EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Board of Directors Meeting

AGENDA

Wednesday, May 8, 2019
11:00 a.m. – 12:00 p.m.

San Joaquin County – Robert J. Cabral Agricultural Center
2101 E. Earhart Avenue – Assembly Room #1, Stockton, California

I. Call to Order/Pledge of Allegiance & Safety Announcement/Roll Call

II. SCHEDULED ITEMS – *Presentation materials to be posted on ESJGroundwater.org and emailed prior to the meeting. Copies of presentation materials will be available at the meeting.*

A. Discussion/Action Items:

1. Approval of Minutes of April 10, 2019 (See Attached)
2. Roadmap Update and Deliverables
3. Bundle 1 – Draft Chapter Overview
4. Management Actions
5. Sustainable Management Criteria for Six Sustainability Indicators
6. Monitoring Network
7. Groundwater Dependent Ecosystem Approach
8. Inter-basin Coordination
9. DWR Update
10. June Agenda Items

B. Informational Items (see attached):

1. February 11, 2019, DWR, "2018 Basin Boundary Modifications – FINAL Decisions"
2. April 10, 2019, Email from John Lambie, "Re: links to recent information on where to best store groundwater"
3. April 10, 2019, Email from John Lambie, "Re: ESJ Groundwater Authority Board and Advisory Committee Meeting AGENDAS for April 10, 2019"
4. April 10, 2019, Stanford News, "Stanford study offers a way to map where flooded fields best replenish groundwater"
5. April 29, 2019, San Francisco Chronicle, "Gov. Newsom issues executive order demanding drought-climate plan"

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY
Board of Directors Meeting
AGENDA
(Continued)

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6. April 30, 2019, DWR, "Statewide Map of SGMA 2019 Basin Prioritization Results"
7. April 2019, SWRCB, "Sustainable Groundwater Management Act: Funding Opportunities"

(Continued on next page)

III. Public Comment (non-agendized items)

IV. Directors' Comments

V. Future Agenda Items

VI. Adjournment

Next Regular Meeting
June 12, 2019 at 11:00 a.m.
San Joaquin County - Robert J. Cabral Agricultural Center
2101 E. Earhart Ave., Assembly Rm. #1, Stockton, California

Action may be taken on any item

Agendas and Minutes may also be found at http://www.ESJGroundwater.org
Note: If you need disability-related modification or accommodation in order to participate in this meeting, please contact San Joaquin County Public Works Water Resources Staff at (209) 468-3089 at least 48 hours prior to the start of the meeting.

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY
Board Meeting Minutes
April 10, 2019

I. Call to Order/Pledge of Allegiance & Safety Announcement/Roll Call

The Eastern San Joaquin Groundwater Authority (GWA) Board meeting was called to order by Chair Chuck Winn at 11 A.M., on April 10, 2019, at the Robert J. Cabral Agricultural Center, 2101 E. Earhart Ave. Stockton, CA. Following the Pledge of Allegiance, Brandon Nakagawa provided the required safety briefing.

In attendance were Chair Chuck Winn, Vice-Chair Mel Panizza, Directors George Biagi, Jr., Alan Nakanishi, David Breitenbucher, David Fletcher, Mike Henry, Tom Flinn, Eric Thorburn, John Herrick, Dale Kuil, Alternate Directors Dan Wright and Walter Ward, and Secretary Kris Balaji. Others in attendance are listed on the sign-in sheet.

II. SCHEDULED ITEMS

A. Discussion/Action Items:

1. Approval of Minutes of March 13, 2019

Motion: (Inaudible)
The March 13 meeting minutes were approved unanimously.

2. Roadmap Update and Deliverables

Ms. Alyson Watson presented the roadmap and revised deliverable review schedule.

3. Water Budget Planning Estimates

Ms. Watson presented on the definition of sustainable yield.

Director Mike Henry noted the word "additional" in the slide under urban conservation should be stricken. Director Dale Kuil indicated he would like to see the 78,000 AFY rather than 80,000 AFY. Director John Herrick asked for clarification on how the 80,000 AFY estimate relates to the 33,700 AFY overdraft estimate. Ms. Watson clarified that the difference is due to changes in groundwater levels and how recharge in the basin interplays with that. Director Herrick asked how to determine the estimates are correct. Ms. Alyson Watson noted the uncertainty is 20 percent.

Ms. Watson indicated the Advisory Committee has recommended the Board approve the 80,000 AFY estimate. Director Tom Flinn stated his concern on setting the target too high. He noted that part of his Board's concern is to reduce potential impact on our community and stated concern over financing projects. Director Herrick indicated that a previous looked at overdraft at 75,000-100,000 AFY and New Melones deliveries have changed that. He noted there were studies with USGS that indicated challenges in modeling groundwater.

Ms. Watson clarified that the estimates are based on projected future demand at 2040 levels, and that is part of the uncertainty and that the number can be refined with more work on the model. Director Alan Nakanishi asked if GSAs will be able to change projects. Director Flinn stated support for a lower target. Mr. Brandon Nakagawa gave context around model development. He noted that the model is the best tool available for use and that the Advisory Committee has made a recommendation. Director Herrick asked if the big players had technical people reviewing the model assumptions. Mr. Nakagawa indicated yes, the we went back to groups multiple times. Chair Chuck Winn asked if the group is comfortable using a cushion estimate. Ms. Watson clarified that low, average, and high estimates are presented, and that the

recommendation is to use to low estimate. Director Flinn made a suggestion of setting a two-level objective around 30,000 AFY and having a high lever if needed. Chair Winn indicated the need to protect the groundwater.

Ms. Watson noted the number will be refined over time and that SGMA requires that we demonstrate how the basin will operate within its sustainable yield. Mr. Paul Wells stated that SGMA is based on real-world monitoring, and that is what the 5-year updates are for. He further indicated that the monitoring and measuring is key to SGMA compliance and showing that the basin is achieving sustainability. Director Herrick questioned if the modeling tells us what level groundwater needs to be at to be sustainable and if there needs to be long-term treatment of monitoring data.

Director Eric Thoburn stated Oakdale Irrigation District's support for the 78,000 AFY or 80,000 AFY estimates.

Motion
Director Thorburn moved, and Director Henry seconded the approval of the motion with the target value revised to 78,000 AFY. The motion passed with Director Flinn voting no.

4. Sustainability Indicators

Ms. Watson presented the Advisory Committee's recommendation on addressing the six sustainability.

