to support model refinement, as necessary, in the White Wolf Subbasin;
- Obtaining and processing model input and output for the White Wolf Subbasin from the C2VSim shared modeling effort; and
- Any other necessary support.

The C2VSim Fine Grid Model results will be used to support the water budget analysis described under Task 2.4 below.

### **Task 18: Develop Basin-Wide Water Budget (0% complete)**

The GSP Regulations (23-CCR §354.18) spell out the requirements for water budgets that must be included in a GSP. Guidance on water budget development, including a partial listing of GSP-related uses, is provided in *BMP 4 Water Budget*. Per the GSP Regulations, the water budget must assess the following:

- Current, historical (at least 10 years) and projected (projecting forward based on 50 years of hydrology) water budgets;
- Quantification of total surface water entering and leaving the basin;

- Inflows and outflows to/from the groundwater system, including (but not limited to) subsurface inflows/outflows, infiltration of applied water and precipitation, and groundwater extraction;
- Change in storage between seasonal high conditions;
- Overdraft during a period when water supply conditions approximate average conditions;
- Water year types; and
- An estimate of the sustainable yield of the basin.

As noted in Task 4, AEWS D has already developed a water budget for its service area and WRMWSD is currently developing a water budget for their service areas. Furthermore, a preliminary water budget was developed by the member agencies comprising the White Wolf GSA for the entire Basin as part of the Basin Boundary Modification effort. The service areas of these two districts collectively overlie the majority of the Basin, with substantial overlap. The water budget framework developed in these efforts will form the basis of the preliminary water budget for the Basin, and the data already compiled will populate the water budget and be updated as appropriate.

### ***Develop Preliminary Water Budget Based on Empirical Storage and Flux Relationships***

Under Task 18, the GSA will develop a preliminary historical and current water budget for the Basin based on a simple “bucket model”, whereby the various storage components (e.g., atmosphere, land surface, root zone, unsaturated zone, and saturated zone) are represented as “buckets”, each subject to mass balance requirements and connected to the other buckets by various flux relationships.

The fluxes between storage components will be quantified using commonly used and accepted analysis methods (e.g., the crop coefficient method of evapotranspiration estimation, Darcy’s Law for groundwater flow through a cross section, soil moisture accounting model for deep percolation, etc.), supported by the best available information compiled under Phases 1 and 2. The preliminary “bucket model” will then be calibrated through strategic adjustment of certain parameters employed within these empirical flux relationships (e.g., hydraulic conductivity, storativity, runoff curve numbers, etc.) to better align simulated groundwater elevations (i.e., changes in groundwater storage) with current and historical water level measurements collected from in-Basin wells.

Considering the high density of irrigated lands within the Basin, the GSA will want to pay special attention to reviewing and selecting the most appropriate methodology for estimating basin-wide agricultural water demands. Additionally, recognizing the ephemeral nature of most of the Basin’s surface water features, the water budget will need to address the short- and long-term temporal dynamics and variability in streamflow conditions throughout the Basin and to quantify associated contributions of surface water seepage to the groundwater table.

The GSA understands that the GSAs in the adjacent Kern Subbasin intend to construct a water budget beginning in 1994 and extending through 2016 (a 23-year period), which fulfills the requirement for a historical water budget “starting with the most recently available information and extending back a minimum of 10 years” (CCR §354.18). To ensure that interaction between the White Wolf Subbasin and the Kern Subbasin is accurately represented in both water budgets being prepared for both subbasins, the GSA intends to use the same 1994 – 2016 period for the historical water budget.

### ***Extract Water Budget Information from C2VSim Fine Grid Model***

After developing the “bucket model”, historical and current water budget information will be extracted from the C2VSim Fine Grid Model. The preliminary historical and current water budget developed through the “bucket model” approach will then be used to further inform and/or verify analogous water budget components calculated through the C2VSim Fine Grid Model. Water budget components extracted from the C2VSim Fine Grid Model that differ significantly from the analogous “bucket model” prediction will be identified and further investigated to determine the nature of the discrepancy and to adjust assumptions/inputs as necessary.

### ***Determine Sustainable Yield of the White Wolf Subbasin***

Once the historical and current water budgets produced by the conceptual “bucket model” and C2VSim Fine Grid Model are in acceptable agreement (based on a pre-defined criteria), the C2VSim Fine Grid Model will be further employed (in coordination with the GSAs in the adjacent Kern Subbasin) to evaluate the availability and reliability of past surface water supply and demand trends “as a function of the historical planned versus actual annual surface water deliveries, by surface water source and water year type, and based on the most recent ten years of surface water supply information” (23-CCR §354.18(c)(2)(A)). The C2VSim Fine Grid Model will then be employed to establish “baseline conditions” and to derive a metric of “sustainable yield” within the Basin in accordance with the requirements described in the GSP regulations (23-CCR §354.18(b)(7), (c)(3)).

The sustainable yield of a groundwater basin is defined as “the maximum quantity of water, calculated over a base period representative of long term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result” (CWC §10721(w)). The sustainable yield will be calculated as the long-term net annual groundwater supply into the Basin based on the historical period of observation outlined above.

### ***Develop Projected (Future) Water Budget Baseline and Uncertainty Scenarios***

Once the C2VSim Fine Grid Model is sufficiently calibrated, the White Wolf GSA will use the model to develop a “baseline condition” for the Basin to simulate projected (future) water budget conditions and to “evaluate future scenarios of uncertainty” in accordance with the requirements described in the GSP Regulations (23-CCR §354.18(c)(3)). This effort will proceed independently from efforts to model future conditions in the Kern Subbasin, as those efforts have not been defined at this time. The baseline condition shall be represented by:

1. 50 years of historical hydrology (e.g. precipitation, evapotranspiration, streamflow information)
2. Water demands based on the most recent land use, evapotranspiration, and crop-coefficient information
3. Surface water supply based on the most recent water supply information (as applicable)

The baseline condition will be evaluated using the C2VSim Fine Grid Model to derive a projected (future) water budget for the Basin. The baseline condition will also be used to evaluate future scenarios of uncertainty related to climate, local land use planning, population growth, surface water supply availability/reliability, and any other factors of particular concern identified by the GSA. This uncertainty analysis will help establish a range in projected water supply and demand conditions which will help to define appropriate sustainability criteria (e.g. minimum thresholds, measurable objectives) and quantify

a “reasonable margin of operational flexibility” for these criteria during later stages of GSP development (see Phase 3 efforts for greater detail).

To inform the development of future scenarios related to land use, population growth, and surface water supply availability including the volume of imports into the Basin, the GSA intends to use data and reports compiled in Task 7. The GSA also understands that DWR will release a guidance document for uncertainty analysis related to climate change, which the GSA intends to use to inform climate uncertainty scenarios.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from the water budget analysis will be documented in technical presentations(s) and in a *Draft TM#8 – Water Budget and Preliminary Estimate of Sustainable Yield* that includes a narrative description of the water budget as well as tables and graphical depictions of historical, current and projected future water budget components, following the examples (i.e., paired bar water budget graphs) provided in BMP 3.

## **Task 19: Assess Existing Monitoring Programs and Develop SGMA-Compliant Monitoring Network (0% complete)**

As described in GSP Regulations (23-CCR §354.34-36) and BMP 2, each basin’s monitoring network must be designed to allow for the collection of data sufficient to provide representative information on groundwater conditions and trends within a basin. The GSP must describe monitoring objectives that, when implemented, will allow for characterization of all relevant sustainability indicators, quantification of progress towards achieving measurable objectives and sustainability goals, and quantification of water budgets and impacts to beneficial uses or users in the basin. Achieving these objectives will require a monitoring network with sufficient spatial and temporal coverage that can directly measure or provide an appropriate representative (i.e. “proxy”) measurement to adequately characterize each relevant sustainability indicator throughout the Basin.

### ***Develop Recommended Monitoring Network***

Under Task 19, the GSA will assess the existing monitoring programs and infrastructure for their ability to achieve the basic objectives outlined above. Currently there exists two CASGEM monitoring entities within the Basin – AEWSD and the White Wolf GSA. The assessment of monitoring programs under Task 19 will build off the efforts of these agencies to date, as well as any efforts related to the California Irrigated Lands Regulatory Program, and will be conducted in parallel with the HCM development and groundwater conditions assessments, focusing on the sustainability indicators that are determined through those efforts to apply to the Basin.

As described in Task 9 above, preliminary data gaps assessment has shown a generally sporadic record of water level information and a lack of water quality and land subsidence data throughout Basin.

Maps of existing monitoring sites will be developed for each relevant sustainability indicator, allowing for the preliminary evaluation of spatial data gaps. Each existing monitoring site will be screened against the data and reporting standards contained in the GSP Regulations (23-CCR S352.4), and deficiencies summarized in a table.

As recommended in BMP 2, the GSA intends to follow the Data Quality Objective (DQO) process described in the US EPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) in developing the Basin's GSP monitoring network. The 8-step DQO process serves as a guide to developing a data collection and QA/QC program that will meet the intended purposes.

***Prepare Technical Presentation(s) and Draft Technical Memorandum***

The monitoring network assessment will be summarized in technical presentation(s) to the GSA and TC and in a *Draft TM #9 – Summary of Monitoring Network Assessment and Preliminary Monitoring Plan* that describes the planned monitoring network and plans to address relevant sustainability indicators and requirements under the GSP Regulations. To the extent that the monitoring plan identifies deficiencies, the GSA will work on plans to rectify those deficiencies prior to submittal of the GSP to DWR, or to address them as part of Plan implementation.

**Task 20: Conduct Stakeholder Engagement Related to Basin Characterization and Analysis Phase (0% complete)**

In accordance with the SCEP developed under Task 12, the GSA will hold at least one public workshop with stakeholders during the Phase 2. The workshop will be focused on presenting and receiving feedback on the preliminary HCM, water budget, definition of groundwater conditions, and the data gaps evaluation and plans to fill them. Additionally, during this workshop, the GSA will outline and receive initial input on the tasks to be completed in the Sustainability Planning (Phase 3) portion of this Work Plan.

Throughout this process, quarterly GSA Board meetings will continue to provide a forum for interested members of the public to track GSP development and provide ongoing input.

**Task 21: Implement GSP Development Funding Plan (0% complete)**

The GSA will continue to implement the GSP Development Funding Plan created in Phase 1.

**Task 22: Participate in Intrabasin and Interbasin Coordination Efforts (0% complete)**

The GSA will follow the developments of basin characterization and analysis in the Kern Subbasin, to ensure that assumptions and estimates of projected values of the major components of interaction between the basins (e.g., groundwater inflow/outflow and stream inflow/outflow) align, or to resolve any differences.

***Participate in Intrabasin Coordination***

The TC will continue to organize and convene regularly scheduled monthly meetings to foster timely and effective discussion of the Phase 2 tasks associated with GSP development and ongoing data-sharing.

**Participate in Interbasin Coordination**

The GSA will continue to foster interbasin dialogues through targeted meetings, integrated participation at GSA Board meetings and ongoing data-sharing to support GSP development, with a particular focus on the water budget and sustainable yield estimates and application of the Numerical Model.

**PHASE 3 - SUSTAINABILITY PLANNING**

As described further below, Phase 3 of the Work Plan focuses on planning for the sustainable management of the Basin. Phase 3 will extend from July 2019 to July 2020.



**Task 23: Evaluate Potential Management Areas (0% complete)**

Based on the understanding of the Basin gained through stakeholder engagement efforts and technical analyses completed in Phases 1 and 2, the GSA will consider whether defining separate management areas within the Basin will facilitate implementation of the GSP and provide an increased ability to achieve Basin-wide sustainable groundwater management (per 23-CCR §354.20). Based on initial GSA and stakeholder input from the GSA and TC meetings held to date, and considering the size, hydrogeology, and groundwater conditions within the Basin, it is unlikely the GSA will consider the use management areas in the GSP. However, should management areas be defined, the GSP will define distinct minimum thresholds, measurable objectives, and monitoring requirements for each management area and will describe how the use of these tailored management criteria will help foster sustainable management across the entire Basin.

**Task 24: Develop Sustainable Management Criteria (0% complete)**

Task 24 will involve developing sustainable management criteria, including the Sustainability Goal for the Basin, as well as Undesirable Results, Minimum Thresholds, Measurable Objectives, and Interim Milestones for the Basin and/or specific management areas. Per the GSP regulations (23-CCR §354.24-30), the GSA will select the Sustainability Goal, Minimum Thresholds, and Measurable Objectives to avoid causing Undesirable Results within the Basin or in adjacent basins, or affecting the ability of adjacent basins to achieve sustainability goals.

The GSA understands that DWR will release a sixth BMP related to developing Sustainable Management Criteria, and will use this document to further inform methodologies for selecting appropriate criteria for the Basin.

**Define Sustainability Goal**

Per the GSP Regulations (23-CCR §354.24), the GSA will develop a Sustainability Goal for the Basin that culminates in the absence of Undesirable Results and the operation of the Basin within its sustainable yield by 2042. Definition of the Sustainability Goal will be based in part on information on the basin setting,

HCM, groundwater conditions, and water budget developed during Phase 2. Stakeholder input will also be critical to defining the Sustainability Goal.

### **Define Undesirable Results and Minimum Thresholds**

Per the GSP Regulations (23-CCR §354.26), Undesirable Results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the Basin. Minimum Thresholds are the numeric values for each sustainability indicator that, if exceeded, may cause Undesirable Results. As demonstrated by their regulatory definitions, Undesirable Results and Minimum Thresholds are closely linked, and therefore must be developed in concert with each other. Furthermore, the meaning of “significant and unreasonable” is subject to local interpretation and will thus need to be defined with ample stakeholder input. As described in the GSP Regulations, an Agency may need to evaluate multiple Minimum Threshold values to determine whether an Undesirable Result is occurring. This suggests that an iterative approach, where whereby multiple potential values are considered before determining a final value, may be required.

Recognizing that Undesirable Results and associated Minimum Thresholds may differ from one location to another within the Basin, the GSA will develop a systematic process for evaluating the occurrence of Undesirable Results across the entire Basin, which may include:

1. **Chronic lowering of groundwater levels** indicating a significant and unreasonable depletion of supply over the planning and implementation horizon;
2. Significant and unreasonable **reduction of groundwater storage**;
3. Significant and unreasonable **seawater intrusion**;
4. Significant and unreasonable **degraded water quality**;
5. Significant and unreasonable **land subsidence** that substantially interferes with surface land uses; and
6. **Depletions of interconnected surface water** that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

These will be defined based on the groundwater conditions assessment performed under Phase 2. For each sustainability indicator, the GSA will identify the primary cause(s) of groundwater conditions occurring throughout the Basin that would lead to or has led to Undesirable Results, and will consider potential effects of Undesirable Results on beneficial uses and users of groundwater. Last, per 23-CCR §354.30, the GSA will determine whether it wants to include in its GSP Measurable Objectives to address Undesirable Results that occurred before, and have not been corrected by, January 1, 2015.

The GSA will then develop Minimum Thresholds for each sustainability indicator, which are quantifiable metrics for each applicable sustainability indicator at each monitoring site or representative monitoring site. The GSA will base its Minimum Thresholds definition on the GSP Regulations (23-CCR §354.28(c)) and the understanding of the Basin generated during Phase 2. Specifically, the GSA will base its Minimum Thresholds definitions on the following analyses:

- **Chronic Lowering of Groundwater Levels.** The GSA will calculate the rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the Basin. Additionally, the GSA will consider the potential effects of groundwater level on other sustainability indicators. The Minimum Threshold will be set as the elevation indicating a depletion of supply at a given location that would lead to Undesirable Results.

- **Reduction of Groundwater Storage.** The GSA will calculate the sustainable yield of the Basin based on historical trends, water year type, and projected water use in the Basin. The Minimum Threshold will be set as the volume of water that can be withdrawn from storage without causing conditions that may lead to Undesirable Results.
- **Seawater Intrusion.** The GSA will base its assessment of seawater intrusion on 1) any existing maps and cross sections that document chloride concentrations within each principal aquifer, and 2) any other existing information or public knowledge that documents the presence of elevated chloride levels within the Basin that could have resulted from an advancing seawater front. The Minimum Threshold would be defined using a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to Undesirable Results. Seawater intrusion is not anticipated to occur at any significant rate due to the Basin’s location on the southern edge of the Central Valley.
- **Degraded Water Quality.** The GSA will base the Minimum Threshold for degradation of water quality on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the GSA to be of concern for the Basin. The Minimum Threshold will be set as the degradation of water quality that may lead to Undesirable Results.
- **Land Subsidence.** The GSA will base the Minimum Threshold for land subsidence on 1) the land uses and property interests that have been or are likely to be affected by land subsidence, and 2) generating maps and graphs showing the extent and rate of land subsidence in the Basin. The Minimum Threshold will be set as the rate of subsidence that substantially interferes with surface land uses and may lead to Undesirable Results.
- **Depletions of Interconnected Surface Water.** The GSA will use the analyses from Phase 2 (including, potentially, the groundwater and surface water model from Task 17) to quantify surface water depletion and will identify the location, quantity, and timing of depletions of interconnected surface water, if present. The Minimum Threshold will be set as the rate or volume of surface water depletion that has adverse impacts on beneficial uses of surface water and that may lead to Undesirable Results.

The GSA will evaluate whether groundwater levels, and the Minimum Threshold defined for this sustainability indicator, can serve as a proxy for other sustainability indicators, as allowed for under the GSP Regulations (23-CCR §354.28(d)).

### **Define Measurable Objectives and Interim Milestones**

Measurable objectives refer to “specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions” (23-CCR §351(s)), and can be considered as indicators of progress towards achieving the long-term sustainability goal for the Basin. The GSA will define Measurable Objectives by applying both qualitative and quantitative optimization techniques using the same metrics and monitoring sites as are used to define the Minimum Thresholds for the Basin, as described above. The Measurable Objectives will be defined based on the 20-year Sustainability Goal and will include the definition of Interim Milestones in increments of five years. The GSA will identify triggers that, when comparing Interim Milestones to actual basin conditions, will prompt corrective actions.

The GSA will provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty defined in the Basin Setting section of the GSP. The margin of operational flexibility will be informed, in part, by the results of the uncertainty analyses related to projected surface water supply reliability, climate, land use planning, and population growth dynamics performed under Task 18. This will likely involve defining proportionality criteria for successive interim milestones relative to the sustainability goal and then approximating reasonable measurable objectives for each sustainability indicator for both the “baseline”, “low uncertainty”, and “high uncertainty” scenarios developed in Task 18.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from Task 24 will be summarized in technical presentation(s) and in a *Draft TM #10 – Establishment of Sustainability Criteria* that includes a narrative description of the sustainable management criteria and which is supported by maps, charts and other graphics, tables, and supporting documentation as appendices, as appropriate.

### **Task 25: Identify Projects and Management Actions (0% complete)**

Given an understanding of the sustainable management criteria relevant to the Basin, the GSA will identify projects and management actions that will need to be carried out in order to meet the Sustainability Goal by 2042 (California Water Code 10727.2(d)(3)).

- **Potential projects** may include any efforts designed to increase available groundwater supplies within the Basin (e.g., WRMWSD has investigated the potential for a groundwater storage and recovery project), while
- **Potential management actions** may include any efforts designed to reduce groundwater demands within the Basin (e.g., AEWSD is implementing a pilot groundwater metering project as part of the Agricultural Water Conservation and Efficiency Program).

### ***Identify and Analyze Projects and Management Actions***

Projects and management actions will be identified through careful consideration and engagement with Basin stakeholders, as described by the SCEP developed in Task 12. The potential impacts of these projects and management actions will be assessed using appropriate quantitative and qualitative analytical techniques.

Consistent with DWR’s GSP Checklist, the description of projects and management actions in the GSP will include:

- Description of projects and management actions that will help achieve the basin’s sustainability goal;
- Measurable objective that is expected to benefit from each project and management action;
- Circumstances for implementation;
- Public noticing;
- Permitting and regulatory process;
- Time-table for initiation and completion, and the accrual of expected benefits;
- Expected benefits and how they will be evaluated;

- How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included;
- Legal authority required;
- Estimated costs and plans to meet those costs; and
- Management of groundwater extractions and recharge.

### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from Task 25 will be summarized in technical presentation(s) and in a *Draft TM #11 – Proposed Projects and Management Actions* that includes a narrative description of the projects and management actions, supported by maps, charts and other graphics, tables, and supporting documentation as appendices, as appropriate.

### **Task 26: Create GSP Implementation Plan (0% complete)**

The GSP must include a plan for implementation, including an estimate of GSP implementation costs, schedule, plan for required annual reporting, and process for required periodic evaluations of the GSP. Task 26 will involve developing this plan for inclusion in the GSP.