Motion
Director Henry moved, and Director Wright seconded the approval of the motion. The motion was approved unanimously.

5. Monitoring, Measuring, and Model Refinements
Ms. Watson walked through the monitoring, measuring, and model refinements.

Director Britenbucher asked about other options. Ms. Watson indicated that the other options would have monitoring options to be completed at the GSA scale or to have GSAs volunteer to cover these. Director Flinn asked about the financial impact. Ms. Watson noted we are looking for policy direction subject to scope and budget of financial plan to be developed at a later date. Director Flinn clarified that he is not making a financial commitment at this time.

Motion
Director Thorburn moved, and Director Fletcher seconded the approval of the motion. The motion was approved unanimously.

6. Project Implementation
Ms. Alyson Watson noted we are looking for policy direction from the Board. Project implementation at the GSA level as opposed to the JPA level

Motion
Director Fletcher moved, and Director Kuil seconded the approval of the motion. The motion was passed unanimously.

7. Outreach & Groundwater Sustainability Workgroup Updates

Ms. Watson provided an update on the Groundwater Sustainability Workgroup and indicated that notes from the meetings are available on the website.

8. DWR Update

Mr. Paul Wells stated that the two service requests submitted in the Technical Support Services (TSS) application have been approved to go to the next level. He noted DWR is working on the formal agreement for those. Regarding the grant amendment, the request is being reviewed. Mr. Wells noted there is a Best Management Practices (BMP) document is out on Sustainable Management Criteria. Lastly, Mr. Wells indicated that recordings of the DWR GSA Forum event hosted on March 21 are online, and copies of PowerPoint presentations are available online as well.

9. May Agenda Items

Ms. Watson asked Board members to hold the May 8 date for the May Board meeting as planned, and that a poll would be sent out to look for an alternate date.

B. Informational Items:

1. March 7, 2016, Handout from SWRCB, "Triggering State Intervention"
2. February 1, 2019, westerncity.com, "California's Public Trust Doctrine Draws Attention in the Courts"
3. March 11, 2019, Email from Ara Marderosian, Responses to 13 March 2019 slides
4. March 12, 2019, City of Lathrop Office of the City Manager, "City of Lathrop – Voluntary Withdrawal from the Eastern San Joaquin Groundwater Authority"
5. March 25, 2019, Email from Ara Marderosian, "ESJ Groundwater Sustainability Workgroup – REPORT 89% of CV water flowing into San Francisco Bay was for salinity control to protect human uses of this water"
6. March 27, 2019, mavensnotebook.com, "CA Water Law Symposium: Groundwater adjudication under SGMA"
7. April 1, 2019, CALmatters, "Gathering storm: What California must learn from the Midwest floods"

III. Public Comment (non-agendized items):

None

IV. Directors' Comments:

Chair Winn indicated there was a meeting with the Delta Counties in Sacramento with legislatures and Governor's staff. Water was discussed. He noted he will be meeting with Wade Crowfoot, Secretary of the California Resources Agency, later in the day on the Delta and water issues and indicated headway is being made around state on discussions of water. Chair Winn thanked group for engagement.

Director Doug Heberle announced he is leaving Woodbridge Irrigation District after five years and Friday will be his last day. He thanked everybody and wish the group good luck.

V. Future Agenda Items:

The agenda items for the May meeting will include the policy items discussed by the Advisory Committee meeting in April.

VI. Adjournment:

Motion
The meeting was adjourned at 12:07 p. m.

Next Regular Meeting: May 8, 2019 at 11:00 a.m.
San Joaquin County - Robert J. Cabral Agricultural Center, 2101 E. Earhart Ave., Assembly Rm. #1, Stockton, CA

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Joint Exercise of Powers Board of Directors Meeting

MEMBER SIGN-IN SHEET

Location: SJ COUNTY ROBERT J. CABRAL AG CENTER Date: 04/10/19 Time: 11:00 AM

INITIAL	Member's Name	GSA	Phone	Email
	John Freeman	Cal Water Member	209-547-7900	jfreeman@calwater.com
	Steve Cavallini	Cal Water Alternate	209-464-8311	scavallini@calwater.com
	George Biagi, Jr.	Central Delta Water Agency Member	209-481-5201	gbiagi@deltabluegrass.com
	Dante Nomellini	Central Delta Water Agency Alternate	209-465-5883	ngmplcs@pacbell.net
	Grant Thompson	Central San Joaquin Water Conservation District Member	209-639-1580	gtom@velociter.net
	Reid Roberts	Central San Joaquin Water Conservation District Alternate	209-941-8714	reidwroberts@gmail.com
	Stephen Salavatore	City of Lathrop Member	209-941-7430	ssalvatore@ci.lathrop.ca.us
		City of Lathrop Alternate		
	Alan Nakanishi	City of Lodi Member	209-333-6702	anakanishi@lodi.gov
	Charlie Swimley	City of Lodi Alternate	209-333-6706	cswimley@lodi.gov
	David Breitenbucher	City of Manteca Member	209-456-8017	dbreitenbucher@ci.manteca.ca.us
	Mark Houghton	City of Manteca Alternate	209-456-8416	mhoughton@ci.manteca.ca.us
	Jesús Andrade	City of Stockton Member	209-937-8244	Jesus.Andrade@stocktonca.gov
	Dan Wright	City of Stockton Alternate	209-937-5614	Dan.Wright@stocktonca.gov

INITIAL	Member's Name	GSA	Phone	Email
	Russ Thomas	Eastside San Joaquin GSA Member	209-480-8968	rthomasccwd@hotmail.com
WAW	Walter Ward	Eastside San Joaquin GSA Alternate	209-525-6710	wward@envres.org
	David Fletcher	Linden County Water District Member	209-887-3202	dqfpe@comcast.net
	Paul Brennan	Linden County Water District Alternate	209-403-1537	ptbrennan@verizon.net
	Mike Henry	Lockeford Community Services District Member	209-712-4014	midot@att.net
	Joseph Salzman	Lockeford Community Services District Alternate	209-727-5035	lcsd@softcom.net
ES	Eric Schmid	Lockeford Community Services District Alternate	209-727-5035	lcsd@softcom.net
	Tom Flinn	North San Joaquin Water Conservation District Member	209-663-8760	tomflinn2@me.com
	Joe Valente	North San Joaquin Water Conservation District Alternate	209-334-4786	jcvalente@softcom.net
	Eric Thorburn, P.E.	Oakdale Irrigation District Member	209-840-5525	ethorburn@oakdaleirrigation.com
		Oakdale Irrigation District Alternate		
	Chuck Winn	San Joaquin County Member	209-953-1160	cwinn@sjgov.org
	Kathy Miller	San Joaquin County Alternate	209-953-1161	kmiller@sjgov.org
	John Herrick, Esq.	South Delta Water Agency Member	209-224-5854	jherrlaw@aol.com
	Jerry Robinson	South Delta Water Agency Alternate	209-471-4025	N/A
	Dale Kuil	South San Joaquin GSA Member	209-670-5829	dkuil@ssjid.com
	Robert Holmes	South San Joaquin GSA Alternate	209-484-7678	rholmes@ssjid.com
	Melvin Panizza	Stockton East Water District Member	209-948-0333	melpanizza@aol.com
	Andrew Watkins	Stockton East Water District Alternate	209-948-0333	watkins.andrew@verizon.net
	Anders Christensen	Woodbridge Irrigation District Member	209-625-8438	widirrigation@gmail.com
	Doug Heberle	Woodbridge Irrigation District Alternate	209-625-8438	heberlewid@gmail.com

Eastern San Joaquin Groundwater Authority Staff & Support

INITIAL	Member's Name	Organization	Phone	Email
	Kris Balaji	San Joaquin County	468-3100	kbalani@sjgov.org
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	Mike Callahan	San Joaquin County	468-9360	mcallahan@sjgov.org
	Alicia Connelly	San Joaquin County	468-3531	aconnelly@sjgov.org
	Kelly Villalpando	San Joaquin County	468-3073	krvillalpando@sjgov.org
	Nancy Tomlinson	San Joaquin County	468-3089	ntomlinson@sjgov.org
	Andy Nguyen	San Joaquin County	953-7948	aynguyen@sjgov.org
	Anthony Diaz	San Joaquin County	468-3060	anthonydiaz@sjgov.org
	Rod Attebery	Neumiller & Beardslee / Legal Counsel	948-8200	rattebery@neumiller.com
	Monica Streeter	Neumiller & Beardslee / Legal Counsel	948-8200	mstreeter@neumiller.com

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Joint Exercise of Powers
Board of Directors Meeting

OTHER INTERSTED PARTIES - SIGN-IN SHEET

Location: SJ COUNTY ROBERT J. CABRAL AG CENTER Date: 4/10/19 Time: 11:00 AM

INITIAL	Member's Name	Organization	Phone	Email
SAS	Stacie Ann Silva	New Current Water + Land	559/978 5135	ssilva@newcurrentwater.com
JAP	Jonathan Pruitt	Catholic Charities	209-396-6934	jpruitt@ccstockton.org
[illegible]	Paul Wells	DWR	916-376-9656	paul.wells@water.ca.gov
DM	Dennis Mills	Calaveras County		
EP	Eric Peirce	Kleinfelder	209 896 6236	EPeirce@Kleinfelder.com
	Scot Moody	SCWA		
	Valerie Kincaid	OID / SSJID		
	Cathy Lee	SEWD		
GS	Grace Su	EBMUD		
JWT	Jane Wagner Tyack	Consultant/LWVSJC		
FB	Fritz Buchman	SJ County		
[illegible]	Gwen Schultz	CD WUA		
RS	Rob Schumann	Kleinfelder		
MS	Monica Streeter	Neumiller & Beardslee		

JWT Jane Wagner-Tyack Consultant/ League of Women Voters

Staff Report for May 8, 2019: ESJ GWA Board Meeting
Agenda Items #4: Management Actions and #5: Sustainable Management Criteria

Submitted by: Woodard & Curran

Meeting Agenda

1. **Approval of April Meeting Minutes** (No accompanying staff report)
2. **Roadmap Update and Deliverables** (No accompanying staff report)
3. **Bundle 1 – Draft Chapter Overview** (No accompanying staff report)
4. **Management Actions**
5. **Sustainable Management Criteria**
6. **Monitoring Network** (No accompanying staff report)
7. **Groundwater Dependent Ecosystems** (No accompanying staff report)
8. **Inter-basin Coordination** (No accompanying staff report)
9. **DWR Update** (No accompanying staff report)
10. **May Agenda Items** (No accompanying staff report)

AGENDA ITEM #4: Management Actions

ISSUE SUMMARY
SGMA requires GSAs to implement projects and management actions to reach sustainability.

QUESTION FOR CONSIDERATION: What kinds of projects and management actions should be included in the GSP implementation plan?

RECOMMENDATION
The Advisory Committee recommendation is that a mixture of supply-side projects and demand-side management actions be used in the implementation plan to achieve sustainability consistent with the identified community values.

ADVISORY COMMITTEE RECOMMENDATION
Advisory Committee made recommendation on April 10, 2019

BOARD RECOMMENDATION
Board to consider on May 8, 2019

Agenda Item #5: Sustainable Management Criteria
Identification of undesirable results, minimum thresholds, measurable objectives, and interim milestones; and definition of undesirable result for each of the six sustainability indicators

Minimum Thresholds and Measurable Objectives (Overview, and specifics for Declining Groundwater Levels)

ISSUE SUMMARY

1.1 INTRODUCTION

Several requirements of GSPs fall under the heading of "Sustainable Management Criteria." These criteria include:

- Sustainability Goal
- Undesirable Results
- Minimum Thresholds
- Measurable Objectives

The development of these criteria for the Eastern San Joaquin GSP relied upon information about the basin developed in the hydrogeologic conceptual model, the descriptions of current and historical groundwater conditions, the water budget, and input from stakeholders during the GSP development process.