#### ***Create Programmatic GSP Implementation Plan***

The GSA will develop a programmatic plan for GSP implementation outlining the framework and general processes associated with meeting SGMA compliance beyond the GSP submission deadline of January 2022. This programmatic plan will include elements related to:

- Annual Reporting, per the GSP Regulations (23-CCR §356.2);
- Periodic (5 Year) Plan Evaluations per the GSP Regulations (23-CCR §356.4); and
- Maintenance of the DMS (including documentation and training for use by GSA staff.

#### ***Create Plan for Implementation of GSP Projects and Management Actions***

The GSA will develop a foundational plan to support implementation of projects and management actions identified in Task 25 in order to ensure that the GSAs will have the legal, funding, and permitting authority to enact these measures, if needed. This implementation plan will outline all efforts related to:

- Conducting feasibility studies for identified projects and/or management actions;
- Performing CEQA and other environmental impact analyses;
- Initiating development/construction efforts for any projects involving built infrastructure; and
- Supporting development of a funding plan (see below).

#### ***Develop Funding Plan for GSP Implementation***

After assessing GSP implementation costs, the GSA will identify potential funding sources and develop a plan to fund GSP implementation. Funding sources may include grants from federal, state, or local governments, as well as monies raised through the collection of fees on Basin landowners levied by the GSA. Should it be decided that fees will be levied, the GSA will follow the required process for public notice and public hearings as documented in California Water Code 10730. This effort may require retention of a rate consultant and/or economics consultant.

### **Prepare Technical Presentation(s) and Draft Technical Memorandum**

Results from Task 26 will be summarized in technical presentation(s) and in a *Draft TM #12 – GSP Implementation Plan*.

### **Task 27: Finalize Monitoring Network and Protocols (0% complete)**

#### **Designate Final Monitoring Network and Protocols**

Per the GSP Regulations (23-CCR §354.34(b)), the GSA must develop a monitoring network fit to achieve the following:

- Demonstrate progress toward achieving measurable objectives described in the Plan;
- Monitor impacts to the beneficial uses or users of groundwater;
- Monitor changes in groundwater conditions relative to Measurable Objectives and Minimum Thresholds; and
- Quantify annual changes in water budget components.

Given the results of the preliminary assessment of the monitoring network in Task 19, the understanding of the Basin generated in the Phase 2, and the development of sustainable management criteria completed in Task 24, the GSA will finalize the monitoring network and protocols. The monitoring network will be designed to leverage existing infrastructure to the extent possible and appropriate and such that the data collected will allow for assessment of the sustainability indicators with respect to the Measurable Objectives and Minimum Thresholds.

Table 1 shows the infrastructure/approach, measurement type, and temporal, spatial, and other considerations corresponding to data collection for each undesirable result. As shown in Table 1, monitoring wells are the main infrastructure used for data collection for groundwater levels, groundwater storage, seawater intrusion, and water quality. There are several options of relevant infrastructure land subsidence and surface water depletion data collection. The GSA will consider which monitoring infrastructure options are most appropriate for the Basin and the sustainable management criteria.

Given the understanding of the Basin generated in Phase 2, the GSA may designate representative monitoring sites at which the sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined (23-CCR §354.36).

Consistent with DWR’s GSP Checklist, the documentation of the Monitoring Network in the GSP will include the following:

- Description of monitoring network;
- Description of monitoring network objectives;
- Description of how the monitoring network is designed to demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features; estimate the change in annual groundwater in storage; monitor seawater intrusion; determine groundwater quality trends; identify the rate and extent of land subsidence; and calculate depletions of surface water caused by groundwater extractions;
- Description of how the monitoring network provides adequate coverage of Sustainability Indicators;

#### *Attachment 4 – Work Plan*

- Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends;
- Scientific rationale (or reason) for site selection;
- Consistency with data and reporting standards;
- Corresponding sustainability indicator, minimum threshold, measurable objective, and interim milestone;
- Location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used; and
- Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies.

To document the use of representative monitoring sites, if applicable, the GSP will include:

- Description of representative sites;
- Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators; and
- Adequate evidence demonstrating site reflects general conditions in the area.

To document the assessment and improvement of the monitoring network, the GSP will further include:

- Review and evaluation of the monitoring network;
- Identification and description of data gaps;
- Description of steps to fill data gaps; and
- Description of monitoring frequency and density of sites.

#### ***Prepare Technical Presentation(s) and Draft Technical Memorandum***

Results from Task 27 will be summarized in technical presentation(s) and in a *Draft TM#13 – Proposed Monitoring Network and Protocols* that includes a narrative description of the plans to implement a monitoring network, supported by maps, charts and other graphics, tables, and supporting documentation as appendices, as appropriate.

#### **Task 28: Conduct Stakeholder Engagement Related to Sustainability Planning (0% complete)**

The Sustainability Planning Phase of GSP development is expected to generate the most interest among Basin stakeholders, and therefore will require substantial stakeholder engagement. We anticipate holding at least two workshops during this phase.

The first workshop will be focused on presenting and receiving feedback on the sustainable management criteria.

The second workshop will be focused on presenting and receiving input on the sustainable management criteria and identifying potential projects and management actions. Additionally, during this workshop, the GSA will outline and receive initial input on the tasks to be completed in the GSP Preparation (Phase 4) portion of this Work Plan.

Throughout this process, GSA Board meetings will continue to provide a forum for interested members of the public to track GSP development and provide ongoing input.

**Task 29: Implement GSP Development Funding Plan (0% complete)**

The GSA will continue to implement the GSP Development Funding Plan created in Phase 1.

**Task 30: Participate in Intrabasin and Interbasin Coordination Efforts (0% complete)**

The GSA will continue to follow developments in the Kern Subbasin, with particular attention paid to the development of sustainable management criteria.

***Participate in Intrabasin Coordination***

The TC will continue to organize and convene regularly scheduled, monthly meetings to foster timely and effective discussion of the Phase 3 tasks associated with GSP development and ongoing data-sharing.

The GSA will also initiate work on a long-term governance framework to guide Plan implementation.

***Participate in Interbasin Coordination***

The GSA will continue to foster interbasin dialogues through targeted meetings, integrated participation at GSA Board meetings and ongoing data-sharing to support Phase 3. The GSA will develop Interbasin Agreements if necessary. Attendance at public meetings of GSAs in the Kern Subbasin, meetings with technical counterparts in the Kern Subbasin, and review and comment on significant work products produced in the Kern Subbasin will continue.

**PHASE 4 - GSP PREPARATION AND SUBMITTAL**

Phase 4 of the Work Plan involves preparation of the GSP and associated deliverables for use by the GSA in adopting the GSP, with subsequent submittal to DWR. It is anticipated that Phase 4 will extend from July 2020 to January 2022.



**Task 31: Compile Complete Draft GSP (0% complete)**

Most of the major GSP components will have been developed and included, in whole or in part, in the TMs prepared in previous tasks of this Work Plan. These previously prepared elements include:

- Data Management System;
- Plan Area Information;
- Data Gaps Assessment;
- Stakeholder Communication and Engagement Plan;

- Hydrogeological Conceptual Model;
- Current and Historical Groundwater Conditions;
- Water Budget Information, including an Estimate of Sustainable Yield of Basin;
- Sustainable Management Criteria;
- Projects and Management Actions, and Plans for Implementation and Funding; and
- Monitoring Network and Protocols.

Under Task 31, these existing GSP components will be compiled and reworked into a full GSP along with additional components such as Administrative Information (23-CCR §354.4–354.6), documentation of notice and communication (23-CCR §354.10), and “additional plan elements” (as applicable, and listed in CWC §10727.4). The GSP will be structured to conform with the GSP regulations, GSP Annotated Outline, and Preparation Checklist for GSP Submittal.

An Administrative Draft will be prepared for TC and GSA review. After comments have been received, a revise draft GSP will be released for public review.

### **Task 32: Distribute Draft GSP and Revise (if necessary) per Stakeholder Feedback** *(0% complete)*

As required by CWC §10728.4, the GSA will distribute a draft GSP to Basin stakeholders and hold a public hearing to receive feedback on the draft GSP. Per CWC §10728.4, the public hearing will be held at least 90 days after providing notice to a city or county within the area of the proposed plan. As necessary, the GSA will revise the draft GSP to reflect stakeholder feedback.

### **Task 33: Submit Final GSP to DWR (0% complete)**

The GSA will submit the final GSP to DWR, after which DWR is to establish a period of at least 60 days to receive comments on the adopted Plan (per 23-CCR §355.2). Final deliverables to DWR will include:

- The Final (written) GSP;
- Coordination Agreements (as applicable);
- A Data Management System, integrated with all existing data; and
- Numerical Model Inputs/Outputs.

DWR will then have up to two years to review the Final GSP, after which it will be given the status of approved, incomplete, or inadequate. Should the GSA’s GSP be deemed incomplete, the GSA will take corrective actions, revise, and resubmit the GSP within 180 days of DWR’s assessment, as required.

### **Task 34: Participate in Intrabasin and Interbasin Coordination Efforts (0% complete)**

The GSA will continue follow developments in the neighboring Kern Subbasin.

***Participate in Intrabasin Coordination***

The TC will continue to organize and convene regularly scheduled, monthly meetings to foster timely and effective discussion of the Phase 4 tasks associated with GSP development and ongoing data-sharing.

If not completed under Phase 3, the GSA will also continue and adopt a long-term governance framework to guide Plan implementation.

***Participate in Interbasin Coordination***

The GSA will continue to foster interbasin dialogues through targeted meetings, integrated participation at public meetings, and ongoing data-sharing to support GSP development.

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Figure 3a	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Total Dissolved Solids
Figure 3b	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Nitrate
Figure 3c	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Arsenic
Figure 3d	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Boron
Figure 3e	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Iron
Figure 3f	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – Manganese
Figure 3g	Evaluation of Available Data and Assessment of Sustainability Indicator #4 – Groundwater Quality – GeoTracker Sites
Figure 4	Evaluation of Available Data and Assessment of Sustainability Indicator #5 – Land Subsidence
Figure 5	Evaluation of Available Data and Assessment of Sustainability Indicator #6 – Groundwater Dependence

## WORK PLAN REFERENCES

This Work Plan has been prepared in accordance with the requirements, recommendations, and guidance contained in the following documents:

- “Attachment 4. Work Plan”, from the Groundwater Sustainability Plans and Projects Proposal Solicitation Package, dated September 2017;
- GSP Emergency Regulations (California Code of Regulations Title 23 [23-CCR], Division 2, Chapter 1.5, Subchapter 2; herein referred to as the “GSP Regulations”), approved by the California Water Commission on 18 May 2016;
- Groundwater Sustainability Plan (GSP) Emergency Regulations Guide, dated July 2016;
- Best Management Practices (BMPs) published by the Department of Water Resources (DWR), dated December 2016, including:
  - BMP 1: Monitoring Protocols, Standards, and Sites;
  - BMP 2: Monitoring Networks and Identification of Data Gaps;
  - BMP 3: Hydrogeologic Conceptual Model;
  - BMP 4: Water Budget; and

*Attachment 4 – Work Plan*

- BMP 5: Modeling; and
- BMP 6: Sustainable Management Criteria, DRAFT dated November 2017.
- Guidance documents published by DWR, including:
  - Preparation Checklist for GSP Submittal, dated December 2016;
  - GSP Annotated Outline, dated December 2016;
  - Engagement with Tribal Governments, DRAFT dated June 2017; and
  - Stakeholder Communication and Engagement, DRAFT dated June 2017.

**Table 1**  
**Summary of Monitoring Network Considerations**

<b>Undesirable Result</b>	<b>Infrastructure / Approach</b>	<b>Measurement Type</b>	<b>Temporal Considerations</b>	<b>Spatial Considerations</b>	<b>Other Considerations</b>
<b>Chronic Lowering of Groundwater Levels</b>	Monitoring Wells	Groundwater Level	<ul style="list-style-type: none"> <li>• Must be measured at a minimum twice per year during the seasonal high and low;</li> <li>• Must be measured more frequently in the case of:               <ul style="list-style-type: none"> <li>• A shallow/unconfined aquifer;</li> <li>• Rapid groundwater flow and recharge;</li> <li>• More groundwater pumping; or</li> <li>• More variable climatic conditions.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Density per 100 square miles could be 0.2 to 10 wells;</li> <li>• Density should be greater in areas of greater pumping and undesirable results;</li> <li>• Well screens should be aquifer-specific;</li> <li>• Proximity to pumping wells, basin boundaries, and significant recharge areas should be considered.</li> </ul>	
<b>Reduction of Groundwater Storage</b>	Monitoring Wells	Groundwater Level	See above.	See above.	Use of water levels to estimate storage requires assumptions about thickness, porosity, and connectivity of units.
	Remote Sensing	Differential Gravity			"Should be used cautiously as they tend to be regional in nature and may not provide the level of accuracy necessary to fully determine conditions within the basin" (BMP, p. 14)
<b>Seawater Intrusion</b>	Monitoring Wells	Groundwater Quality	Must be measured "at least quarterly" (BMP, p. 15) and more frequently during initial characterization.	<p>Must be:</p> <ul style="list-style-type: none"> <li>• Accompanied by groundwater elevation monitoring;</li> <li>• Adequate to map isocontour of chloride;</li> <li>• From each aquifer that is currently, or may be in the future, impacted by degraded water quality;</li> <li>• Able to define the three-dimensional extent of existing seawater intrusion;</li> <li>• Sufficient for mapping movement of seawater or degraded water quality; and</li> <li>• Sufficient to assess groundwater quality impacts on beneficial uses and users.</li> </ul> <p>May be optimized by:</p> <ul style="list-style-type: none"> <li>• Including geophysical techniques to identify the preferential pathways controlling seawater intrusion; and</li> <li>• Targeting critical connections to existing water supply wells and mitigation efforts.</li> </ul>	<ul style="list-style-type: none"> <li>• Must analyze for chloride concentration;</li> <li>• Additional analytes may be desirable; and</li> <li>• Use of a surrogate (e.g., electrical conductivity) must be demonstrated through correlative analysis.</li> </ul>

**Table 1**  
**Summary of Monitoring Network Considerations**

Undesirable Result	Infrastructure / Approach	Measurement Type	Temporal Considerations	Spatial Considerations	Other Considerations
<b>Degraded Water Quality</b>	Monitoring Wells	Groundwater Quality	Must be measured at times generally correlated to seasonal high and low, or more frequent as appropriate.	Must be: <ul style="list-style-type: none"> <li>• Adequate to map or supplement mapping of known contaminants;</li> <li>• From each aquifer that is currently, or may be in the future, impacted by degraded water quality;</li> <li>• Able to define the three-dimensional extent of existing degraded water quality;</li> <li>• Sufficient for mapping movement of degraded water quality;</li> <li>• Sufficient to assess groundwater quality impacts to beneficial uses and users; and</li> <li>• Adequate to evaluate whether management activities are contributing to water quality degradation.</li> </ul>	Supplement to existing monitoring under regulatory programs (i.e., contaminant plumes); Additional may be needed to address unregulated contaminant plumes and naturally occurring water quality impacts
<b>Land Subsidence</b>	Level Surveys	Elevation	Should reflect results of initial screening level analysis for subsidence.	Should reflect results of initial screening level analysis for subsidence, which should include review of: <ul style="list-style-type: none"> <li>• The Basin's HCM and understanding of grain-size distributions and potential for subsidence to occur;</li> <li>• Any known regional or correlative geologic conditions where subsidence has been observed;</li> <li>• Historic range of groundwater levels in the principal aquifers of the Basin;</li> <li>• Historic records of infrastructure impacts, including, but not limited to, damage to pipelines, canals, roadways, or bridges, or well collapse potentially associated with land surface elevation changes;</li> <li>• Remote sensing results such as InSAR or other land surface monitoring data; and</li> <li>• Existing CGPS surveys.</li> </ul>	Following Caltrans Surveys Manual and tied to known benchmarks.
Borehole Extensometers	Change in Elevation	Following extensometry principles and methods used by the USGS.			
CGPS Locations	Elevation	Following Caltrans Surveys Manual.			
Remote Sensing	InSAR data	Requires data (some available for free) and processing is "not a trivial task" (BMP, p. 20).			
Monitoring Wells	Groundwater Level	Correlation of subsidence to groundwater level must be demonstrated.			

**Table 1**  
**Summary of Monitoring Network Considerations**

<b>Undesirable Result</b>	<b>Infrastructure / Approach</b>	<b>Measurement Type</b>	<b>Temporal Considerations</b>	<b>Spatial Considerations</b>	<b>Other Considerations</b>
<b>Depletions of Interconnected Surface Waters (b)</b>	Modeling	Calculated Exchange between Surface Water and Groundwater			Requires input parameters and assumptions to be made which should be based on empirical observations.
	Stream Gauges	Surface Water Flow		Must account for surface water diversions and return flows or gauging locations must be selected over which no diversions or return flows exist.	Measurements should be in accordance with USGS WSP 2175, Volumes 1 and 2.
	Monitoring Wells	Groundwater Level	Adequate to capture seasonal pumping conditions in vicinity-connected surface water bodies.	Network should: <ul style="list-style-type: none"> <li>• Extend parallel and perpendicular to connected streams; and</li> <li>• Identify and quantify timing and volume of groundwater pumping within approximately 3 miles of stream or as appropriate for the flow regime.</li> </ul>	
	Visual Observation	Flow Cessation			Qualitative evaluation of timing and position of cessation of flow in ephemeral streams may contribute to understanding of surface water depletion.
	Other Methods for Initial Characterization	Stream Bed Conductance Surveys; Aquifer Testing; Isotopic / Geochemical Studies; Geophysical Techniques			May help to establish an appropriate monitoring method that would best provide parameters for a model or another technique to estimate depletion of surface water.

**Abbreviations**

BMP = Best Management Practices

Caltrans = California Department of Transportation

CGPS = continuous global position system

DWR = California Department of Water Resources

InSAR = interferometric synthetic aperture radar

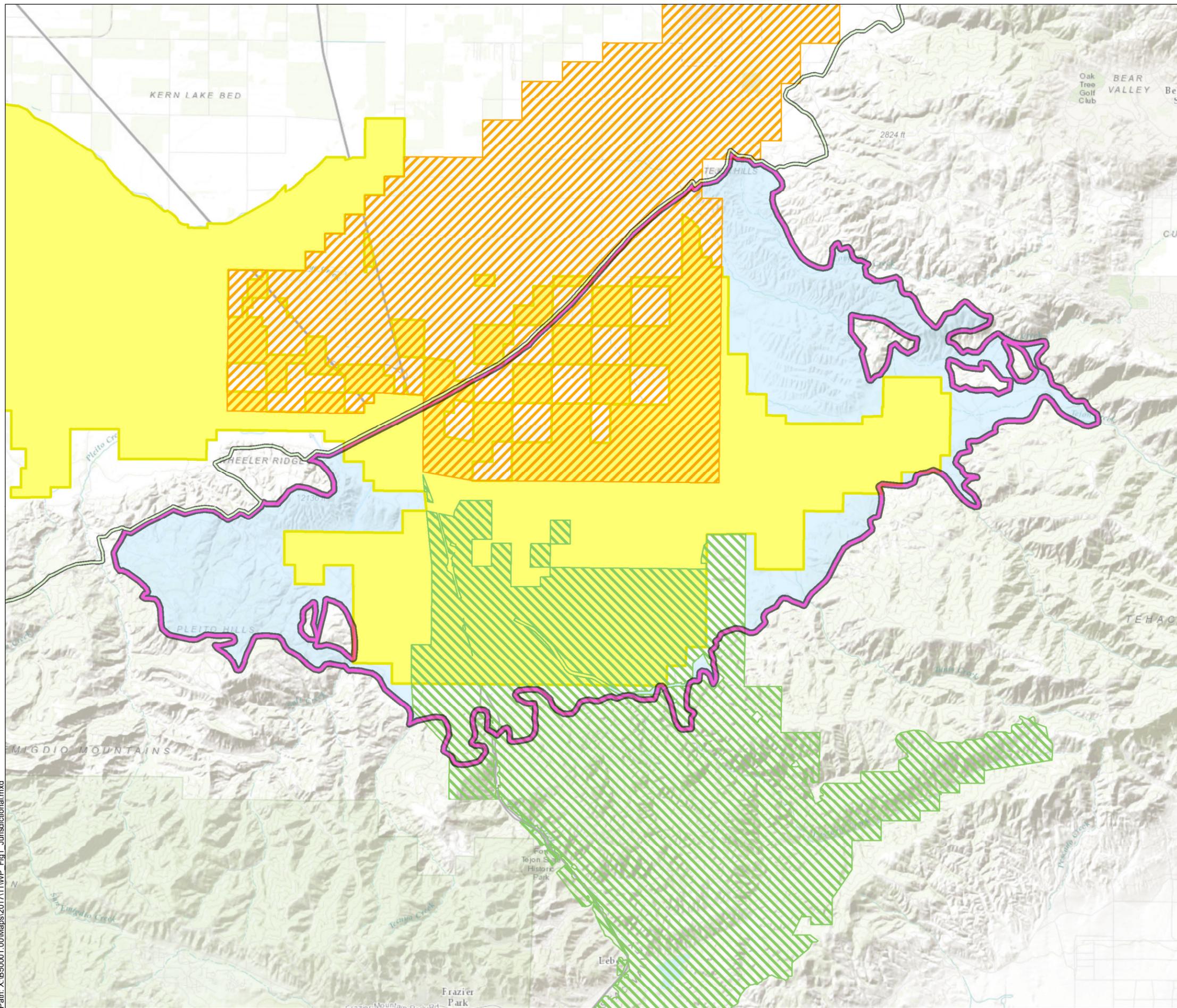
USGS = United States Geological Survey

WSP = Water Supply Paper

**Notes**

(a) This table has been created as a summary of the guidance provided in DWR's *Best Management Practices for the Sustainable Management of Groundwater: Monitoring Networks and Identification of Data Gaps* document, referred to herein as "BMP".

(b) Several infrastructure / approach options will have to be utilized to characterize and monitor potential depletion of interconnected surface water(s); use of a model would require data collection for input parameters.



**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Service Area**

- AEWSD Service Area
- TCWD Service Area
- WRMWSD Service Area
- Kern County (outside of other GSA parties' jurisdictions)

**Abbreviations**

AEWSD = Arvin-Edison Water Storage District  
 DWR = California Department of Water Resources  
 TCWD = Tejon-Castac Water District  
 WRMWSD = Wheeler Ridge-Maricopa Water Storage District

**Notes**

1. All locations are approximate.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.  
 2. DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.

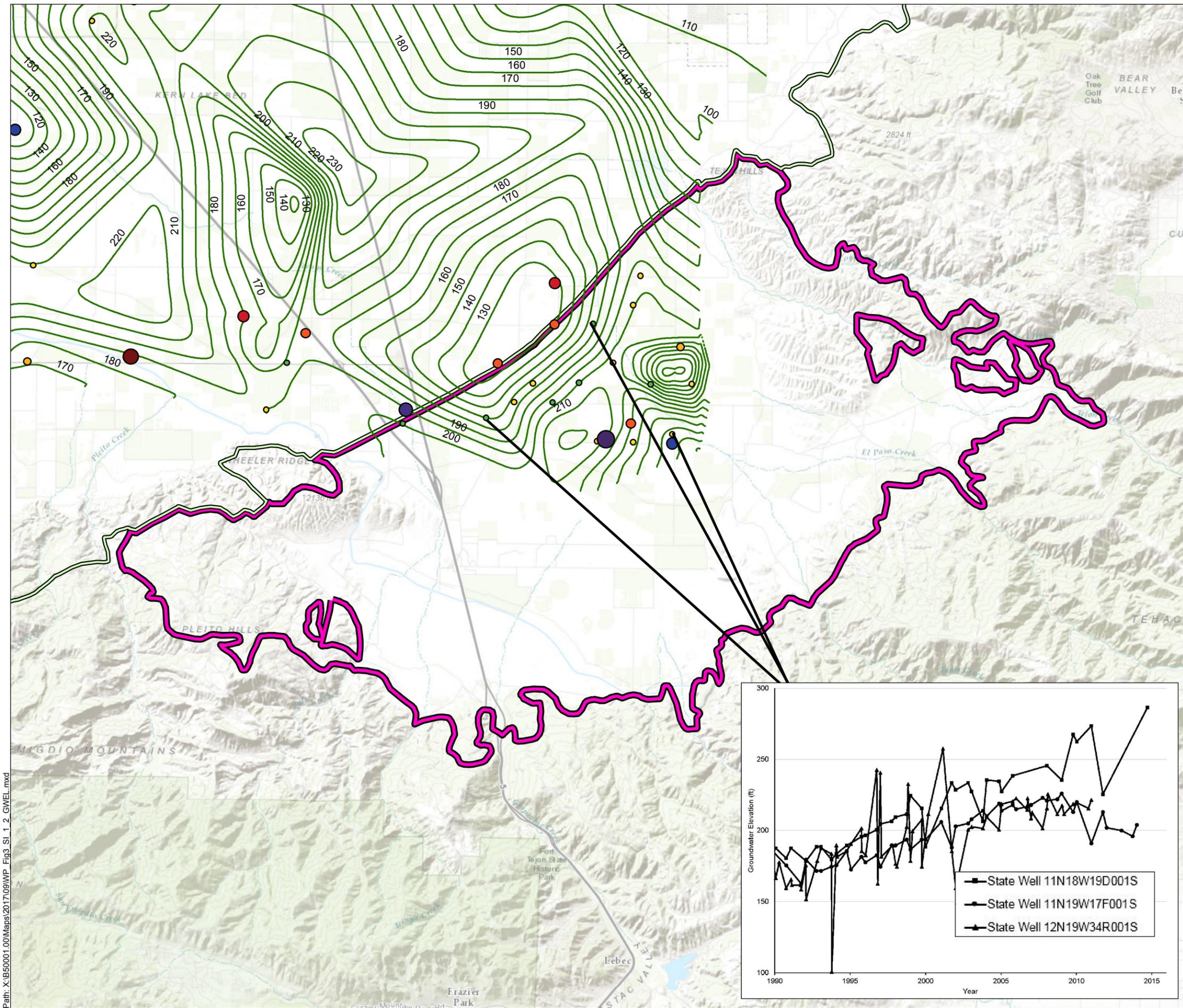
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**White Wolf Subbasin  
Jurisdictional Boundaries**

Tejon-Castac Water District  
Kern County, CA  
November 2017  
EKI B50001.04

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**Figure 1**



**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County
- DWR Groundwater Elevation Contours

**CASGEM Point Data**

- > 60 foot decline
- 50 - 60 foot decline
- 40 - 50 foot decline
- 30 - 40 foot decline
- 20 - 30 foot decline
- 10 - 20 foot decline
- 0 - 10 foot decline
- 0 - 10 foot increase
- 10 - 20 foot increase
- 20 - 30 foot increase
- 30 - 40 foot increase
- 40 - 50 foot increase
- 50 - 60 foot increase
- > 60 foot increase

**Abbreviations**

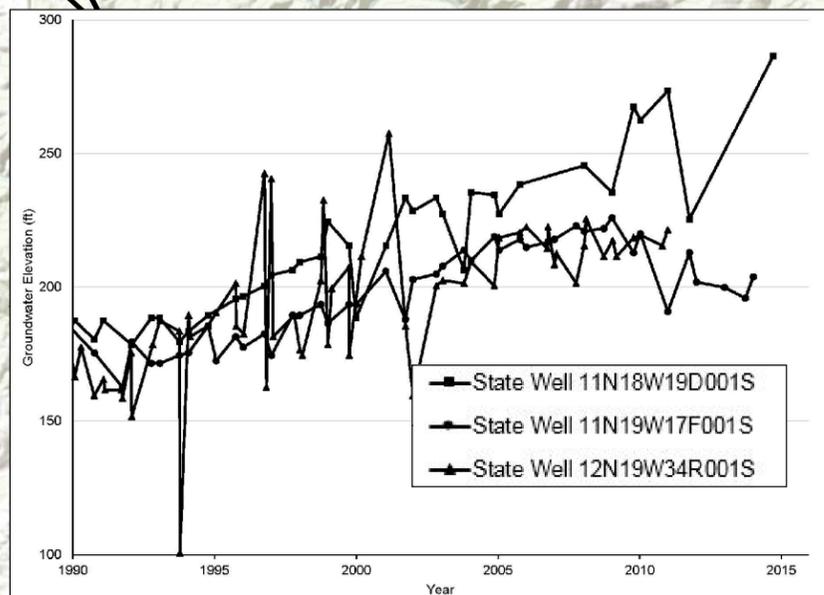
CASGEM = California Statewide Groundwater Elevation Monitoring  
 DWR = California Department of Water Resources  
 GSA = Groundwater Sustainability Agency  
 GWE = Groundwater Elevation  
 UR = Undesirable Result

**Notes**

- All locations are approximate.
- Countour lines represent a 10-ft interval of GWE for Spring 2013.

**Sources**

- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- The White Wolf GSA area is the same as the White Wolf Subbasin.
- Groundwater elevation contours obtained from the DWR Groundwater Information Center.
- Groundwater elevation change point and hydrograph data from the CASGEM public portal.
- Topographic map provided by ESRI's ArcGIS Online, obtained 27 September 2017.

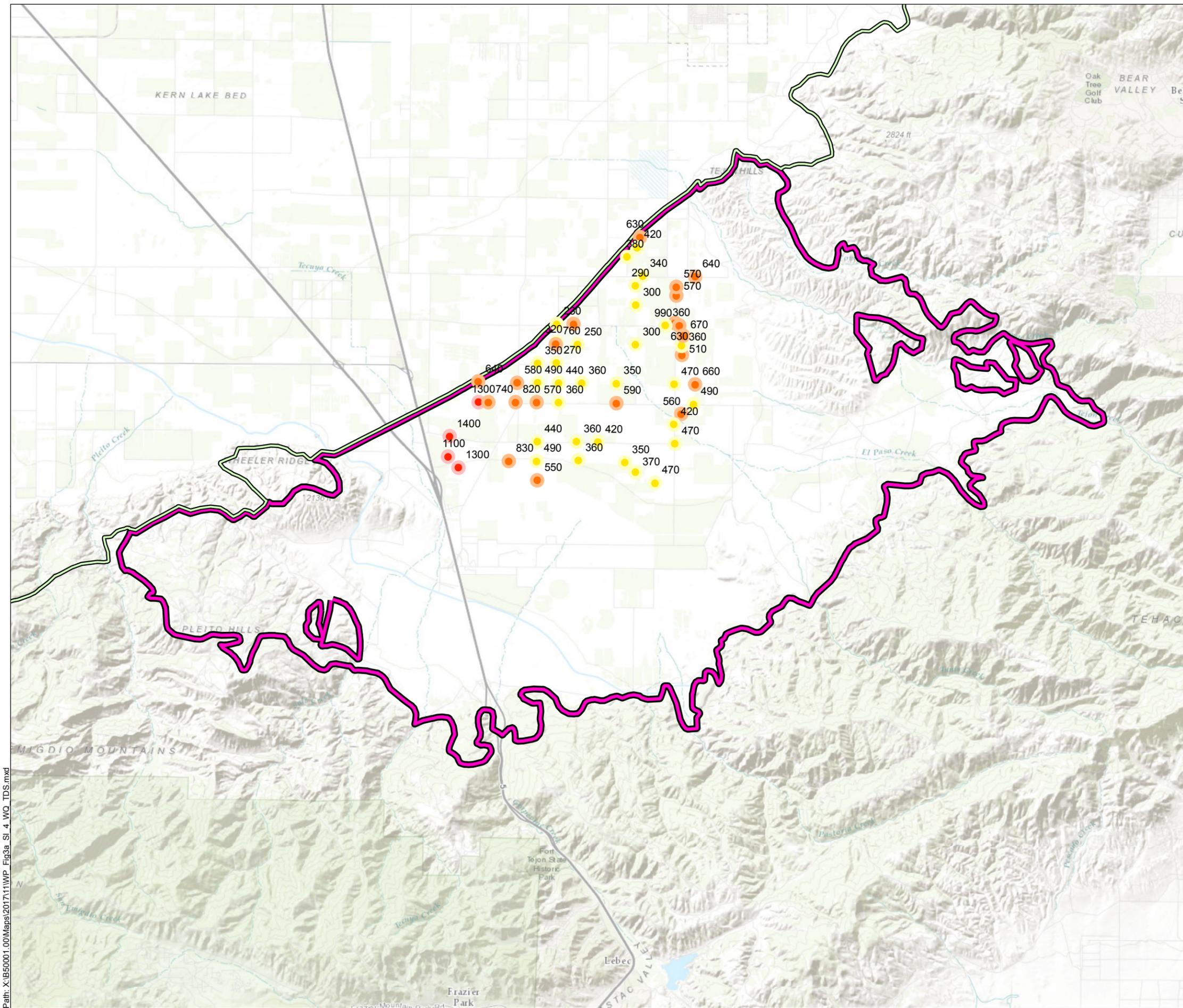


**Evaluation of Available Data and Assessment of Sustainability Indicators #1 and #2 - Groundwater Elevation Change and Contours**

Tejon-Castac Water District  
 Kern County, CA  
 November 2017  
 EKI B50001.04

**Figure 2**

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Total Dissolved Solids Concentration (mg/L)**

- 33 - 200
- 200 - 500
- 500 - 1000
- > 1000

**Abbreviations**

AEWSD = Arvin-Edison Water Storage District  
 CCR = California Code of Regulations  
 DWR = California Department of Water Resources  
 EPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 mg/L = milligrams per Liter  
 TDS = Total Dissolved Solids  
 UR = Undesirable Result

**Notes**

- All locations are approximate.
- For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
- Water quality data provided by AEWSD.
- TDS measurements obtained using EPA-160.1 method, with a detection limit of 33 mg/L.
- CCR 22-4 Table 64449-B lists "Upper" Secondary MCL for TDS at 1000 mg/L.

**Sources**

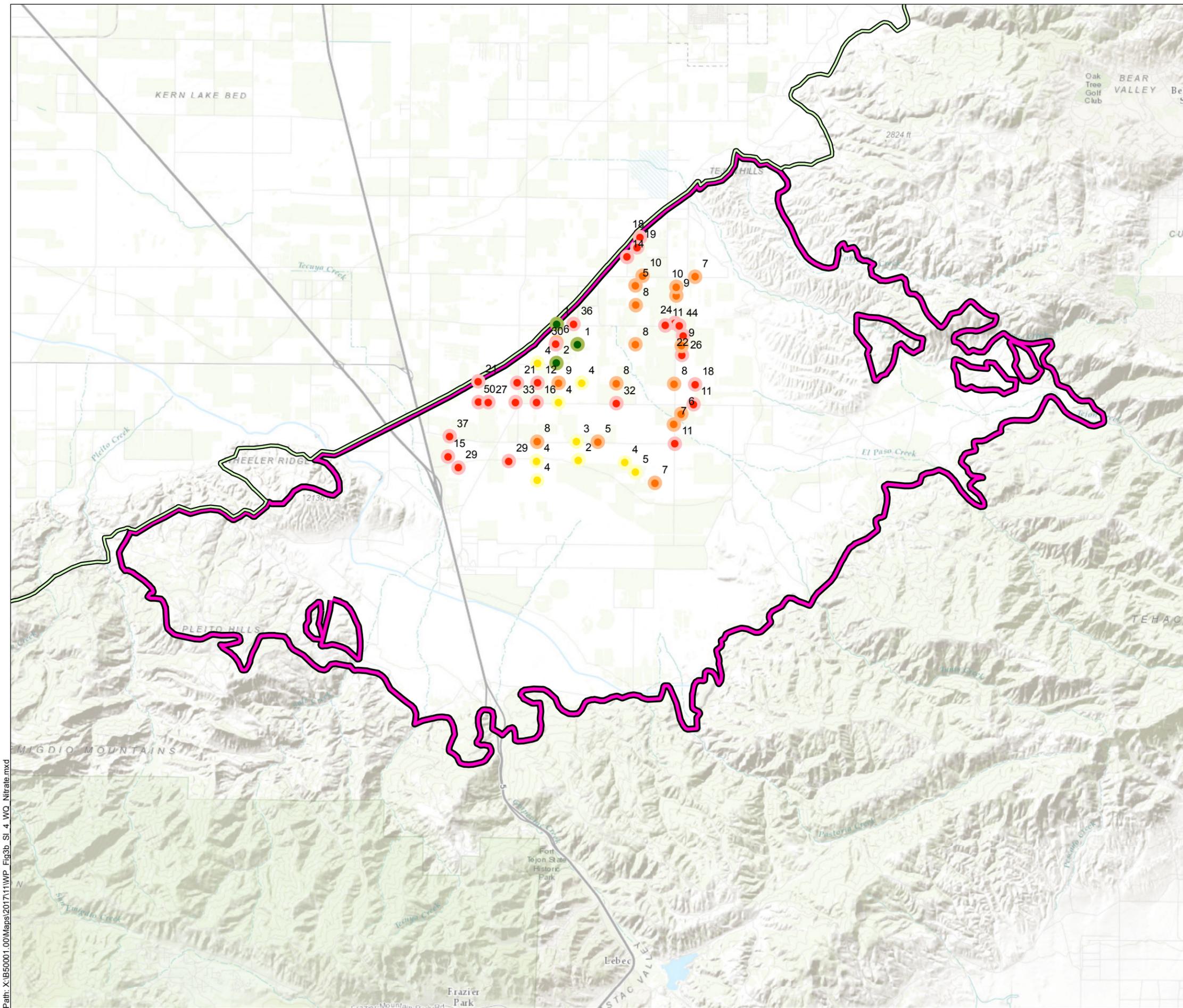
- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Water quality data obtained from AEWSD on 3 April 2017.

N  
 0 2.5 5  
 (Scale in Miles)

**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality - Total Dissolved Solids**  
 Tejon-Castac Water District  
 Kern County, CA  
 November 2017  
 EKI B50001.04  
**Figure 3a**

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Nitrate (as N) Concentration (mg/L)**

- ND (< 0.1)
- 0.1 - 2
- 2 - 5
- 5 - 10
- > 10

**Abbreviations**

AEWSD = Arvin-Edison Water Storage District  
 CCR = California Code of Regulations  
 DWR = California Department of Water Resources  
 EPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 mg/L = milligrams per Liter  
 ND = Not Detected  
 UR = Undesirable Result

**Notes**

- All locations are approximate.
- For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
- Water quality data provided by AEWSD.
- Nitrate measurements obtained using EPA-300.0 method, with a detection limit of 0.1 mg/L.
- CCR 22-4 Table 64431-A lists Primary MCL for Nitrate (as N) at 10 mg/L.

**Sources**

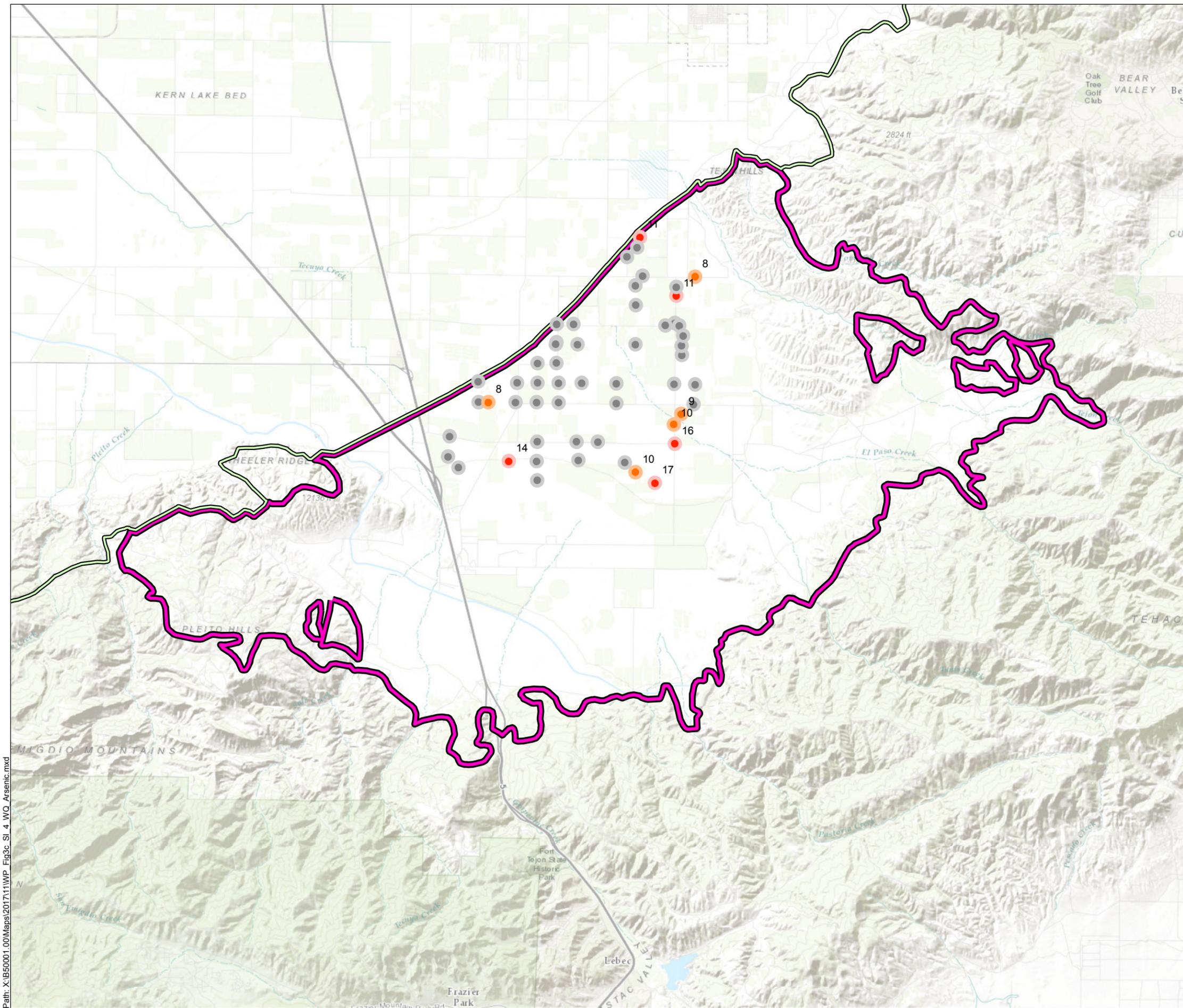
- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Water quality data obtained from AEWSD on 3 April 2017.