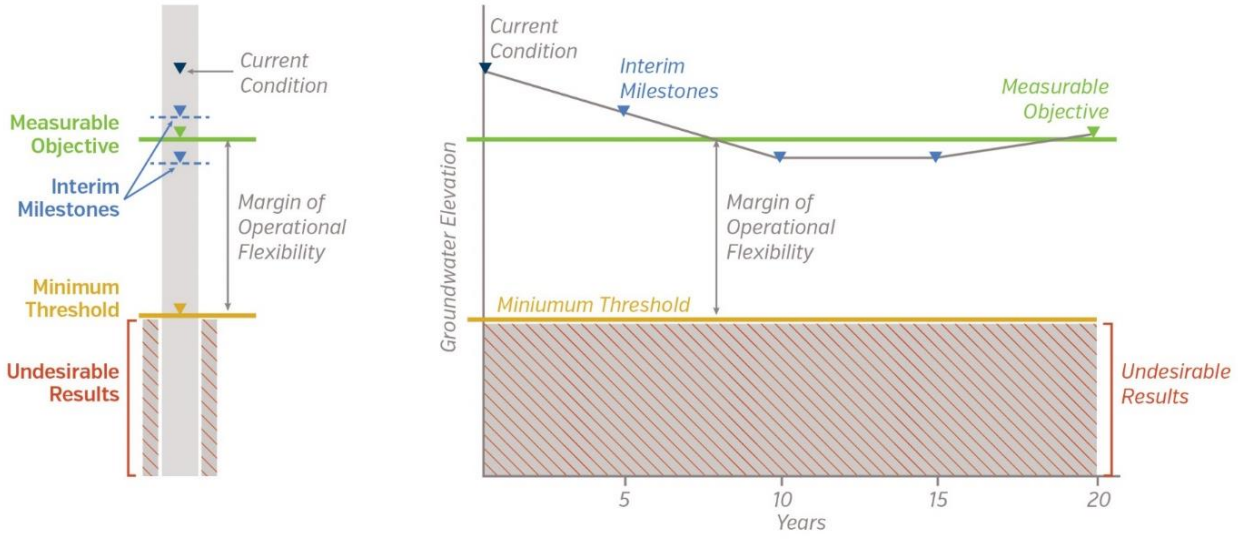
This GSP considers the six sustainability indicators defined by SGMA in the development of sustainable management criteria. SGMA allows several pathways to meet the distinct local needs of each basin, including development of sustainable management criteria, usage of other sustainability indicators as a proxy, and identification as not being applicable to the basin. Because of limited data availability for other parameters, groundwater levels are proposed to be utilized as a proxy for minimum thresholds and measurable objectives for groundwater storage and land subsidence.

Sustainable Management Criteria Definitions

- **Undesirable Results** – Significant and unreasonable negative impacts associated with each sustainability indicator, avoidance of which is used to guide development of GSP components
- **Minimum Threshold** – Quantitative threshold for each sustainability indicator used to define the point at which undesirable results may begin to occur
- **Measurable Objective** – Quantitative target that establishes a point above the minimum threshold that allows for a range of active management in order to prevent undesirable results
- **Interim Milestones** – Targets set in increments of five years over the implementation period of the GSP to put the basin on a path to sustainability
- **Margin of Operational Flexibility**: The range of active management between the measurable objective and the minimum threshold

See Figure 1 for a graphic that demonstrates the relationship between the Sustainable Management Criteria terms.

Figure 1: Sustainable Management Criteria Definitions Graphic (Groundwater Levels Example)



1.2 SUSTAINABILITY GOAL

SGMA defines sustainable groundwater management as the management and use of groundwater in a manner that can be maintained during the planning and implementation of the GSP without causing undesirable results. The sustainability goal succinctly states the GSAs' objectives and desired conditions of the Subbasin. The Subbasin is heavily reliant on groundwater and users recognize the basin has been in overdraft for a long period. undesirable results that have been experienced in the Subbasin are discussed in greater detail below. These include lowering of water levels in some areas of the Subbasin and increased salinity along the western boundary.

The preliminary proposed Sustainability goal description for the ESJ Subbasin is:

> *to maintain an economically-viable groundwater resource for the beneficial use of the people of the Eastern San Joaquin Subbasin by operating the basin within its sustainable yield or by modification of existing management to address future conditions. This goal will be achieved through the implementation of a mix of supply and demand type projects consistent with the GSP implementation plan*

The GSP's sustainability goal will allow groundwater levels to continue to decline during the implementation period as projects are implemented and basin operations are changed, provided there are no undesirable results. The goal will be expanded to include additional information on how the goal will be achieved, consistent with SGMA regulations, once the implementation plan has been developed. This includes description of measures and explanation of how the goal will be achieved in 20 years.

This sustainability goal is supported by the locally-defined minimum thresholds that sufficiently prevent undesirable results, presented later in this section. Demonstration of stable groundwater levels on a long-term average basis combined with the absence of undesirable results will support a determination that the basin is operating within its sustainable yield and the conclusion that the sustainability goal has been achieved.

1.3 OVERVIEW OF UNDESIRABLE RESULTS

The GSP Emergency Regulations (California Code of Regulations, Title 23, § 354.26) present the requirements for describing undesirable results as follows:

"(a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin."

"(b) The description of undesirable results shall include the following:"

"(1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate."

"(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin."

"(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results."

"(c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site."

"(d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators."

To determine areas of current or historical undesirable results, GSA representatives were provided with maps displaying active and inactive wells located within the boundaries of their GSA for the years 1992, 2015, and 2017. These timeframes were selected to capture the effects of the end of two most recent droughts (1992 and 2015), as well as current basin conditions. GSA representatives were asked to indicate on the maps which wells, if any, are experiencing or have in the past experienced issues related to chronic lowering of groundwater levels.

Follow-up conversations were carried out with the GSAs to confirm these designations and definitions accordingly. GSAs were met with individually and in groups to confirm and identify any undesirable results occurring in their area of the Subbasin.