N

0 2.5 5  
(Scale in Miles)

**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality - Nitrate**

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Total Recoverable Arsenic Concentration (ug/L)**

- ND (< 7.8)
- 7.8 - 10
- > 10

**Abbreviations**

AEWSD = Arvin-Edison Water Storage District  
 CCR = California Code of Regulations  
 DWR = California Department of Water Resources  
 EPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 ug/L = micrograms per Liter  
 ND = Not Detected  
 UR = Undesirable Result

**Notes**

1. All locations are approximate.
2. For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
3. Water quality data provided by AEWSD.
4. Arsenic measurements obtained using EPA-200.7 method, with a detection limit of 7.8 ug/L.
5. CCR 22-4 Table 64431-A lists Primary MCL for Arsenic at 10 ug/L.

**Sources**

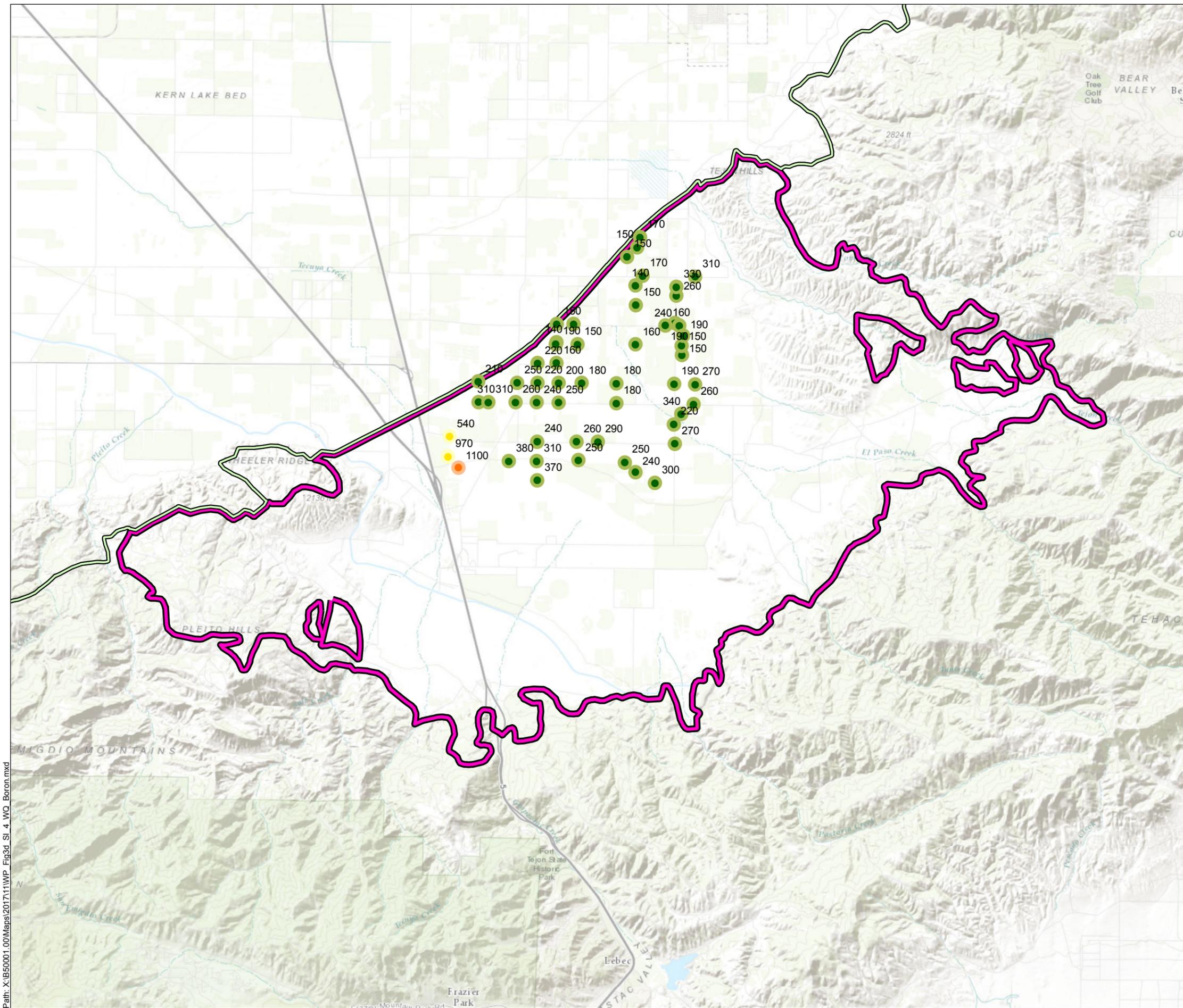
1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
2. DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
3. Water quality data obtained from AEWSD on 3 April 2017.

N

(Scale in Miles)

**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality - Arsenic**

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Total Recoverable Boron Concentration (ug/L)**

- 10 - 400
- 400 - 1000
- 1000 - 2000
- > 2000

**Abbreviations**

AEWSD = Arvin-Edison Water Storage District  
 CCR = California Code of Regulations  
 DWR = California Department of Water Resources  
 EPA = United States Environmental Protection Agency  
 MCL = Maximum Contaminant Level  
 ug/L = micrograms per Liter  
 ND = Not Detected  
 UR = Undesirable Result

**Notes**

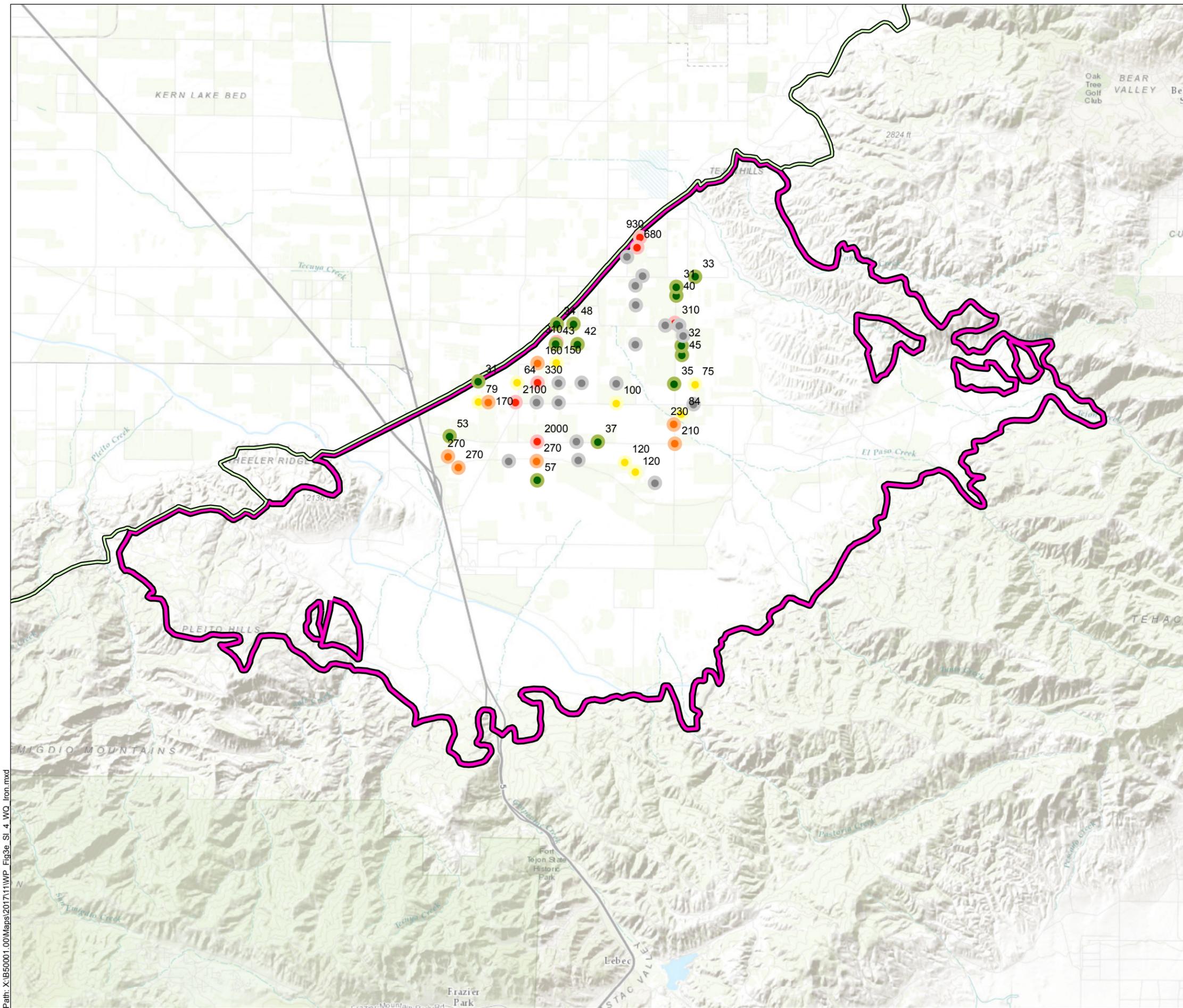
- All locations are approximate.
- For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
- Water quality data provided by AEWSD.
- Boron measurements obtained using EPA-200.7 method, with a detection limit of 10 ug/L.
- Boron levels >700-2000 ug/L can exhibit slight to moderate restrictions on agricultural productivity, depending on crop type.

**Sources**

- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Water quality data obtained from AEWSD on 3 April 2017.

N  
 0 2.5 5  
 (Scale in Miles)

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Total Recoverable Iron Concentration (ug/L)**

- ND (<30)
- 30 - 60
- 60 - 150
- 150 - 300
- > 300

**Abbreviations**

- AEWSD = Arvin-Edison Water Storage District
- CCR = California Code of Regulations
- DWR = California Department of Water Resources
- EPA = United States Environmental Protection Agency
- MCL = Maximum Contaminant Level
- ug/L = micrograms per Liter
- ND = Not Detected
- UR = Undesirable Result

**Notes**

- All locations are approximate.
- For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
- Water quality data provided by AEWSD.
- Iron measurements obtained using EPA-200.7 method, with a detection limit of 30 ug/L.
- CCR 22-4 Table 64449-A lists Secondary MCL for Iron at 300 ug/L.

**Sources**

- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Water quality data obtained from AEWSD on 3 April 2017.

N

0 2.5 5  
(Scale in Miles)

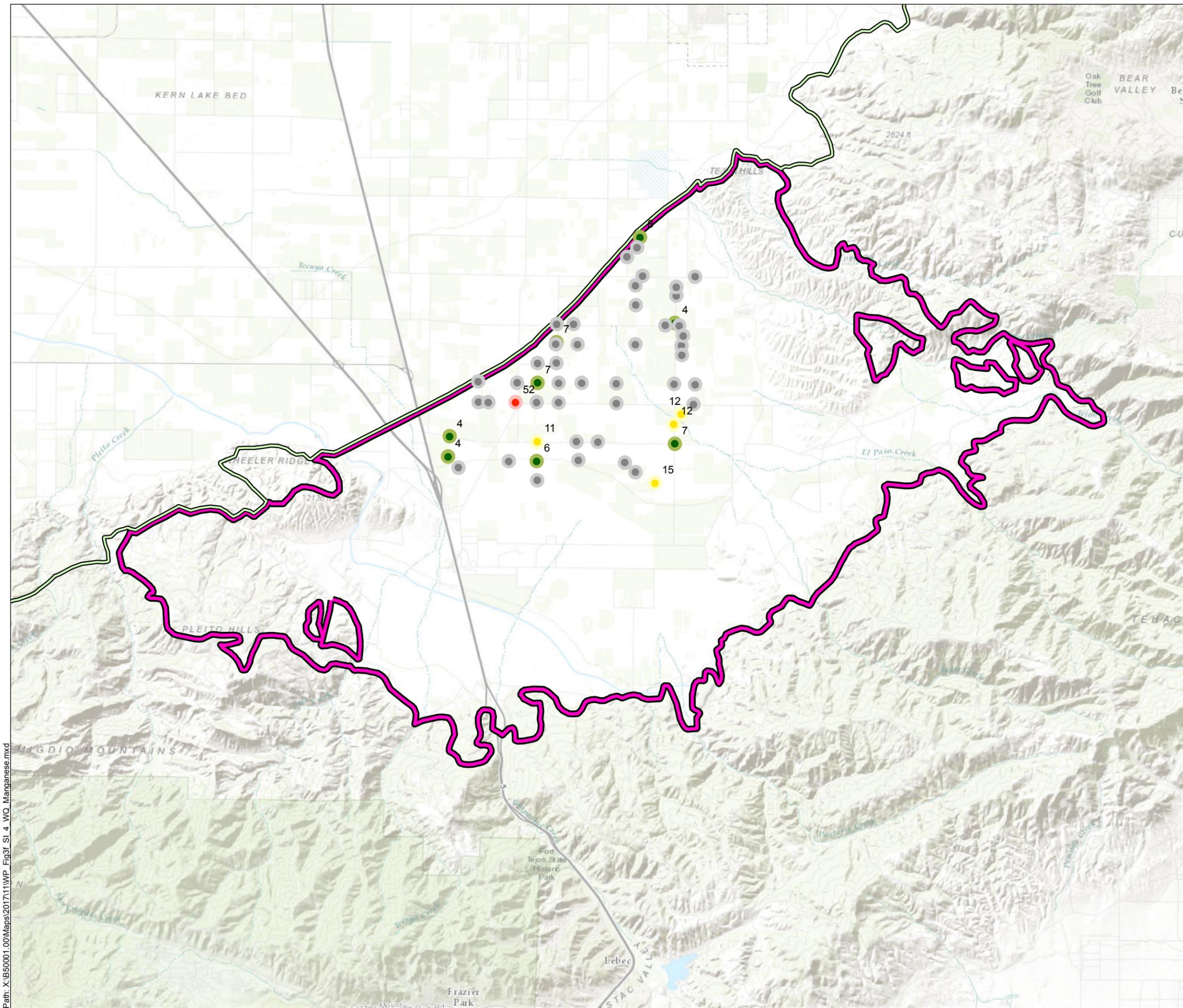
**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality - Iron**

Tejon-Castac Water District  
Kern County, CA  
November 2017  
EKI B50001.04

**eki** environment & water

**Figure 3e**

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**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Total Recoverable Manganese Concentration (ug/L)**

- ND (< 4)
- 4 - 10
- 10 - 25
- 25 - 50
- > 50

**Abbreviations**

- AEWSD = Arvin-Edison Water Storage District
- CCR = California Code of Regulations
- DWR = California Department of Water Resources
- EPA = United States Environmental Protection Agency
- MCL = Maximum Contaminant Level
- ug/L = micrograms per Liter
- ND = Not Detected
- UR = Undesirable Result

**Notes**

- All locations are approximate.
- For a given well, reported water quality values represent the latest sample collected during the 2016 calendar year.
- Water quality data provided by AEWSD.
- Manganese measurements obtained using EPA-200.7 method, with a detection limit of 4 ug/L.
- CCR 22-4 Table 64449-A lists Secondary MCL for Manganese at 50 ug/L.

**Sources**

- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Water quality data obtained from AEWSD on 3 April 2017.

N

0 2.5 5  
(Scale in Miles)

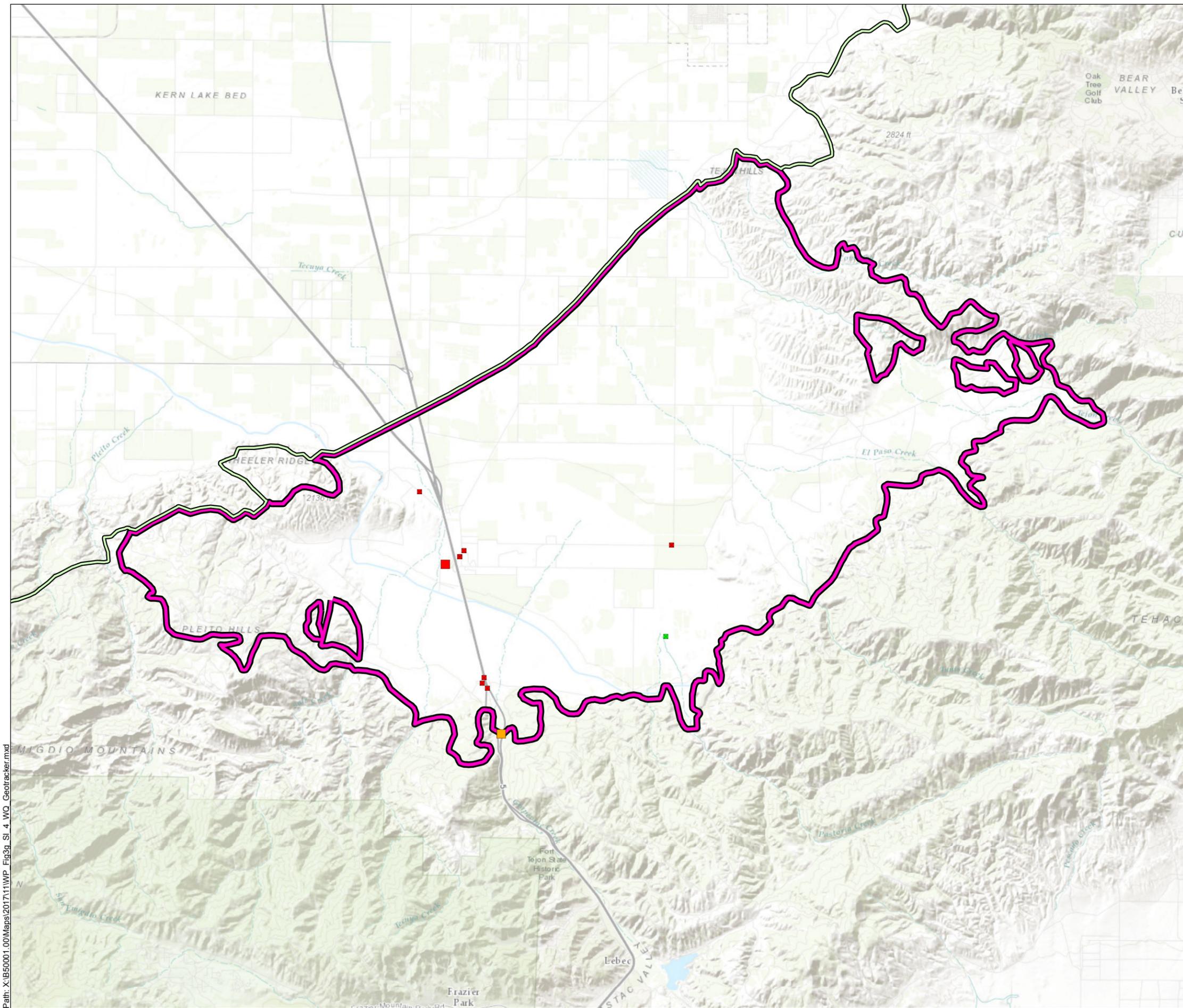
**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality Manganese**

Tejon-Castac Water District  
Kern County, CA  
November 2017  
EKI B50001.04

**eki** environment & water

**Figure 3f**

Path: X:\B50001.00\MapInfo\201711\WP\_Fig3f\_SI\_4\_WQ\_Manganese.mxd



**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**GeoTracker Sites**

- Cleanup Program Site, Open
- Cleanup Program Site, Closed
- LUST Cleanup Site, Open
- LUST Cleanup Site, Closed
- Military/UST Site, Open
- Military/UST Site, Closed
- Land Disposal Site, Open
- Land Disposal Site, Closed

**Abbreviations**

DWR = California Department of Water Resources  
 LUST = Leaking Underground Storage Tank  
 SWRCB = State Water Resources Control Board  
 UR = Undesirable Result  
 UST = Underground Storage Tank

**Notes**

1. All locations are approximate.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.  
 2. DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.  
 3. Locations of contamination sites from SWRCB GeoTracker website (<http://geotracker.waterboards.ca.gov/datadownload>), accessed 31 August 2017.

N

0 2.5 5  
(Scale in Miles)

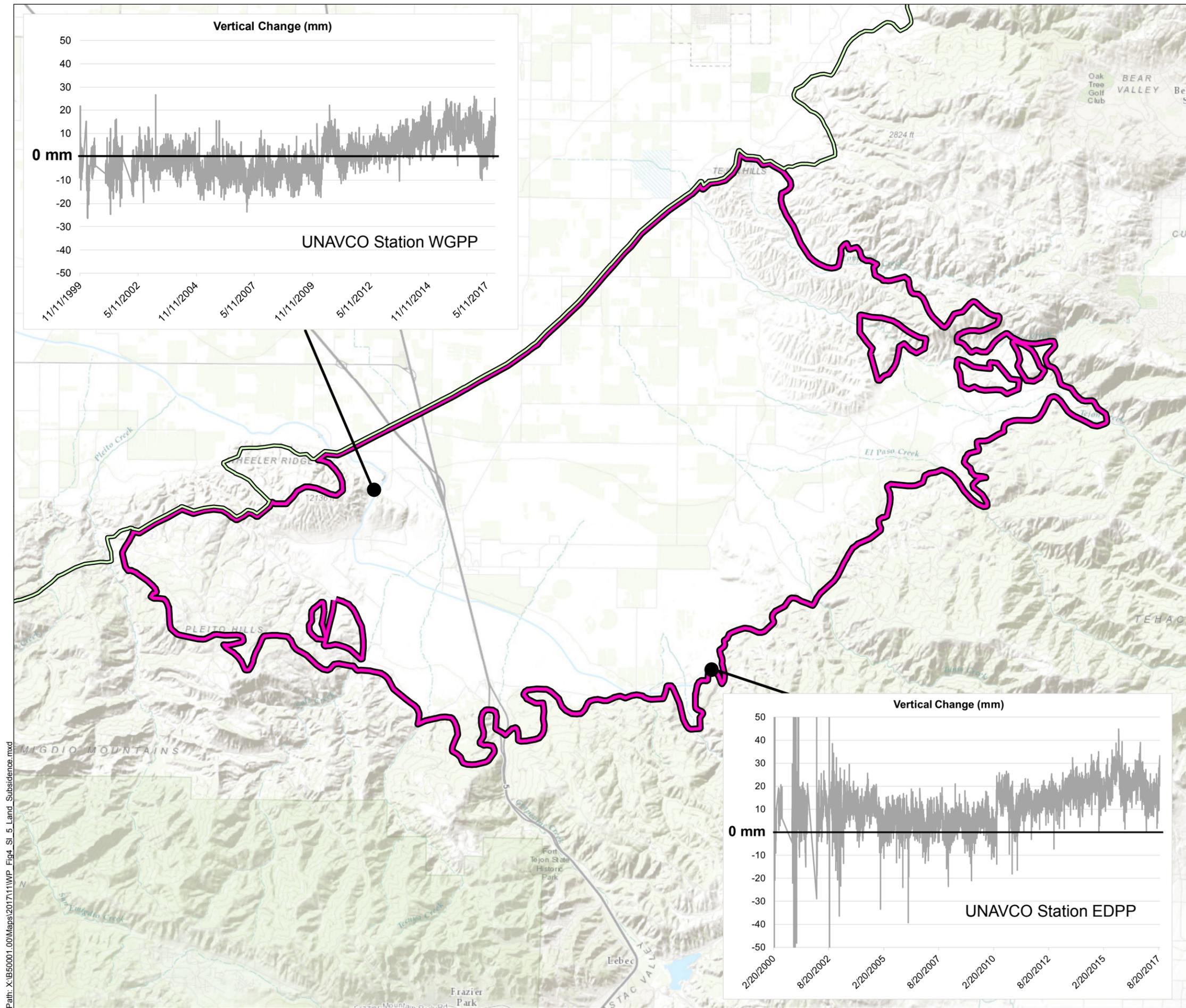
**Evaluation of Available Data and Assessment of Sustainability Indicator #4 - Water Quality GeoTracker Sites**

Tejon-Castac Water District  
 Kern County, CA  
 November 2017  
 EKI B50001.04

**eki** environment & water

**Figure 3g**

Path: X:\B50001.00\MapInfo\201711\WP\_Fig3g\_Sl\_4\_WQ\_Geotracker.mxd



**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County
- UNAVCO Station

**Abbreviations**

DWR = California Department of Water Resources  
 mm = millimeters  
 UR = Undesirable Result

**Notes**

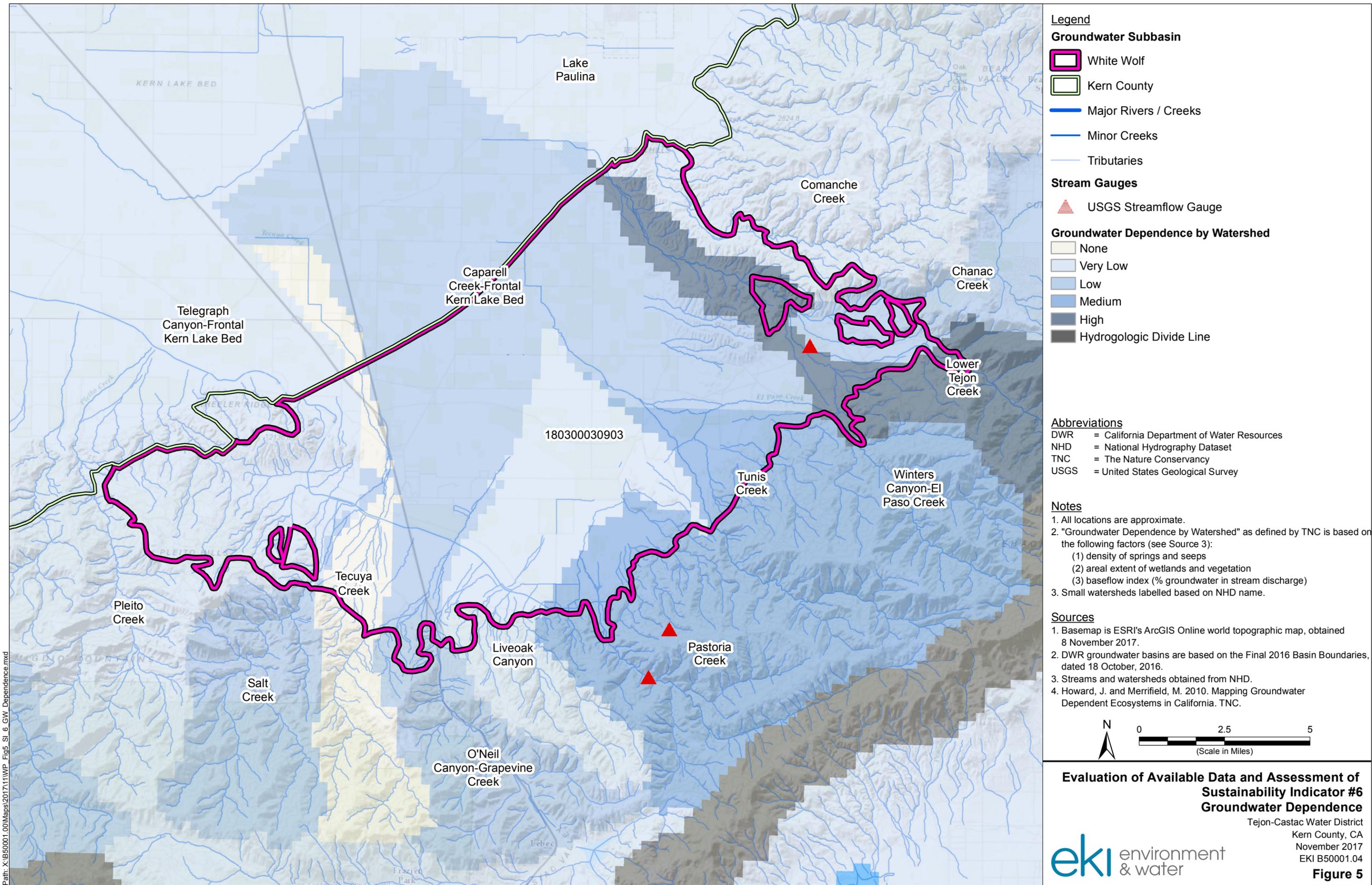
1. All locations are approximate.
2. Vertical change in millimeters measured with respect to initial elevation on first measurement date. For UNAVCO Station WGPP (northwest portion of the White Wolf Subbasin), the first measurement was taken on 11 November 1999. For UNAVCO Station EDPP (southern border of the White Wolf Subbasin), the first measurement was taken on 20 February 2000.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
2. DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
3. Land subsidence data acquired from UNAVCO's Plate Boundary Observatory database on 18 September 2017.

Path: X:\B50001.00\Map\201711\WP\_Fig4\_SI\_5\_Land\_Subsidence.mxd

**Evaluation of Available Data and Assessment of Sustainability Indicator #5 - Land Subsidence**



**Legend**

**Groundwater Subbasin**

- White Wolf
- Kern County

**Stream Gauges**

- USGS Streamflow Gauge

**Groundwater Dependence by Watershed**

- None
- Very Low
- Low
- Medium
- High
- Hydrogeologic Divide Line

**Abbreviations**

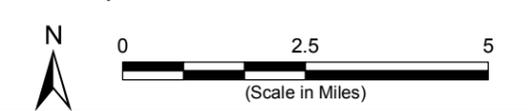
DWR = California Department of Water Resources  
 NHD = National Hydrography Dataset  
 TNC = The Nature Conservancy  
 USGS = United States Geological Survey

**Notes**

- All locations are approximate.
- "Groundwater Dependence by Watershed" as defined by TNC is based on the following factors (see Source 3):
  - density of springs and seeps
  - areal extent of wetlands and vegetation
  - baseflow index (% groundwater in stream discharge)
- Small watersheds labelled based on NHD name.

**Sources**

- Basemap is ESRI's ArcGIS Online world topographic map, obtained 8 November 2017.
- DWR groundwater basins are based on the Final 2016 Basin Boundaries, dated 18 October, 2016.
- Streams and watersheds obtained from NHD.
- Howard, J. and Merrifield, M. 2010. Mapping Groundwater Dependent Ecosystems in California. TNC.



**Evaluation of Available Data and Assessment of Sustainability Indicator #6 Groundwater Dependence**

Tejon-Castac Water District  
 Kern County, CA  
 November 2017  
 EKI B50001.04

**eki environment & water**

**Figure 5**

Path: X:\B50001.00\Map01\201711\WP\_Fig5\_SI\_6\_GW\_Dependence.mxd

## **Attachment B**

**White Wolf GSA Proposition 1 Schedule**

Attachment 6 - Project Schedule

ID	Phase/Task #	Phase/Task Name	Start	Finish	Duration	2014				2015				2016				2017				2018				2019				2020				2021				2022			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	<b>PM Phase</b>	<b>Project Management</b>	<b>Fri 12/1/17</b>	<b>Mon 1/31/22</b>	<b>1087 days</b>	<b>PM Phase</b>																																			
2	Task 1	Prop 1 Grant Management, Administration, and Reporting	Fri 12/1/17	Mon 1/31/22	1087 days	Task 1																																			
3	Task 2	Project Management	Fri 12/1/17	Mon 1/31/22	1087 days	Task 2																																			
4	Task 3	Quality Assurance/Quality Control	Fri 12/1/17	Mon 1/31/22	1087 days	Task 3																																			
5	<b>Phase 1</b>	<b>GSP Foundation</b>	<b>Thu 1/1/15</b>	<b>Sat 6/30/18</b>	<b>913 days</b>	<b>Phase 1</b>																																			
6	Task 4	Conduct Preliminary GSP Development Efforts	Thu 1/1/15	Mon 11/13/17	748 days	Task 4																																			
7	Task 5	Provide Initial Notification of GSP Development	Fri 12/1/17	Sun 12/31/17	22 days	Task 5																																			
8	Task 6	Select or Design Data Management System	Mon 1/1/18	Thu 2/15/18	34 days	Task 6																																			
9	Task 7	Gather Available Data & Compile into DMS	Fri 2/16/18	Tue 5/15/18	63 days	Task 7																																			
10	Task 8	Compile Info on Plan Area & Basin Mgmt. Activities	Mon 1/1/18	Sat 3/31/18	66 days	Task 8																																			
11	Task 9	Conduct Data Gaps Assessment	Sun 4/1/18	Thu 5/31/18	45 days	Task 9																																			
12	Task 10	Evaluate Numerical Groundwater Model Options	Mon 1/1/18	Mon 4/30/18	86 days	Task 10																																			
13	Task 11	Update GSP Development Funding Plan	Mon 1/1/18	Fri 6/29/18	130 days	Task 11																																			
14	Task 12	Develop Stakeholder Communication & Engagement Plan	Mon 1/1/18	Sat 3/31/18	66 days	Task 12																																			
15	Task 13	Conduct Stakeholder Engagement Re: GSP Foundation	Sun 4/1/18	Sat 6/30/18	67 days	Task 13																																			
16	Task 14	Participate in Intrabasin & Interbasin Coordination Efforts	Mon 1/1/18	Sat 6/30/18	131 days	Task 14																																			
17	<b>Phase 2</b>	<b>Basin Characterization and Analysis</b>	<b>Sun 7/1/18</b>	<b>Sun 6/30/19</b>	<b>262 days</b>	<b>Phase 2</b>																																			
18	Task 15	Implement Plan for Filling Data Gaps Needed for GSP Preparation	Sun 7/1/18	Mon 12/31/18	132 days	Task 15																																			
19	Task 16	Assess Groundwater Conditions & Develop HCM	Sun 7/1/18	Mon 12/31/18	132 days	Task 16																																			
20	Task 17	Coordinate Regarding C2VSim Modeling	Mon 10/1/18	Fri 3/29/19	130 days	Task 17																																			
21	Task 18	Develop Basin-Wide Water Budget	Tue 1/1/19	Sun 6/30/19	130 days	Task 18																																			
22	Task 19	Assess Existing Monitoring Programs & Develop SGMA Network	Sat 9/1/18	Thu 2/28/19	130 days	Task 19																																			
23	Task 20	Conduct Stakeholder Engagement Re: Basin Char. & Analysis	Sun 7/1/18	Sun 6/30/19	262 days	Task 20																																			
24	Task 21	Implement GSP Development Funding Plan	Sun 7/1/18	Sun 6/30/19	262 days	Task 21																																			
25	Task 22	Participate in Intrabasin & Interbasin Coordination Efforts	Sun 7/1/18	Sun 6/30/19	262 days	Task 22																																			
26	<b>Phase 3</b>	<b>Sustainability Planning</b>	<b>Mon 7/1/19</b>	<b>Tue 6/30/20</b>	<b>262 days</b>	<b>Phase 3</b>																																			
27	Task 23	Evaluate Potential Management Areas	Mon 7/1/19	Mon 9/30/19	66 days	Task 23																																			
28	Task 24	Develop Sustainable Management Criteria	Mon 7/1/19	Fri 12/27/19	130 days	Task 24																																			
29	Task 25	Identify Projects and Management Actions	Tue 10/1/19	Tue 3/31/20	131 days	Task 25																																			
30	Task 26	Create GSP Implementation Plan	Wed 4/1/20	Tue 6/30/20	65 days	Task 26																																			
31	Task 27	Finalize Monitoring Network & Protocols	Tue 10/1/19	Tue 6/30/20	196 days	Task 27																																			
32	Task 28	Conduct Stakeholder Engagement Re: Sustainability Planning	Mon 7/1/19	Tue 6/30/20	262 days	Task 28																																			
33	Task 29	Implement GSP Development Funding Plan	Mon 7/1/19	Tue 6/30/20	262 days	Task 29																																			
34	Task 30	Participate in Intrabasin & Interbasin Coordination Efforts	Mon 7/1/19	Tue 6/30/20	262 days	Task 30																																			
35	<b>Phase 4</b>	<b>GSP Preparation &amp; Submittal</b>	<b>Wed 7/1/20</b>	<b>Mon 1/31/22</b>	<b>414 days</b>	<b>Phase 4</b>																																			
36	Task 31	Compile Complete Draft GSP	Wed 7/1/20	Wed 3/31/21	196 days	Task 31																																			
37	Task 32	Distribute Draft GSP & Revise per Stakeholder Feedback	Thu 4/1/21	Sun 1/30/22	218 days	Task 32																																			
38	Task 33	Submit Final GSP to DWR	Mon 1/31/22	Mon 1/31/22	1 day	Task 33																																			
39	Task 34	Participate in Intrabasin & Interbasin Coordination Efforts	Wed 7/1/20	Mon 1/31/22	414 days	Task 34																																			

White Wolf Subbasin Groundwater Sustainability Plan Development  
November 2017



Attachment 6 - Proposal Schedule

ID	Phase/Task #	Phase/Task Name	Start	Finish	Duration	2014				2015				2016				2017				2018				2019				2020				2021				2022			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Project 1	<b>GSP Development Project</b>	Thu 1/1/15	Mon 1/31/22	1848 days	Project 1																																			
2	PM Phase	Project Management	Fri 12/1/17	Mon 1/31/22	1087 days	PM Phase																																			
3	Phase 1	GSP Foundation	Thu 1/1/15	Sat 6/30/18	913 days	Phase 1																																			
4	Phase 2	Basin Characterization and Analysis	Sun 7/1/18	Sun 6/30/19	262 days	Phase 2																																			
5	Phase 3	Sustainability Planning	Mon 7/1/19	Tue 6/30/20	262 days	Phase 3																																			
6	Phase 4	GSP Preparation & Submittal	Wed 7/1/20	Mon 1/31/22	414 days	Phase 4																																			

## **Attachment C**

**Cost Estimate to Develop a Groundwater Sustainability Plan Chapter**

**TABLE 2**  
**COST ESTIMATE TO DEVELOP A GROUNDWATER SUSTAINABILITY PLAN CHAPTER**  
 Tejon-Castac Water District  
 EKI B8-045

<b>Task</b>	<b>Total Budget</b>	<b>Grant Reimbursable Amount (a)</b>	<b>White Wolf GSA Amount</b>
<b>Task 1 - Conduct Preliminary GSP Development Efforts</b>	<b>\$134,282</b>	<b>\$77,133</b>	<b>\$57,149</b>
<i>Subtask 1.1 Provide Initial Notification of GSP Development</i>	\$1,761	\$1,002	\$759
<i>Subtask 1.2 Select or Design Data Management System (DMS)</i>	\$8,688	\$4,943	\$3,745
<i>Subtask 1.3 Gather Available Data and Compile into DMS</i>	\$13,233	\$7,803	\$5,430
<i>Subtask 1.4 Compile Information on the Plan Area and Basin Management Activities</i>	\$11,209	\$6,560	\$4,649
<i>Subtask 1.5 Conduct Data Gaps Assessment</i>	\$33,387	\$19,270	\$14,117
<i>Subtask 1.6 Evaluate Numerical Groundwater Modeling Options</i>	\$10,654	\$6,062	\$4,592
<i>Subtask 1.7 Update GSP Development Funding Plan</i>	\$5,426	\$3,087	\$2,339
<i>Subtask 1.8 Develop Stakeholder Communication and Engagement Plan</i>	\$15,827	\$9,005	\$6,822
<i>Subtask 1.9 Conduct Stakeholder Engagement Related to GSP Foundation</i>	\$6,856	\$3,901	\$2,955
<i>Subtask 1.10 Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$27,242	\$15,500	\$11,742
<b>Task 2 - Develop Basin Setting Information</b>	<b>\$292,614</b>	<b>\$119,964</b>	<b>\$172,650</b>
<i>Subtask 2.1 Implement Plan for Filling Data Gaps Needed for GSP Preparation</i>	\$83,217	\$0	\$83,217
<i>Subtask 2.2 Assess Groundwater Conditions &amp; Develop Hydrogeologic Conceptual Model</i>	\$40,879	\$23,806	\$17,073
<i>Subtask 2.3 Coordinate Regarding C2VSim Modeling</i>	\$12,630	\$7,186	\$5,444
<i>Subtask 2.4 Develop Basin-Wide Water Budget</i>	\$74,233	\$42,329	\$31,904
<i>Subtask 2.5 Assess Existing Monitoring Programs &amp; Develop SGMA-Compliant Monitoring Network</i>	\$29,822	\$17,150	\$12,672
<i>Subtask 2.6 Conduct Stakeholder Engagement Related to Basin Characterization and Analysis</i>	\$13,711	\$7,802	\$5,910
<i>Subtask 2.7 Implement GSP Development Funding Plan</i>	\$1,340	\$762	\$577
<i>Subtask 2.8 Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$36,783	\$20,929	\$15,854