1.4 OVERVIEW OF MINIMUM THRESHOLDS

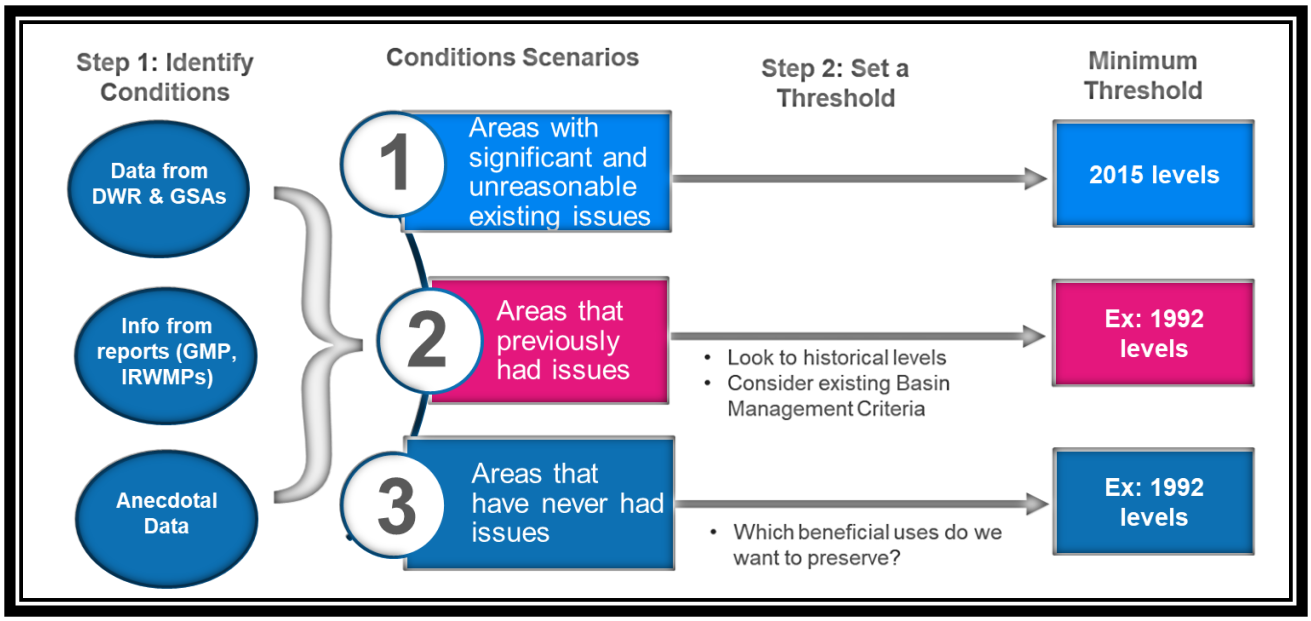
Understanding of potential undesirable results and basin conditions was built on language in established in prior planning work in the region—including Integrated Regional Water Management Plans, the 2004 Groundwater Management Plan, Agricultural Water Management Plans, and the MokeWISE Water Program—model development, and anecdotal data from GSAs.

Discussions were held at the GWA level to develop an understanding of potential for undesirable results based on past, present, and future conditions. Data from DWR and GSAs, information from reports and planning documents, and anecdotal on-the-ground data were used to identify how a given area falls into any one of three conditions: 1) Areas with significant and unreasonable existing issues, 2) Areas that previously had issues, and 3) Areas that have never had issues. Each of the three conditions scenarios correspond to a different pathway to setting minimum thresholds (Figure 2).

- Areas with significant and unreasonable existing issues: these areas are considered to have undesirable results, and minimum thresholds are set to 2015 in accordance with SGMA legislation. No areas were identified under this condition scenario.

- Areas that previously had issues: for areas with historical but not current significant and unreasonable issues, historical levels were considered in the development of minimum thresholds in addition to existing basin management criteria.
- Areas that have never had issues: in areas that have never had issues, discussions on values drove identification of potential thresholds, and minimum thresholds were established based on the preservation of future beneficial uses.

Figure 2: Approach to Setting Minimum Thresholds



1.5 GROUNDWATER LEVELS

1.5.1 Undesirable Results

Description of Undesirable Results

The undesirable result related to groundwater levels is defined in SGMA as:

> *Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.*

An undesirable result for chronic lowering of groundwater levels in the Eastern San Joaquin Subbasin is experienced if sustained groundwater levels are too low to satisfy beneficial uses within the basin over the planning and implementation horizon of this GSP. During development of the GSP, undesirable results identified by stakeholders included:

- Wells going dry
- Reduced production

- Higher pumping costs due to greater lift
- Deeper installation (more expensive drilling)

Identification of Undesirable Results

An undesirable result is considered to occur during GSP implementation when least 25% of representative monitoring wells used to monitor groundwater levels fall below their minimum level thresholds for 2 consecutive years that are categorized as non-dry years (below-normal, above-normal, or wet), according to the San Joaquin Valley Water Year Hydrologic Classification. The lowering of groundwater levels during consecutive dry or critically-dry years is not considered to be unreasonable, and would therefore not be considered an undesirable result, unless the levels do not rebound to above the thresholds following those consecutive non-dry years.

Potential Causes of Undesirable Results

The Eastern San Joaquin Subbasin is currently in a state of critical overdraft. Potential causes of future undesirable results for the chronic lowering of groundwater levels indicator could result from insufficient pumping reductions/offsets in the basin that result in localized or basin-wide groundwater level lowering, or delays in implementation of GSP programs or projects due to regulatory, permitting, or funding obstacles.

Potential Effects of Undesirable Results

If groundwater levels were to reach levels causing undesirable results, effects could include: de-watering of a subset of the existing groundwater infrastructure, starting with the shallowest wells, which are generally domestic wells; and adverse effects on groundwater dependent ecosystems, to the extent connected with the production aquifer. Lowering levels to this degree could necessitate changes in irrigation practices and crops grown and could cause adverse effects to property values and the regional economy. Additionally, undesirable results for groundwater levels could adversely affect current and projected municipal uses, which rely on groundwater in the Subbasin, increasing costs for potable water supplies.

1.5.2 Minimum Thresholds

Language on thresholds in prior planning documents were used as a starting point for setting minimum thresholds under SGMA. The 2014 IRWM provides language around thresholds for the chronic lowering of groundwater levels sustainability indicator that loosely indicate Fall 1992 groundwater elevation levels as historical lows, stating “The Eastern San Joaquin Groundwater Basin contour measured in 1992 is proposed as the basin management framework baseline. Groundwater fell to its lowest recorded elevation in 1992 following a significant drought period and it is considered undesirable to drop below this level.” (2014, ESJ IRWMP) This language, although not developed within the SGMA framework, describes what would be considered minimum thresholds under SGMA, establishing Fall 1992 groundwater elevations as the lowest conditions can go without causing an undesirable result.

Fall 1992 groundwater levels were examined and compared to levels following the recent drought (Fall 2015-16) levels using groundwater elevation data from officially monitored CASGEM wells, voluntarily monitored CASGEM wells, clustered and nested wells, and San Joaquin County database wells. Through this, it was determined that while groundwater elevation levels in some areas of the Subbasin have recovered since 1992, with much of the central portion of the Subbasin showing an increase of greater than 10 feet, groundwater elevation levels in other portions of the Subbasin have further decreased below 1992 levels without undesirable results occurring in these areas. In many cases, areas that experienced undesirable results in 1992 put mitigation measures in place, often deepening wells, meaning that 1992 groundwater levels would no longer trigger undesirable results.