**TABLE 2**  
**COST ESTIMATE TO DEVELOP A GROUNDWATER SUSTAINABILITY PLAN CHAPTER**  
 Tejon-Castac Water District  
 EKI B8-045

<b>Task</b>	<b>Total Budget</b>	<b>Grant Reimbursable Amount (a)</b>	<b>White Wolf GSA Amount</b>
<b>Task 3 - Develop Sustainable Management Criteria</b>	<b>\$254,542</b>	<b>\$126,514</b>	<b>\$128,028</b>
<i>Subtask 3.1 Evaluate Potential Management Areas</i>	\$6,947	\$3,998	\$2,949
<i>Subtask 3.2 Develop Sustainable Management Criteria</i>	\$76,265	\$43,713	\$32,553
<i>Subtask 3.3 Identify Projects and Management Actions</i>	\$56,200	\$32,295	\$23,904
<i>Subtask 3.4 Create GSP Implementation Plan</i>	\$33,713	\$0	\$33,713
<i>Subtask 3.5 Finalize Monitoring Network &amp; Protocols</i>	\$29,584	\$17,015	\$12,569
<i>Subtask 3.6 Conduct Stakeholder Engagement Related to Sustainability Planning</i>	\$13,711	\$7,802	\$5,910
<i>Subtask 3.7 Implement GSP Development Funding Plan</i>	\$1,340	\$762	\$577
<i>Subtask 3.8 Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$36,783	\$20,929	\$15,854
<b>Task 4 - Prepare and Submit GSP</b>	<b>\$102,174</b>	<b>\$58,409</b>	<b>\$43,765</b>
<i>Subtask 5.1 Compile Complete Draft GSP</i>	\$27,535	\$15,940	\$11,595
<i>Subtask 5.2 Distribute Draft GSP and Revise per Stakeholder Feedback</i>	\$23,596	\$13,426	\$10,170
<i>Subtask 5.3 Submit Final GSP to DWR</i>	\$1,622	\$923	\$699
<i>Subtask 5.4 Participate in Intrabasin &amp; Interbasin Coordination Efforts</i>	\$49,421	\$28,120	\$21,301
<b>Task 5 - Project Management and Grant Administration</b>	<b>\$85,731</b>	<b>\$48,871</b>	<b>\$36,860</b>
<i>Subtask 5.1 Proposition 1 Grant Management, Administration, and Reporting</i>	\$27,693	\$15,757	\$11,936
<i>Subtask 5.2 Project Management</i>	\$48,483	\$27,586	\$20,897
<i>Subtask 5.3 Quality Assurance/Quality Control</i>	\$9,556	\$5,528	\$4,028
<b>TOTAL</b>	<b>\$869,343</b>	<b>\$430,891</b>	<b>\$438,452</b>

**Abbreviations:**

C2VSim = California Central Valley Groundwater-Surface Water Simulation Model  
 DMS = Data Management System  
 DWR = California Department of Water Resources  
 GSA = Groundwater Sustainability Agency  
 GSP = Groundwater Sustainability Plan  
 HCM = Hydrogeologic Conceptual Model

**Notes:**

(a) Assumes full funding of the White Wolf GSA's Proposition 1 grant as recommended by DWR on 6 February 2018.

**Attachment D**  
**2018 Schedule of Charges**

Proposal/Agreement Date: **8 March 2018**

EKI Project # **B8-045**

**SCHEDULE OF CHARGES FOR EKI ENVIRONMENT & WATER, INC.<sup>1</sup>**

**1 January 2018**

<u>Personnel Classification</u>	<u>Hourly Rate</u>
Officer and Chief Engineer-Scientist	280
Principal Engineer-Scientist	270
Supervising I, Engineer-Scientist	260
Supervising II, Engineer-Scientist	250
Senior I, Engineer-Scientist	238
Senior II, Engineer-Scientist	225
Associate I, Engineer-Scientist	213
Associate II, Engineer-Scientist	199
Engineer-Scientist, Grade 1	185
Engineer-Scientist, Grade 2	175
Engineer-Scientist, Grade 3	160
Engineer-Scientist, Grade 4	140
Engineer-Scientist, Grade 5	124
Engineer-Scientist, Grade 6	109
Technician	100
Senior GIS Analyst	128
CADD Operator / GIS Analyst	113
Senior Administrative Assistant	125
Administrative Assistant	99
Secretary	82

**Direct Expenses**

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

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

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

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

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

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

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

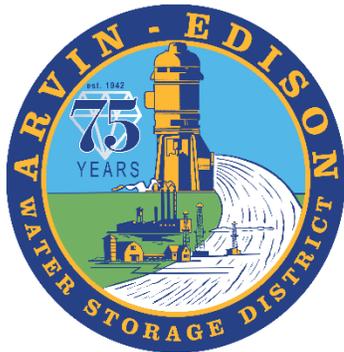
<sup>1</sup> Formerly known as Erler & Kalinowski, Inc.

# White Wolf Subbasin Groundwater Sustainability Agency

## Correspondence List

- a) Letter from Jeevan Muhar, AEWS to Sheridan Nicholas, WRMWSD, "Re: Mettler Groundwater Recharge Project," 7 August 2018.
- b) "Proposition 1 Integrated Regional Water Management (IRWM) Implementation Grant Program Eligibility Criteria." Submitted to California Department of Water Resources on 11 December 2018.
- c) Transmittal from Anona Dutton, EKI Environment and Water to Phyllis Stanin, Todd Groundwater and Terry Erlewine, Kern Groundwater Authority, "White Wolf Groundwater Sustainability Agency Comments on the C2VSim Beta Fine Grid Model," 14 September 2018.
- d) Email from Angelica Martin to Robby Tut following up on Tut Brothers #96 public water system data request, 6 September 2018.
- e) Stakeholder data requests mailed to 11 stakeholders on 5 October 2018.
- f) Email from Angelica Martin to Mike Maley and Phyllis Stanin, Todd Groundwater and Patty Poire, Kern Groundwater Authority, "C2VSim Questions," 7 February 2019.

# ARVIN-EDISON WATER STORAGE DISTRICT



August 7, 2018

Via Electronic Mail ([snicholas@wrmwsd.com](mailto:snicholas@wrmwsd.com))

Sheridan Nicholas  
Wheeler Ridge-Maricopa Water Storage District  
12109 Highway 166  
Bakersfield, CA 93313-9630

**Re: Mettler Groundwater Recharge Project**

**DIRECTORS**

Edwin A. Camp  
President  
Jeffrey G. Giumarra  
Vice President  
John C. Moore  
Secretary/Treasurer  
Derek J. Yurosek  
Ronald R. Lehr  
Dennis B. Johnston  
Charles Fanucchi  
Catalino M. Martinez  
Kevin E. Pascoe

**STAFF**

Jeevan S. Muhar  
Engineer-Manager  
David A. Nixon  
Deputy General Manager  
Steven C. Collup  
Director of Water Resources  
Christopher P. Krauter  
General Superintendent

Dear Mr. Nicholas:

The proposed Wheeler Ridge-Maricopa Water Storage District (WRMWSD) Mettler Groundwater Recharge Project (Project) is a creative water management action and should generate many benefits. Arvin-Edison Water Storage District (AEWSD) is generally supportive of these types of projects and offers the following comments to the Project Initial Study/Mitigated Negative Declaration (MND).

As you are aware, the Project is located within the AEWSD boundaries and accordingly AEWSD is interested in the continued coordination of the Project and related operations. AEWSD hereby requests to be involved in developing the Monitoring and Operational Constraints Program (MOCP) including, but not limited to, receipt of MOCP data transmittals.

The Project is located in the White Wolf Subbasin and provided the early stages of the Sustainable Groundwater Management Act (SGMA), the continued operations and deliveries of imported supplies by both WRMWSD and AEWSD (as well as Tejon-Castac Water District) into the White Wolf Subbasin are important to its long-term sustainability and compliance with SGMA. Similar to

AEWSD, WRMWSD's service area extends beyond the White Wolf Subbasin and into the Kern County Subbasin. Accordingly, AEWSD understands that WRMWSD may need to amend its existing Rules and Regulations to consider input from the White Wolf Groundwater Sustainability Agency. AEWSD hereby requests your confirmation on the potential to amend the existing WRMWSD Rules and Regulations to limit and/or mitigate for water management actions that could negatively harm the White Wolf Subbasin and/or be contrary to AEWSD policies.

AEWSD understands that the Project is located within the "High Vulnerability Area" as defined by the Waste Discharge Requirements for Discharge from Irrigated Lands General Order (with Kern River Watershed Coalition Authority being the Third Party representing such lands). However, the MND states "...Project is not within an area designated as being at risk for nitrate contamination" (page 3-71). AEWSD hereby requests clarification and/or explanation of the potentially conflicting statement.

Thank you, and again we appreciate the opportunity to provide input into the Project. If you have questions or comments, please contact me.

Sincerely,

Jeevan Muhar  
Engineer-Manager

cc: Board of Directors  
Steve Collup, Director of Water Resources  
White Wolf Groundwater Sustainability Agency

JSM:sj\AEWSD\Muhar\Correspondence\AEWSD.comments.WRMWSD.Mettler.GW.Recharge.Project.MND.08.18.docx



## White Wolf Groundwater Sustainability Agency

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

11 December 2018

To: California Department of Water Resources (DWR)

Cc: Angelica Martin, Tejon-Castac Water District (TCWD)  
Jeevan Muhar, Arvin-Edison Water Storage District (AEWSD)  
Steve Collup, AEWSD  
Sheridan Nicholas, Wheeler Ridge-Maricopa Water Storage District (WRMWSO)  
Robert Kunde, WRMWSO  
Alan Christensen, Kern County

From: Catalino "Tito" Martinez, President, White Wolf Groundwater Sustainability Agency

**Subject: Proposition 1 Integrated Regional Water Management (IRWM)  
Implementation Grant Program Eligibility Criteria**

On 5 October 2018 DWR released the Draft 2018 IRWM Grant Program Guidelines<sup>1</sup>. One of the IRWM Grant funding opportunities eligibility criteria is that a project must be included in an adopted IRWM Plan that is consistent with 2016 IRWM Plan standards. We respectfully request DWR to consider extending the Grant eligibility criteria for projects to include either the IRWM Plan consistent with 2016 standards, or the most recently adopted IRWM Plan for the project area.

Regards,

Catalino Martinez

<sup>1</sup> <https://water.ca.gov/Work-With-Us/Grants-And-Loans/IRWM-Grant-Programs/Proposition-1/Implementation-Grants>



Fri 9/14/2018 7:57 AM

Anona Dutton <adutton@ekiconsult.com>

Re-transmittal of C2VSim comments

To TErlewine@ppeng.com; pstanin@toddgroundwater.com; ppoire@kerngwa.com

Cc Angelica Martin; Jeevan Muhar; Sheridan Nicholas

Message

Todd-KGA Transmittal - C2VSim FG Beta comments.pdf (4 MB)

Dear Phyllis and Terry,

On behalf of the White Wolf Groundwater Sustainability Agency (WW GSA), EKI is transmitting a copy of the letter "Comments on the C2VSim Beta Fine Grid Model". The WW GSA submitted this letter to the California Department of Water Resources (DWR) on 9 July 2018, to document concerns of the WW GSA regarding the development and calibration of the C2VSim Fine Grid Beta Model. While you were cc'd on that transmittal, we just wanted to ensure that you received the correspondence directly. This may be appropriate to share with the KGA's model peer reviewers.

Thank you,  
Anona

14 September 2018

To: Phyllis Stanin, Todd Groundwater  
Terry Erlewine, Kern Groundwater Authority (KGA)

Cc: Catalino "Tito" Martinez, White Wolf Groundwater Sustainability Agency  
Angelica Martin, Tejon-Castac Water District (TCWD)  
Jeevan Muhar, Arvin-Edison Water Storage District (AEWSD)  
Steve Collup, AEWSD  
Sheridan Nicholas, Wheeler Ridge-Maricopa Water Storage District (WRMWSO)  
Robert Kunde, WRMWSO  
Alan Christensen, Kern County

From: Anona Dutton, EKI Environment and Water (EKI)

**Subject: White Wolf Groundwater Sustainability Agency Comments on the C2VSim Beta Fine Grid Model**

On behalf of the White Wolf Groundwater Sustainability Agency (WW GSA), EKI is transmitting a copy of the letter "Comments on the C2VSim Beta Fine Grid Model". The WW GSA submitted this letter to the California Department of Water Resources (DWR) on 9 July 2018, to document concerns of the WW GSA regarding the development and calibration of the C2VSim Fine Grid Beta Model. While you were cc'd on that transmittal, we just wanted to ensure that you received the correspondence directly. This may be appropriate to share with the KGA's model peer reviewers.

In summary, the WW GSA identified the following issues with the model that they would like DWR to address during the final model calibration phase.

- Model Discretization and Calibration
  - Model grid discretization may not be adequate for some analysis.
  - Model layer thicknesses near the margins of the subbasin don't accurately represent thinning of aquifer near the margins.
  - Performance for the previous C2VSim Coarse Grid model was poor in the southern Kern County area indicating the area is difficult to model.
- Representation of the White Wolf Fault Trace
  - The boundary between the White Wolf and Kern County Subbasins was delineated by DWR based on the location of the White Wolf Fault. However, the representation of the White Fault in the model does not align with this subbasin boundary.

Formerly known as Erler & Kalinowski, Inc.

- Representation of the White Wolf Fault Hydraulic Properties
  - The hydraulic properties assigned to the nodes representing the White Wolf Fault do not represent the fault as a barrier to horizontal groundwater flow, which is contrary to the current understanding of the how the fault affects groundwater flow.
- Representation of the White Wolf Subbasin Hydraulic Properties
  - Hydraulic property values in the subbasin are relatively uniform, which may not adequately represent the actual variability within the aquifer.
  - Specific storage values in much of the subbasin result in storativity values of greater than 1, which is unrealistic.
- Surface Water Diversion / Groundwater Pumping Estimates
  - Source and level of detail of surface water deliveries and pumping used as model input is unknown and may not accurately simulate actual conditions.

Attachment: Comments on the C2VSim Beta Fine Grid Model



## White Wolf Groundwater Sustainability Agency

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

9 July 2018

To: Tyler Hatch, California Department of Water Resources (DWR)

Cc: Timothy Godwin, DWR

Dane Mathis, DWR

Terry Erlewine, Kern Groundwater Authority (KGA)

Phyllis Stanin, Todd Groundwater

Angelica Martin, Tejon-Castac Water District (TCWD)

Jeevan Muhar, Arvin-Edison Water Storage District (AEWSD)

Steve Collup, AEWSD

Sheridan Nicholas, Wheeler Ridge-Maricopa Water Storage District (WRMWSD)

Robert Kunde, WRMWSD

Alan Christensen, Kern County

From: Catalino "Tito" Martinez, President, White Wolf Groundwater Sustainability Agency

**Subject: Comments on the C2VSim Beta Fine Grid Model**

This letter presents comments on the Beta version of the updated Fine Grid Central Valley Groundwater-Surface Water Simulation Model (C2VSimFG Beta) that was released by the California Department of Water Resources (DWR) on 8 May 2018. We understand that DWR is currently refining the model calibration and that a final version of the C2VSim model is expected in Fall 2018. To support DWR's work to calibrate the model, we offer the following comments based on our review of the C2VSimFG Beta and the limited available documentation, with a particular focus on the model's representation of the White Wolf Subbasin (DWR Basin No. 5-22.18).

### **Background**

In March 2016, the Tejon-Castac Water District (TCWD), Wheeler Ridge-Maricopa Water Storage District (WRMWSD), and Arvin-Edison Water Storage District (AEWSD) (collectively, the "Districts") submitted a basin boundary modification request (Request) to DWR to subdivide the

Kern County Subbasin (DWR 5-22.14) into two subbasins: the Kern County Subbasin and the White Wolf Subbasin. On 18 October 2016, DWR provided notice for final approval of the Request, which consequently created the White Wolf Subbasin (WW Subbasin).

The WW Subbasin is described briefly herein and in detail in the *White Wolf Subbasin Technical Study* (Technical Study) that accompanied the Request.<sup>1</sup> The WW Subbasin is located at the southern end of the San Joaquin Valley, approximately 16 miles southwest of Bakersfield along State Highway 99. The WW Subbasin consists of approximately 108,000 acres that are bounded on the north by the White Wolf Fault and by mountain ranges on the other three sides. The majority of the WW Subbasin is included in the service areas of the Districts where irrigated agriculture is the primary land use. The WW Subbasin contains productive, water-bearing strata with a total estimated storage capacity of 4.0 million acre-feet (Anderson et al., 1979<sup>2</sup>). The principal unconfined and semi-confined aquifers are younger and older alluvium and the Kern River Formation (Wood and Dale, 1964<sup>3</sup>; AEWSD, 2003<sup>4</sup>; WRMWSD, 2007<sup>5</sup>). The more confined Chanac and Santa Margarita formations are also tapped by water wells in the WW Subbasin.

In May 2017, the White Wolf Groundwater Sustainability Agency (GSA) was formed for the WW Subbasin to meet SGMA requirements. The GSA is composed of the three Districts and Kern County. The GSA is preparing a single Groundwater Sustainability Plan (GSP) for the WW Subbasin and intends to coordinate groundwater modeling efforts with other GSAs in the adjacent Kern County Subbasin, including the Kern Groundwater Authority GSA. Specifically, the GSAs currently intend to rely on the C2VSimFG for certain SGMA-related analysis in both the WW Subbasin and the Kern County Subbasin.

### **Model Review**

In May 2018, DWR released an early version of the C2VSimFG (C2VSimFG Beta). The C2VSimFG Beta is an update of the C2VSim version released in 2013. The C2VSimFG Beta includes refined horizontal and vertical discretization, updated precipitation data, updated texture analysis, updated land use data, and updated surface water deliveries. One purpose for the release of C2VSimFG Beta is for GSAs to review the model prior to the final release, which is expected in Fall 2018.

***Model Grid Discretization and Calibration:*** The WW Subbasin constitutes part of one of 21 subregions within C2VSimFG Beta, which covers the entire Central Valley. In the 2013 release of the C2VSim Coarse Grid Model, this subregion had the second worst performance in terms of

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<sup>1</sup> EKI, *White Wolf Subbasin Technical Study*, 2016. Accessible at: <http://sgma.water.ca.gov/basinmod/basinrequest/preview/34>.

<sup>2</sup> Anderson, S.C., Sanchez, D.K., and A.A. Swanson, *Preliminary Evaluation of State Water Project Ground Water Storage Program, White Wolf Basin*, State of California Department of Water Resources, Southern District, September 1979.

<sup>3</sup> Wood P.R. and R. H. Dale, *Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California*, USGS Water Supply Paper 1656, 1964.

<sup>4</sup> Arvin-Edison Water Storage District, *Groundwater Management Plan*, June 2003.

<sup>5</sup> Wheeler Ridge-Maricopa Water Storage District, *AB3030 Groundwater Management Plan*, 2007.

calibration (i.e., simulated water levels were an average of 94 feet different from observed water levels over the 1975-2003 modeling period)<sup>6</sup>. The poor performance of the prior version of C2VSim suggests that this subregion is difficult to model and that there is considerable uncertainty in the aquifer parameters assigned to nodes in the subregion. It is unknown how the updated model will perform.

The WW Subbasin is represented by all or part of 121 elements with an average element size of 950 acres. This level of representation is potentially adequate for certain analyses (e.g., basin-wide water balance) but likely has limited utility for more refined SGMA-related planning or projects level analysis (e.g., local recharge enhancement).

The C2VSimFG Beta external boundary and element configuration generally follows the western, southern, and eastern boundaries of the WW Subbasin, although there are some discrepancies (see Figure 1). In the vertical dimension there are some additional discrepancies, as described below.

The Technical Study reported that the “bottom” of the WW Subbasin is defined by the base of fresh water, similar to the Kern County Subbasin and other nearby subbasins due to the thickness of alluvial sediments that fill the southern San Joaquin Valley. The base of fresh water ranges from 2,000 to 2,500 feet below ground surface (ft bgs) in the deepest part of the WW Subbasin (i.e., in the center of the valley trough in the northern part of the WW Subbasin). The thickness of the alluvium decreases and the depth to the base of fresh water becomes shallower towards the margins of the WW Subbasin (see geologic cross section from Technical Study in Appendix A). In the C2VSimFG Beta, the northern part of the WW Subbasin near the White Wolf Fault is represented by depths of up to 2,000 feet to the bottom of layer 2, the deepest pumped layer. This is generally consistent with the reported “bottom” of the WW Subbasin in this area. However, near the southwestern margins of the WW Subbasin, the depth to bottom of layer 2 exceeds 3,000 feet at some nodes, which is contrary to the thinning of the WW Subbasin near the margins as represented in the cross section provided in Appendix A.

**Representation of the White Wolf Fault Trace:** The C2VSimFG Beta uses the Integrated Water Flow Model (IWFM) platform. The IWFM platform does not have a feature to explicitly represent a fault in the same way the U.S. Geological Survey (USGS) MODFLOW platform uses the Hydrologic Flow Barrier (HFB) package<sup>7</sup> to represent faults. That being said, a fault can be represented in the IWFM platform by discretizing the model domain with closely spaced nodes along the assumed fault trace. This is how the White Wolf Fault is represented in C2VSimFG Beta.

However, the White Wolf Fault as discretized in C2VSimFG Beta does not align with the northern WW Subbasin boundary (Figure 1). The mapped trace of the White Wolf Fault has varied in peer-reviewed journals, engineering reports, and government publications. The fault trace reported

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<sup>6</sup> Brush, C.F, E.C. Dogrul and T.N. Kadir, *Development and Calibration of the California Central Valley Groundwater-Surface Water Simulation Model (C2VSim)*, Version 3.02-CG, 2016.

<sup>7</sup> Hsieh, Paul A. and John R. Freckleton, *Documentation of a computer program to simulate horizontal-flow barriers using the U.S. Geological Survey’s modular three-dimensional finite-difference groundwater-flow model*, USGS Open-File Report 92-477, 32 pp., 1993.

by Wood and Dale (1964)<sup>8</sup> was selected as the northern boundary of the WW Subbasin based on its conformance with hydrologic data. The fault as discretized in the C2VSimFG Beta appears to most closely follow the fault trace as mapped by Ross et al (1986)<sup>9</sup> or Lofgren (1975)<sup>10</sup> although a specific source is not cited, nor is a rationale given for diverging from the DWR-mapped subbasin boundary. **The GSA requests that the model's representation of the fault using closely spaced nodes match the DWR-mapped subbasin boundary.**

**Representation of the White Wolf Fault Hydraulic Properties:** As described in the DWR-approved basin boundary adjustment, significant evidence has been compiled that clearly demonstrates that the White Wolf Fault acts as a significant impediment to groundwater flow (CA DPW [1952]<sup>11</sup>, Dibblee and Oakeshott [1953]<sup>12</sup>, Dibblee [1955]<sup>13</sup>, Davis et al. [1959]<sup>14</sup>, Wood and Dale [1964]<sup>15</sup>, Swanson [1977]<sup>16</sup>, Anderson et al. [1979]<sup>17</sup>, Hagan [2001]<sup>18</sup>, Williamson et al. [1989]<sup>19</sup>, Faunt et al., [2009]<sup>20</sup>, Brush et al. [2013]<sup>21</sup>).

Restrictions to groundwater flow across the fault can be simulated in IWFEM by assigning a low hydraulic conductivity value to the nodes representing the fault. However, in the C2VSimFG Beta, the hydraulic conductivity values assigned to the nodes representing the fault are not

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<sup>8</sup> Wood P.R. and R. H. Dale, *Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California*, USGS Water Supply Paper 1656, 1964.

<sup>9</sup> Ross, D.C., *Basement-rock correlations across the White Wolf-Breckenridge-southern Kern Canyon fault Zone southern Sierra Nevada California*, USGS Bulletin 1651, 25 pp., 1986.

<sup>10</sup> Lofgren, B.E., *Land subsidence in the Arvin-Maricopa area, San Joaquin Valley, California*, in Geological Survey research 1963, USGS Professional Paper 475-B, pp. B171-B175, 1963.

<sup>11</sup> California Department of Public Works, Division of Water Resources, *Report on Physical Effects of Arvin Earthquake of July 21, 1952*, 44 pp., 1952.

<sup>12</sup> Dibblee, T.W. Jr. and G.B. Oakeshott, White Wolf fault in relation to geology of the southern margin of San Joaquin Valley, California, GSA Bulletin, vol. 94 pp. 1502-1503, 1953.

<sup>13</sup> Dibblee, T.W. Jr., *Geology of the southeastern margin of the San Joaquin Valley California*, in *Earthquakes in Kern County, California, during 1952*, California Dept. Nat. Resources, div. Mines Bull, 171 pp. 23-34, 1955.

<sup>14</sup> Davis, G.H., J.H. Green, F.H. Olmstead, and D.W. Brown, *Groundwater conditions and storage capacity in the San Joaquin Valley, California*, USGS Water-Supply Paper 1469, 271 pp., 1959.

<sup>15</sup> Wood P.R. and R. H. Dale, *Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California*, USGS Water Supply Paper 1656, 1964.

<sup>16</sup> Swanson, AA., *Preliminary Evaluation of the Hydrogeology of the White Wolf Ground Water Basin, California*, Department of Water Resources, San Joaquin District, Draft Technical Information Record No. 1614-2-A-1, 8 pp., 1977.

<sup>17</sup> Anderson, S.C., Sanchez, D.K., and A.A. Swanson, *Preliminary Evaluation of State Water Project Ground Water Storage Program, White Wolf Basin*, State of California Department of Water Resources, Southern District, September 1979.

<sup>18</sup> Hagan, Otto, *The Effects of the White Wolf Fault on Groundwater Hydrology in the Southern San Joaquin Valley, California*, Thesis presented to the faculty of the School of Arts and Sciences, California State University, Bakersfield in partial fulfillment of the requirements for the Degree of Master of Science in Geology, 2001.

<sup>19</sup> Williamson, A.K., D.E. Prudic, and L.A. Swain, *Ground-Water Flow in the Central Valley, California*, USGS Professional Paper 1401-D, 1989.

<sup>20</sup> Faunt et al., *Groundwater availability of the Central Valley Aquifer, California*, USGS Professional Paper 1766, 225 pp., 2009.

<sup>21</sup> Brush, C.F, E.C. Dogrul and T.N. Kadir, *Development and Calibration of the California Central Valley Groundwater-Surface Water Simulation Model (C2VSim)*, Version 3.02-CG, 2016.

significantly lower than the hydraulic conductivity values assigned to the adjacent in-basin nodes (Figure 2). In fact, the hydraulic conductivity values assigned to nodes representing the fault are, in some cases, higher than the hydraulic conductivity values of adjacent in-basin nodes. This implies that, contrary to current understanding, the White Wolf Fault is not represented as acting as a barrier to horizontal groundwater flow in C2VSimFG Beta. **The GSA requests that the hydraulic properties along the fault be adjusted during the calibration process to better represent the fault as a significant impediment to groundwater flow.**

**Representation of White Wolf Subbasin Hydraulic Properties:** We have reviewed the current parameterization of the C2VSimFG Beta with comments provided below:

The **hydraulic conductivity** values specified in C2VSimFG Beta in the WW Subbasin are typical of alluvial material described as silty sand and clean sand.<sup>22</sup> However, the values are relatively uniform (Figure 2) and may not reflect the actual variability within the alluvial aquifer. For example, the hydraulic conductivity values in C2VSimFG Beta range from 19 to 79 feet per day (ft/d) in layer 1 and from 13 to 43 ft/d in layer 2 (layer 1 and 2 represent the pumped portion of the aquifer). By comparison, as reported in the Technical Study, hydraulic conductivity values estimated for the WW Subbasin by others range from 18 to 271 ft/d.

We note that the aquifer properties specified in the C2VSimFG Beta were determined from lithologic texture analysis from the USGS Central Valley Hydrologic Model (CVHM)<sup>23</sup>. The USGS texture model represents the WW Subbasin with approximately 10-15 data points which may not provide adequate information in both the horizontal and vertical directions.

The **specific yield** values specified for all layers throughout the extent of the C2VSimFG Beta (i.e., for the entire Central Valley) range from 7% to 10%. Within the WW Subbasin, specific yield values assigned have even less variability, from 8% to 10% (Figure 3). This range in values may not represent the actual specific yield variability of the alluvial aquifer. The Technical Study reported specific yield values estimated from production well and aquifer tests in the WW Subbasin range from 2.2% to 21%. Anderson et al (1979)<sup>24</sup> estimated specific yield values in the WW Subbasin range from less than 10% to 17.6%, with a weighted average of 13.3-14.3%. Davis et al (1959)<sup>25</sup> reported specific yield values for the WW Subbasin area between 16% and 18%.

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<sup>22</sup> Freeze, Alan R. and John A. Cherry, *Groundwater*, Prentice Hall, NJ, 1979.

<sup>23</sup> Faunt et al., *Groundwater availability of the Central Valley Aquifer, California*, USGS Professional Paper 1766, 225 pp., 2009.

<sup>24</sup> Anderson, S.C., Sanchez, D.K., and A.A. Swanson, *Preliminary Evaluation of State Water Project Ground Water Storage Program, White Wolf Basin*, State of California Department of Water Resources, Southern District, September 1979.

<sup>25</sup> Davis, G.H., J.H. Green, F.H. Olmstead, and D.W. Brown, *Groundwater conditions and storage capacity in the San Joaquin Valley, California*, USGS Water-Supply Paper 1469, 271 pp., 1959.

Johnson (1967)<sup>26</sup> summarized specific yield values for various aquifer materials. He found that average specific yield for silt and sandy clay was 7% to 8% and average specific fine to coarse sand ranged from 21% to 27%.

The **specific storage** values average approximately 0.0014 throughout the extent of C2VSimFG Beta. Within the WW Subbasin, 106 of 115 nodes have a specific storage value greater than 0.0010 for layer 2. When multiplied by layer thickness to calculate storativity, values greater than 1 are calculated, which is unrealistic. In separate correspondence we have brought this issue to DWR's attention and understand that they are looking into the apparent error.

**The GSA requests that the calibrated model better reflect reasonable values and the known variability in hydraulic properties of the WW Subbasin.**

***Surface Water Diversion / Groundwater Pumping Estimates:*** It is unknown what the sources of information are that are being used in C2VSimFG Beta to estimate the spatial distribution and volume of surface water deliveries and groundwater pumping. The Districts operate complex water management and delivery systems that impact the timing and quantity of deliveries and pumping within the WW Subbasin. It is unclear if this level of detail is accurately incorporated into the model. **The White Wolf GSA is willing to provide available District pumping and surface water delivery data to aid model updates and calibration.**

### **Conclusion**

The issues with the C2VSimFG Beta identified above may affect the ability of the model to provide accurate information for development of a GSP for the WW Subbasin and several GSPs for the adjacent Kern County Subbasin. In particular, the discrepancies noted regarding the White Wolf Fault location and hydraulic properties in the C2VSimFG Beta may prevent the model from providing accurate information on groundwater flow between the WW Subbasin and the adjacent Kern County Subbasin.

The GSA would like to thank DWR for making the C2VSimFG Beta available for review and comment. We hope that DWR will take into consideration the additional local sources of data on aquifer parameters, surface water delivery, and District pumping. We understand and appreciate DWR's efforts to provide a model that can be used in meeting the requirements of SGMA and preparation of GSPs.

Sincerely,



Catalino "Tito" Martinez

President, White Wolf GSA Board of Directors

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<sup>26</sup> Johnson, A.I., *Specific Yield – Compilation of specific yields for various materials*, USGS Water-Supply Paper 1662-D, 74 pp., 1967.

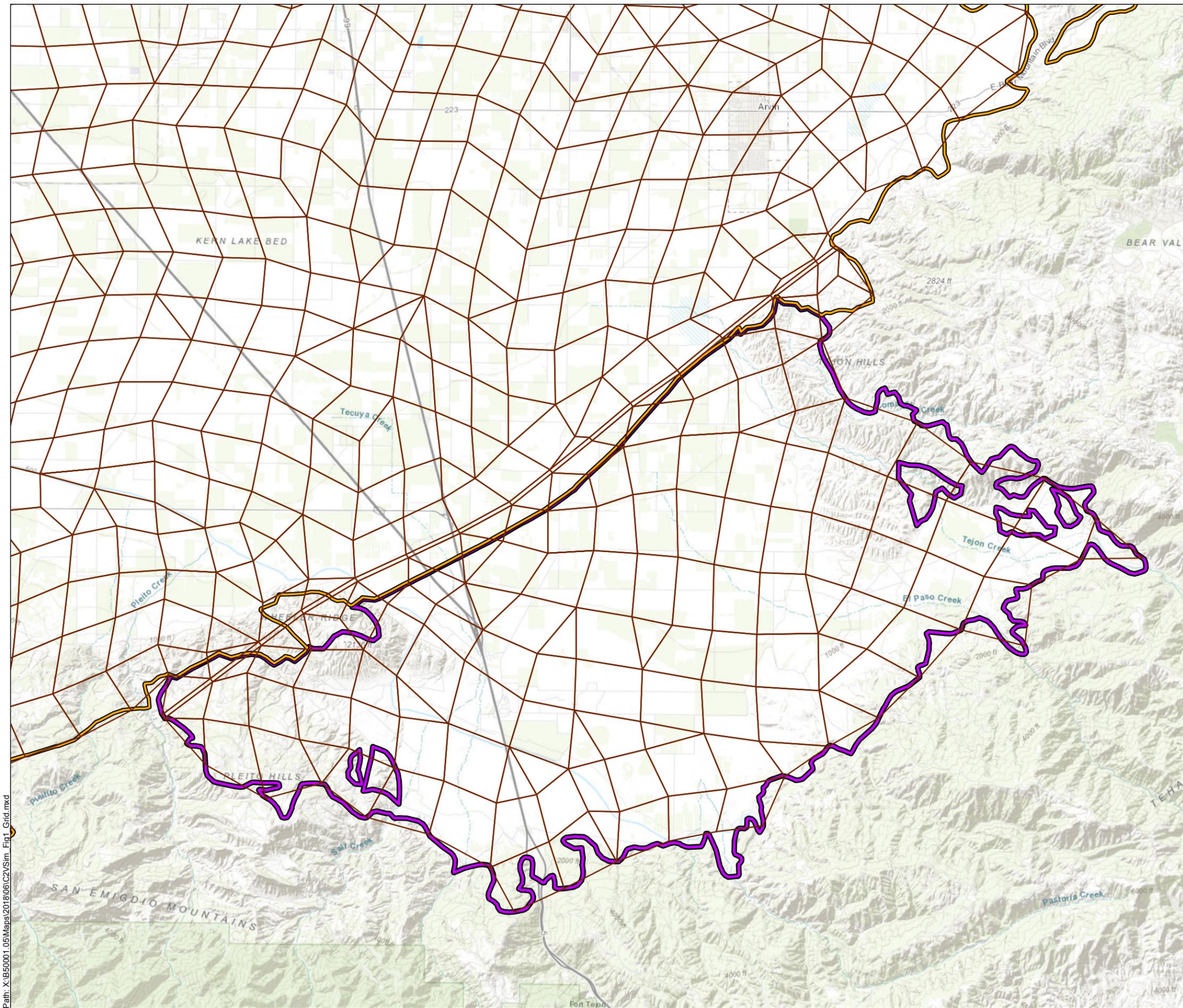
## **Attachments**

- Figure 1 C2VSim Fine Grid Beta Elements
- Figure 2 C2VSim Fine Grid Beta Elements and Layer 1 Hydraulic Conductivity
- Figure 3 C2VSim Fine Grid Beta Elements and Layer 1 Specific Yield

## **Appendices**

- Appendix A White Wolf Geologic Cross Section

## Attachments

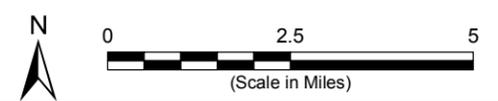


- Legend**
- White Wolf Subbasin
  - Kern County Subbasin
  - C2VSim Element

- Abbreviations**
- CNRA = California Natural Resources Agency
  - C2VSim = California Central Valley Groundwater-Surface Water Simulation Model
  - DWR = California Department of Water Resources

- Notes**
1. All locations are approximate.

- Sources**
1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 21 June 2018.
  2. DWR groundwater basins are based on the boundaries defined in California's Groundwater, Bulletin 118 - 2016 Update.
  3. C2VSim Fine Grid Beta Model obtained from the CNRA Open Data Platform on 30 April 2018:  
<https://data.cnra.ca.gov/dataset/c2vsimfg-beta-model>



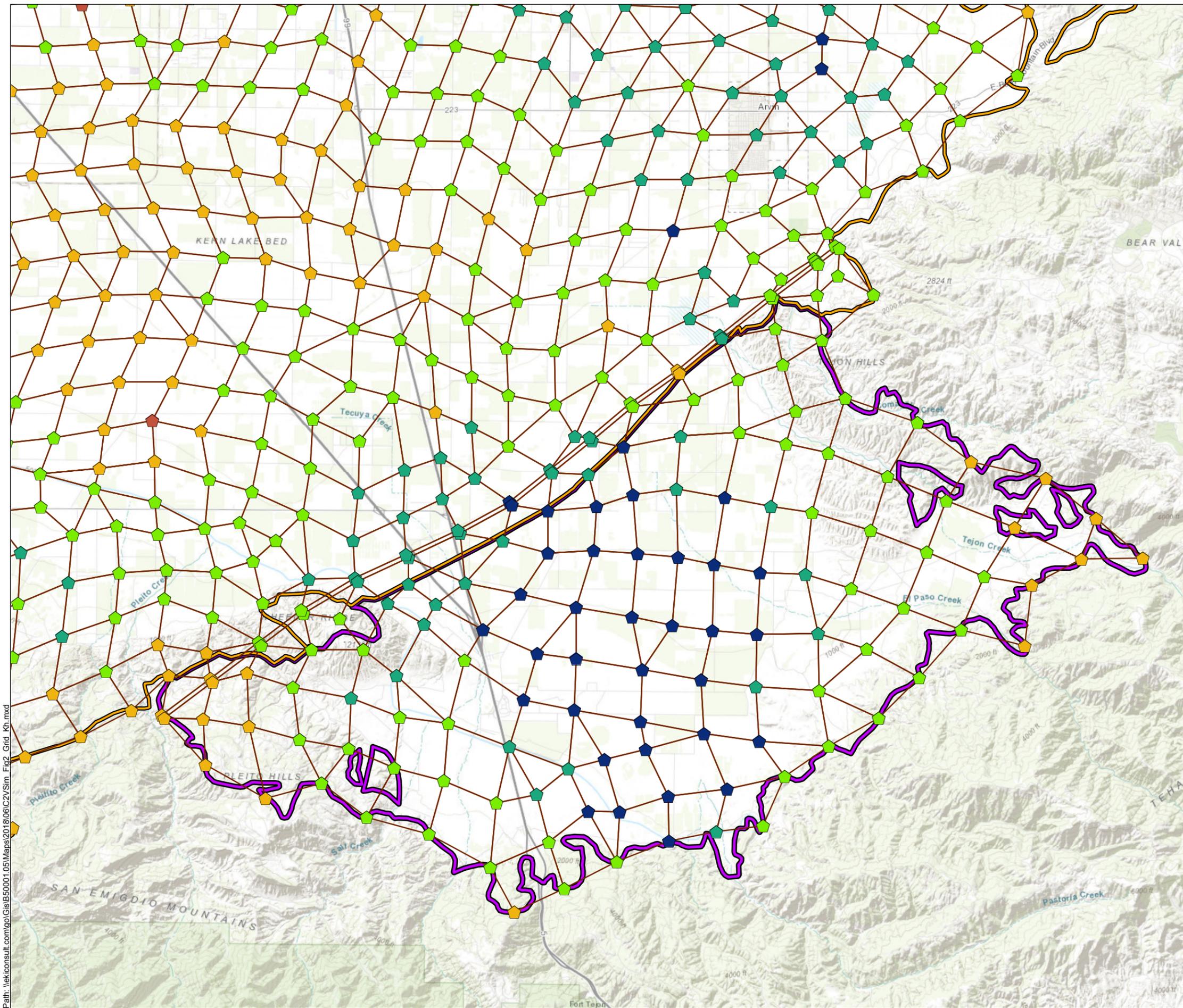
**C2VSim Fine Grid Beta Elements**

Tejon-Castac Water District  
 Kern County, CA  
 July 2018  
 B50001.05



**Figure 1**

Path: X:\B50001.05\Map01\06\C2VSim\_Fig1\_Grid.mxd



**Legend**

- White Wolf Subbasin
- Kern County Subbasin
- C2VSim Element

**Layer 1 Horizontal Hydraulic Conductivity (feet/day)**

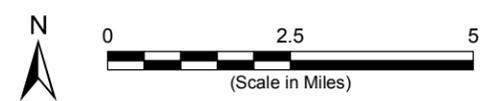
- ◆ <10
- ◆ 10 - 20
- ◆ 20 - 30
- ◆ 30 - 40
- ◆ >40