To set preliminary thresholds, a contour was developed for the Subbasin that mapped the lowest low, or the greatest depth to water between fourth quarter 1992, 2015, and 2016. These years were chosen based on the threshold language in the IRWMP and also to capture the end of the two most recent droughts. Fourth quarter 2014 data was used in the north west corner of the Subbasin, where data is lacking.

Individual GSAs confirmed understanding of the historical lows based on their experience, provided feedback on approach for their GSAs, and indicated if undesirable results could occur if the minimum threshold was set below the lower of 1992 and 2015-16 based on their understanding. From there, GSAs provided 0-5 wells to be representative monitoring wells for assessment of the sustainability indicators. Proposed minimum thresholds were developed for each representative monitoring well based on the lower of 1992 or 2015-16 values unless otherwise indicated. A buffer was subtracted from the minimum 1992 or 2015 groundwater elevation. The buffer was calculated by finding the difference between the minimum and maximum groundwater level over the historical record for each representative monitoring well. The subtraction of the buffer provides a range in which groundwater levels may continue to decline during implementation of projects and management actions until sustainable yield is reached. In cases where the 10th percentile domestic well depth is shallower than the historical low with the buffer, that value was selected as the proposed threshold to prevent undesirable results associated with dewatering wells in the Subbasin.

1.5.3 Measurable Objectives and Interim Milestones

Measurable objectives are targets set above minimum thresholds at a point that allows for active management of the basin during dry periods without reaching the minimum threshold. The condition between the measurable objective and the minimum threshold is known as the margin of operational flexibility (MoOF). The MoOF is intended to accommodate droughts, climate change, conjunctive use operations, or other groundwater management activities. The MoOF was defined at each well as the difference between the minimum and maximum groundwater level over the historical record for that well.

The measurable objective for each representative monitoring well was established to add a MoOF above the minimum threshold value. The MoOF is defined as the difference between the minimum threshold and measurable objective. The proposed measurable objective for the Eastern San Joaquin Subbasin is defined as the lower of 1992 or 2015 groundwater level values unless otherwise indicated.

To assist the Subbasin in reaching the measurable objective for groundwater levels, interim milestones for 2025, 2030, and 2035 are established to keep implementation on track. Interim milestones are based on the measurable objective and will be coordinated with projects and management actions.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** The deeper of 1992 and 2015-16 levels with a buffer of 100% of historical range applied, *or* the 10th percentile domestic well depth, whichever is shallower
- **Proposed Measurable Objective:** The deeper of 1992 and 2015-16 levels
- **Proposed Interim Milestones:** Interim milestones under development
- **Proposed Definition of Undesirable Result:** An undesirable result is considered to occur during GSP implementation when at least 25 percent of representative monitoring wells used to monitor groundwater levels (5 of 19 wells in the Subbasin) fall below their minimum level thresholds for two consecutive years that are categorized as non-dry years (below-normal, above-normal, or wet), according to the San Joaquin Valley Water Year Hydrologic Classification. The lowering of groundwater levels during consecutive dry or critically-dry years is not considered to be unreasonable, and would therefore not be considered an undesirable result, unless the levels do not rebound to above the thresholds following those consecutive non-dry years.

ADVISORY COMMITTEE RECOMMENDATION

Advisory Committee made recommendation on April 10, 2019

BOARD RECOMMENDATION

Board to consider May 8, 2019

Minimum Thresholds and Measurable Objectives (Degraded Water Quality)

ISSUE SUMMARY

1.6 DEGRADED WATER QUALITY

1.6.1 Overview: Selection of Salinity (by TDS) for Undesirable Results and Minimum Thresholds

As specified by SGMA regulations, "minimum thresholds for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results." Undesirable results for degraded water quality result from a groundwater pumping and management activities that cause significant and unreasonable impacts to the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP.

Salinity is the only water quality constituent of concern in the Eastern San Joaquin Subbasin that can be reasonably managed by the GSAs and GSP activities. Although other constituents of concern, such as arsenic, nitrogen, chloride, and sulfate were evaluated in the Current and Historical Groundwater Conditions section**,** ultimately it was determined that these constituents are managed through existing management and regulatory programs within the Subbasin. For example, programs such as the Central Valley Salinity Alternatives for Long Term Sustainability (CV-SALTS) and Irrigated Lands Regulatory Program (IRLP) focus on improving water quality by managing septic and agricultural sources of salinity and nutrients. Point source contaminants are managed and regulated through a variety of programs, by RWQCB, DTSC and the US EPA. The GSP will document these constituents and programs and will lay out an approach to coordinating with existing programs to prevent interference with existing cleanup programs and / or causing migration of existing plumes. In addition, a subset of the constituents identified as being of potential concern are naturally occurring at relatively low concentrations that do not result in undesirable results.

Salinity was identified as a constituent with potential to create significant and unreasonable undesirable results. Historical data for total dissolved solids (TDS) is more widely available than other constituents used to measure salinity, such as electrical conductivity (EC) or chloride. TDS data is available through existing monitoring programs such as the CV-SALTS program and Groundwater Ambient Monitoring and Assessment (GAMA) program or through monitoring or regulatory agencies such as United States Geological Survey (USGS), Department of Water Resources (DWR), SWRCB, and the Central Valley Water Board Waste Discharge Requirement (WDR) Dairy program. Local water purveyors, including Cal Water and the cities of Stockton, Lodi, Manteca, and Lathrop, also provided TDS data from existing monitoring wells.

1.6.2 Undesirable Results

Description of Undesirable Results

The undesirable result related to degraded water quality is defined in SGMA as:

> *Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.*

Where it exists, the undesirable result for degraded water quality is a result stemming from a causal nexus between groundwater extractions and potential other SGMA-related groundwater quantity management activities, and groundwater quality that causes significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP.

This GSP prevents undesirable results associated with salinity by managing TDS concentrations, to the extent caused by pumping rather than loading.

To avoid salinity-related undesirable results, existing high TDS groundwater must be prevented from migrating substantially, vertically or horizontally. Several existing wells in the Subbasin with TDS measurements between 2015 – 2018 have elevated TDS, but are not considered to have undesirable results, because existing practices in those areas have been modified to

accommodate higher TDS concentrations (e.g., farming salt-tolerant crops, blending supplies, etc.) Thus, undesirable results for salinity are applied to wells where the current TDS concentrations are below the threshold, but if TDS were to increase to the threshold, these beneficial uses would be impacted.

Identification of Undesirable Results

Undesirable results are considered to occur during GSP implementation when more than 25 percent of representative monitoring wells (3 of 10 sites) exceed the minimum thresholds for water quality for two consecutive years and where these concentrations are the result of groundwater management activities.