**Abbreviations**  
 CNRA = California Natural Resources Agency  
 C2VSim = California Central Valley Groundwater-Surface Water Simulation Model  
 DWR = California Department of Water Resources

**Notes**  
 1. All locations are approximate.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 21 June 2018.
2. DWR groundwater basins are based on the boundaries defined in California's Groundwater, Bulletin 118 - 2016 Update.
3. C2VSim Fine Grid Beta Model obtained from the CNRA Open Data Platform on 30 April 2018: <https://data.cnra.ca.gov/dataset/c2vsimfg-beta-model>



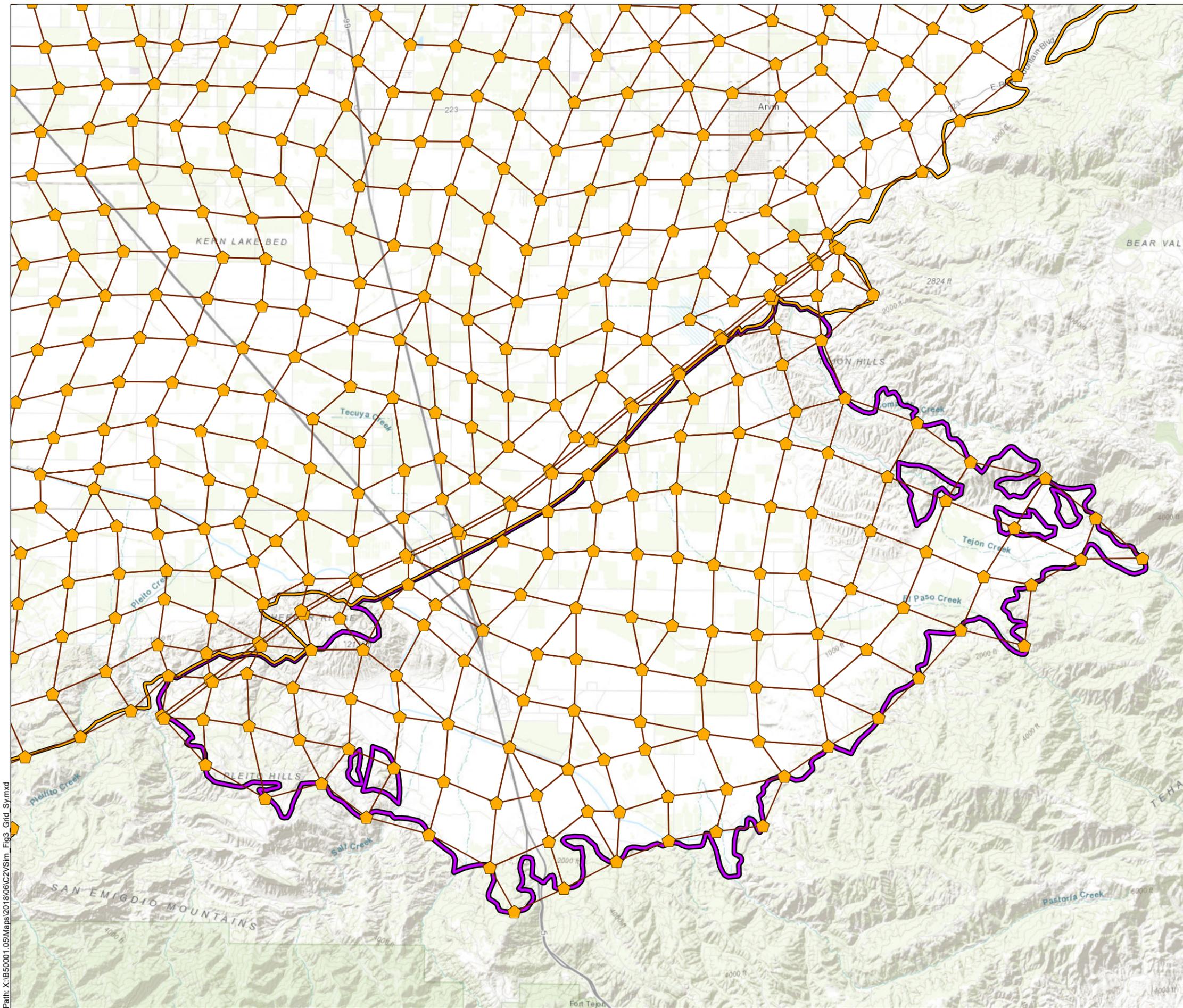
**C2VSim Fine Grid Beta Elements and Layer 1 Hydraulic Conductivity**  
 Tejon-Castac Water District

Kern County, CA  
 July 2018  
 B50001.05



**Figure 2**

Path: \\ekiconsult.com\go\GIS\B50001.05\Maps\2018\06\C2VSim\_Eig2\_Grid\_Kh.mxd



**Legend**

- White Wolf Subbasin
- Kern County Subbasin
- C2VSim Element

**Layer 1 Specific Yield**

- ◆ 0.01 - 0.10
- ◆ 0.11 - 0.20
- ◆ 0.21 - 0.30
- ◆ 0.31 - 0.50

**Abbreviations**

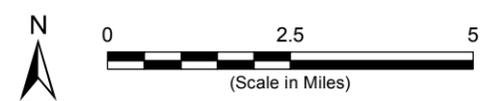
CNRA = California Natural Resources Agency  
 C2VSim = California Central Valley Groundwater-Surface Water Simulation Model  
 DWR = California Department of Water Resources

**Notes**

1. All locations are approximate.

**Sources**

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 21 June 2018.
2. DWR groundwater basins are based on the boundaries defined in California's Groundwater, Bulletin 118 - 2016 Update.
3. C2VSim Fine Grid Beta Model obtained from the CNRA Open Data Platform on 30 April 2018: <https://data.cnra.ca.gov/dataset/c2vsimfg-beta-model>

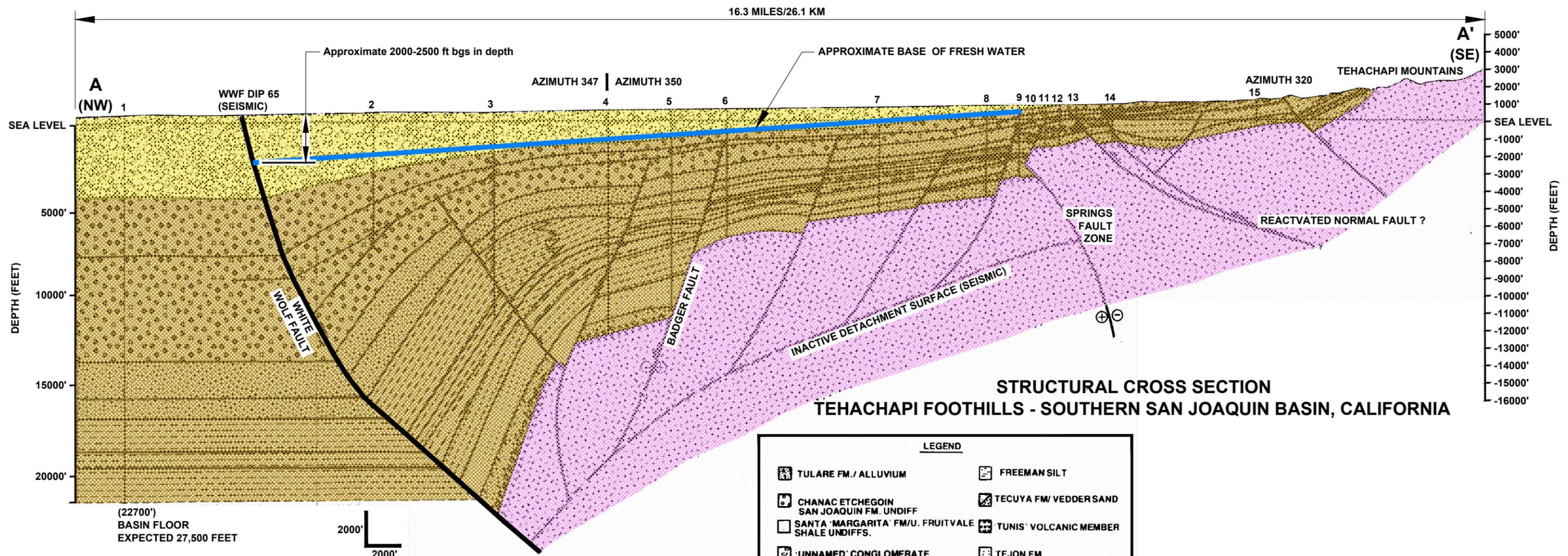


Path: X:\B50001.05\Maps\2018\06\C2VSim\_Fig3\_Grid\_Sym.mxd

**C2VSim Fine Grid Beta Elements and Layer 1 Specific Yield**  
 Tejon-Castac Water District  
 Kern County, CA  
 July 2018  
 B50001.05  
**Figure 3**

## Appendix A

White Wolf Geologic Cross Section



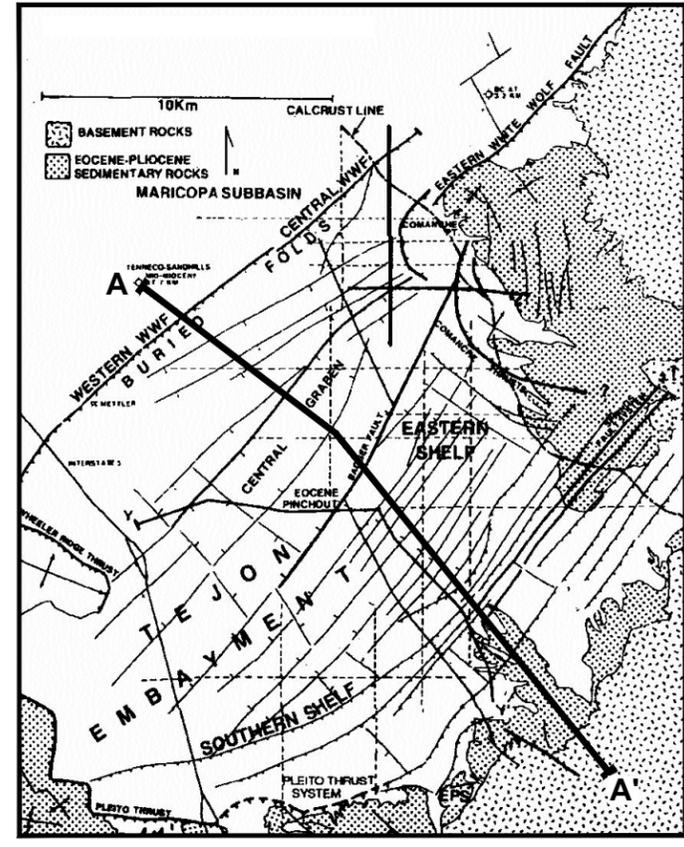
**LEGEND**

TULARE FM./ ALLUVIUM	FREEMAN SILT
CHANAC ETCHEGOIN SAN JOAQUIN FM. UNDIFF.	TECUYA FM/ VEDDER SAND
SANTA MARGARITA FM./U. FRUITVALE SHALE UNDIFFS.	TUNIS VOLCANIC MEMBER
UNNAMED CONGLOMERATE	TEJON FM.
LOWER FRUITVALE SHALE. MONTEREY FM.. ROUND MTN. SILT. OLCESE SAND	CRYSTALLINE BASEMENT

**Explanation**

	ALLUVIUM/TULARE FORMATION (PLIO-PLIOCENE TO RECENT)
	SANDSTONE, SILTSTONE, MINOR VOLCANICS (EOCENE TO EARLY PLIOCENE)
	CRYSTALLINE BASEMENT (PRE-TERTIARY)

**Source:**  
 Copyright (1992) Wiley. Used with permission from: Goodman, E.D., and Malin, P.E., Evolution of the Southern San Joaquin Basin and Mid-Tertiary "Transitional" Tectonics, Central California, in: Tectonics, vol.11, no. 3, pp 478-498, American Geophysical Union.



**FAULT STRUCTURE SOUTHERN SAN JOAQUIN BASIN**

**Erler & Kalinowski, Inc.**

Geologic Cross-Section Through the White Wolf Subbasin

Tejon Ranch Company  
 Tejon, CA  
 March 2016  
 EKI B50001.00  
 Figure 8

C:\Users\ricastal\appdata\local\temp\AsxPublish\_1404\Figure 8.dwg 3-16-16



Thu 9/6/2018 9:32 AM

Angelica Martin

**FW: White Wolf Subbasin Groundwater Sustainability Agency**

To 'robbytut@hotmail.com'

Cc Anona Dutton

 This message was sent with High importance.

---

 Message  StakeholderSurvey\_20180614\_form.pdf (308 KB)

Hi Robby,

This is a follow-up to our phone conversation earlier.

Please see prior email as well as attachment and let me know if you have any questions.

Thank you,

Angelica Martin

*Water Resources Director*



P.O. Box 1000 | 4436 Lebec Road

Tejon Ranch, CA 93243

(661) 663-4262 Direct

(661) 248-3400 Fax

(661) 381-3492 Mobile

[www.TejonRanch.com](http://www.TejonRanch.com)

[www.TejonOutlets.com](http://www.TejonOutlets.com)

[www.TejonCommerce.com](http://www.TejonCommerce.com)

**From:** Angelica Martin  
**Sent:** Wednesday, June 27, 2018 3:26 PM  
**To:** 'robbytut@hotmail.com' <[robbytut@hotmail.com](mailto:robbytut@hotmail.com)>  
**Subject:** White Wolf Subbasin Groundwater Sustainability Agency

Hi Robby,

My name is Angelica and I am the Secretary of the White Wolf Groundwater Sustainability Agency (GSA), which formed last year to comply with the Sustainable Groundwater Management Act (SGMA) in the White Wolf Groundwater Subbasin (Basin). We have begun to develop a Groundwater Sustainability Plan (GSP) for the Basin and aim to reflect the interests of groundwater users in the GSP. We have developed a website (<http://whitewolfgsa.org/>) to communicate with stakeholders about GSP development and SGMA compliance, and we post information about our quarterly meetings on this website.

In our review of publicly available data from the State Water Resources Control Board (SWRCB), we have identified the Tut Brothers Farm #96 as a Public Water System in the Basin, and have noted you as the system contact from the [SWRCB Water System Details page](#). We are hoping to learn more about your system and groundwater interests in order to best reflect them in the GSP. We have developed the attached stakeholder survey and would appreciate if you can take a few moments to complete it. It would be particularly helpful if you can share data on your well locations, depths, screen intervals, and reference point elevations, if known.

Additionally, we see that the SWRCB page notes that your system serves a population of 30 people with 13 service connections. Are these the most updated numbers? The most recent Consumer Confidence Report (2016) notes to contact you for information on the Source Assessment and hauled water. Can you please provide us with this information?

Please feel free to provide any additional information, and don't hesitate to let us know if you have any questions.

Thank you,

Angelica Martin

*Water Resources Director*

P.O. Box 1000 | 4436 Lebec Road

Tejon Ranch, CA 93243

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[www.TejonCommerce.com](http://www.TejonCommerce.com)



Fri 10/5/2018 3:16 PM

Angelica Martin

White Wolf Basin Well Data Request

To: Angelica Martin

Bcc: 'dbuck@anthonyvineyards.com'; 'Katie@cattanimfarming.com'; 'willy@wreyneveld.com'; 'lvejv@sbcglobal.net'; 'Alan Becker'; Carl Voss (Cvoss@grimmway.com); 'markwescott1@gmail.com'; 'dontindsey@gmail.com'; 'jerriden@pacbell.net'; 'Paramjit Dosanjh'

This message was sent with High importance.

Message

WWGSA Stakeholder Data Request Form.pdf (817 KB)

Dear White Wolf Basin Stakeholder,

My name is Angelica and I am the Secretary of the White Wolf Groundwater Sustainability Agency (GSA). You previously indicated in the White Wolf GSA Stakeholder Survey that you would be willing to share data with the White Wolf GSA to support Groundwater Sustainability Plan (GSP) development. We are transmitting the attached Data Request Forms in hopes you can provide us with data you have from your well(s). All fields are optional, but please complete as much information as you can. You can either email the form back to me at [amartin@tejonranch.com](mailto:amartin@tejonranch.com), or print the form and mail it to:

Angelica Martin  
4436 Lebec Road  
Lebec, CA 93243

Please transmit your data before October 31, 2018; data received after October 31, 2018 will not be used for GSP development. If you have questions, please feel free to contact me.

Thank you for your help!

Angelica Martin  
*Water Resources Director*



P.O. Box 1000 | 4436 Lebec Road  
Tejon Ranch, CA 93243  
(661) 663-4262 Direct  
(661) 248-3400 Fax  
(661) 381-3492 Mobile  
[www.TejonRanch.com](http://www.TejonRanch.com)  
[www.TejonOutlets.com](http://www.TejonOutlets.com)  
[www.TejonCommerce.com](http://www.TejonCommerce.com)



Thu 2/7/2019 3:15 PM

Angelica Martin

C2VSim Questions

To 'MMaley@todddgroundwater.com'; Phyllis Stanin

Cc Patricia Poire

Message

Copy of AE\_WR\_WWB\_monthly\_SWdeliveries\_2019-01-18.xlsx (64 KB)

Good afternoon,

After conducting a preliminary review of the C2VSim-based water budget provided last week, there are several questions and observations that we would like to share and would like to arrange a conference call to discuss further. Please let us know your availability for a call; however we have provided an initial list of items for discussion.

Our questions stem from the water budget results that appear to overestimate certain components (pumping, recharge, and watershed inflows, primarily) relative to an internal water budget analysis, and may therefore lead to an overestimation of available water within each model element. Consequently, we would like to better understand the source of discrepancies between the two methodologies.

**QUESTIONS:**

- Has the model-simulated total actual ET been compared to the ITRC data, and if so what does it show (spatially, temporally)? Based on our review, the model appears to be over-estimating crop demands.
- Is the pumping demand from non-irrigated/native lands in the White Wolf Subbasin and other non-irrigated areas within the basin "turned off", similarly to what was done on the west side of the Kern County Subbasin? That would be important to get a more realistic estimate of actual groundwater pumpage. Current pumping estimates in the model seem very high relative to areas where we have metered data, or where other estimates have been made.
- Have the inflow rates and volumes from the surrounding watersheds been compared to any stream gauging records? How do they compare to the small watershed inflow rates calculated by the USGS as part of the CVHM? In our review in the White Wolf Subbasin, the C2VSim model is predicting significantly more contribution from surrounding water sheds than estimates by others (e.g., USGS).
- We understand a "correction factor" was applied to Kern River flow rates, was a similar correction factor applied to other surface water streams or small watersheds?
- Were any calculated flow components (e.g., ET, deep percolation, subsurface flow rates, small watershed inflows) validated against metered/measured data and/or other independent estimates? Generally, the model seems to have more water flowing in and out of the system than other estimates.
- Can a copy of all model input files (especially the IDC files) be provided for review by the Districts?
- Please provide the water budget results from the Unsaturated Zone domain.

**DATA CLARIFICATION:**

We have attached a spreadsheet that details total monthly surface water deliveries to the AEWSD-Kern (Zone 4), WRMWSD-Kern (Zone 22), and White Wolf Basin (Zone 1) agricultural areas from 1/1994 – 12/2015 as measured from AEWSD and WRMWSD turnout data, for use in refining the “Non-ponded Ag. Deliveries” component of the C2VSim-FG model. This is a more refined dataset than the input data requested by GEI in May 2018, which requested total surface water inflows and outflows through the Districts’ jurisdictional boundaries. This updated dataset represents actual surface water delivery data that is net of the Districts’ groundwater banking/recovery and pump-in operations and representative of deliveries to the AEWSD/WRMWSD overlap area as it is discretized in TODD’s C2VSim-FG model zones. The model’s estimation of “Non-ponded Ag. Deliveries” should be more closely aligned this dataset (currently the model is under-predicting SW deliveries by as much as 20,000 AFY in some areas – e.g., the White Wolf Subbasin).

I look forward to hearing from you.

Thank you,

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