Potential Causes of Undesirable Results

Elevated TDS concentrations in the Subbasin are the result of natural processes and overlying land use activities. Pumping in excess of recharge has resulted in declining aquifer water levels and led to an increase of salinity in groundwater wells since the 1950s (O'Leary, Izbicki, and Metzger; 2015). Within the Subbasin, there are three primary sources of salinity, including:

1. **San Joaquin Delta Sediments** – Naturally occurring soluble salts are emplaced in the San Joaquin Delta sediments from the evaporation of groundwater in discharge areas.
2. **Deep Deposits –** Saline groundwater in the Subbasin is principally the result of the migration of a deep saline water body which originates in regionally deposited marine sedimentary rocks that underlie the San Joaquin Valley. This results in a saline aquifer underlying the freshwater aquifer and well pumping can result in upwelling saline brines into the freshwater aquifer. High TDS water in the Subbasin is naturally occurring from these marine sedimentary rocks and well pumping can result in upwelling saline brines.
3. **Irrigation Return Water –** Irrigation return water is excess surface and subsurface water that flows from a point source following the application of irrigation water. Return water may include contaminants typical of agricultural practices (e.g. pesticides, herbicides) and will act as a conduit delivering these contaminants to the surrounding watershed.

Potential Effects of Undesirable Results

If groundwater quality were degraded to reach levels causing undesirable results, the effect could potentially cause a reduction in usable supply to groundwater users, with domestic wells being most vulnerable as treatment costs or access to alternate supplies can be high for small users. Some water quality issues could potentially cause more impact to agricultural uses than municipal or domestic uses, depending on the impact of the contaminant to these water use sectors. Water quality degradation could cause potential changes in irrigation practices, crops grown, adverse effects to property values, and other economic effects. Additionally, reaching undesirable results levels for groundwater quality could adversely affect current and projected municipal uses, and users could have to install treatment systems or seek alternate supplies.

1.6.3 Minimum Thresholds and Interim Milestones

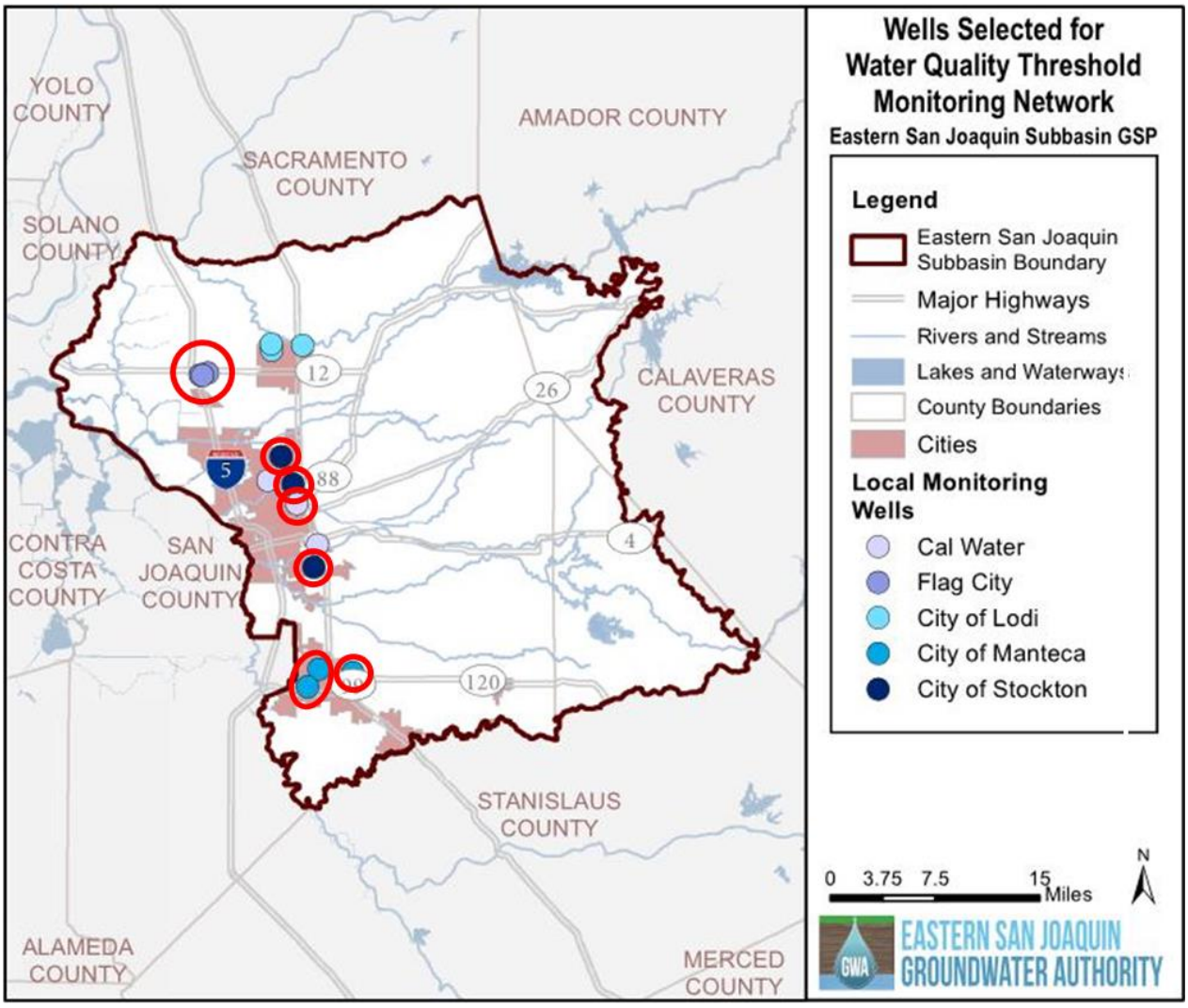
Minimum Threshold Selection

Proposed minimum thresholds in this GSP are focused on addressing the major groundwater quality issue of salinity by monitoring TDS as a representative constituent of salinity and preventing future water quality degradation due to pumping. The nexus between water quality and water supply management exists to mitigate increased TDS concentrations in locations that have historically not had high TDS concentrations. As determined by the GSAs, the proposed minimum threshold for groundwater quality is defined by a TDS measurement exceeding 1,000 mg/L. Two primary beneficial uses as risk of undesirable results related to salinity were considered when determining the minimum threshold for the Subbasin: drinking water and agriculture.

For drinking water, the TDS SMCL was considered. The State Water Resources Control Board (SWRCB) Division of Drinking Water has established SMCLs for TDS in drinking water supplies. SMCLs are established for aesthetic reasons such as taste, odor, and color and are not based on public health concerns. For TDS, the SMCL is 500 mg/L (recommended) and the upper SMCL is 1,000 mg/L (State Water Resources Control Board). The SWRCB has set a short-term standard of 1,500 mg/L which is a temporary concentration generally allowed only under rare circumstances (State Water Resources Control Board).

For crops and agricultural uses, crop tolerances in the Subbasin were considered which ranged by crop type from 900 mg/L TDS for almonds up to 4,000 mg/L TDS for wheat (Texas A&M AgriLife Extension). Crop tolerances are more focused on fruit and nut trees and vineyards, as these crops cover more than half of the acreage of the Subbasin. These crop types have lower crop tolerances of TDS, in the range of 900 – 1,000 mg/L; any standard in this range is considered protective of these crop types and therefore the majority of the Subbasin's crops.

Figure 3. Wells Selected for Water Quality Threshold Monitoring Network



Indicates Representative Monitoring Well with Minimum Thresholds and Measurable Objectives

1.6.4 Measurable Objectives and Interim Milestones

The proposed approach to measurable objectives for degraded water quality is 600 mg/L TDS. 600 mg/L was selected based on the TDS recommended SMCL for drinking water of 500 mg/L and adding a 100 mg/L buffer to meet the needs of wells used for both drinking water and agricultural wells. In addition to agricultural uses, the crop tolerance for turf is 750 mg/L; the selected minimum threshold is more stringent than this and will protect landscape uses are against impacts of high salinity groundwater (Texas A&M AgriLife Extension). The selected minimum threshold reflects input from local drinking water purveyors as well as the local agricultural community and is expected to maintain beneficial uses of groundwater for both drinking water and agricultural users.

To promote attainment of the measurable objective for groundwater quality, interim milestones for 2025, 2030, and 2035 will be established to keep implementation on track. Proposed interim milestones are based on the measurable objective and will be coordinated with projects and management actions.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** 1,000 mg/L TDS at identified wells
- **Proposed Measurable Objective:** 600 mg/L TDS at identified wells
- **Proposed Interim Milestones:** 5-year milestones along a linear trend between current condition and the measurable objective
- **Proposed Definition of Undesirable Result:** Undesirable results are considered to occur during GSP implementation when more than 25 percent of representative monitoring wells (3 of 10 sites) exceed the minimum thresholds for water quality for two consecutive years and where these concentrations are the result of groundwater management activities.

ADVISORY COMMITTEE RECOMMENDATION
Advisory Committee made recommendation on April 10, 2019

BOARD RECOMMENDATION
Board to consider on May 8, 2019

Minimum Thresholds and Measurable Objectives (Reduction of Groundwater Storage)

ISSUE SUMMARY

1.7 REDUCTION OF GROUNDWATER STORAGE

1.7.1 Undesirable Results

Overview of Undesirable Results Related to Groundwater Storage

Undesirable results related to groundwater storage in the Subbasin have not occurred historically, are not currently occurring, and are not likely to occur in the future. In 2015, total non-saline groundwater storage was estimated at 53.0 million acre-feet (AF). Previous analysis of groundwater storage using the ESJWRM showed fluctuations within a range of approximately 900,000 AF over the past 50 years, based on the analysis of groundwater levels from 1996 to 2015. This range of fluctuation, which includes major drought cycles, is approximately 1.72% of the total estimated available fresh groundwater in storage, or 0.001% per year.

Description of Undesirable Results

Although the Subbasin has enough fresh groundwater in storage to theoretically sustain groundwater pumping in conditions of overdraft for centuries, as groundwater levels decline, it will become more expensive to access groundwater. This undesirable result is driven by the chronic lowering of groundwater levels sustainability indicator, and minimum thresholds set for that indicator will be protective of possible subsequent undesirable results for storage, including running out of fresh groundwater to access in drought years.

1.7.2 Minimum Thresholds and Measurable Objectives

Justification for Using Groundwater Levels as a Proxy

GSP regulations allow GSAs to use groundwater levels as a proxy metric for any sustainability indicator, provided the GSP demonstrates that there is a significant correlation between groundwater levels and the other metrics. DWR indicates two possible approaches:

1) ***Demonstrate that the minimum thresholds and measurable objectives for chronic declines of groundwater levels are sufficiently protective to ensure significant and unreasonable occurrences of other sustainability indicators will be prevented. In other words, demonstrate that setting a groundwater level minimum threshold satisfies the minimum threshold requirements for not only chronic lowering of groundwater levels but other sustainability indicators at a given site.***

2) *Identify representative groundwater elevation monitoring sites where minimum thresholds and measurable objectives based on groundwater levels are developed for a specific sustainability indicator. In other words, the use of a groundwater level minimum threshold is <u>not</u> intended to satisfy the minimum threshold requirements for chronic lowering of groundwater but is intended solely for establishing a threshold for another sustainability indicator.*

Sustainability in the Subbasin related to groundwater storage volume is driven by the groundwater level sustainability indicator, which primarily relates to the ability of infrastructure to economically access groundwater. Consistent with approach 1 above, minimum thresholds for groundwater levels will effectively avoid undesirable results for reduction of groundwater storage. Minimum thresholds and measurable objectives for groundwater levels can therefore be used as a proxy for reduction in groundwater storage because groundwater levels are sufficiently protective against occurrences of significant and unreasonable reduction in groundwater storage. In this approach, the same numeric definitions for undesirable results and minimum thresholds would be applied to both the chronic lowering of groundwater levels sustainability indicator and the reduction of groundwater storage sustainability indicator.

Model runs will be used to estimates the storage reduction that would result at the groundwater levels minimum thresholds.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** Consistent with groundwater levels minimum thresholds
- **Proposed Measurable Objective:** Consistent with groundwater levels measurable objectives
- **Proposed Interim Milestones:** Consistent with groundwater levels interim milestones
- **Proposed Definition of Undesirable Result:** Consistent with groundwater levels definition of undesirable result

ADVISORY COMMITTEE RECOMMENDATION

Advisory Committee made recommendation on April 10, 2019

BOARD RECOMMENDATION

Board to consider on May 8, 2019

Minimum Thresholds and Measurable Objectives (Seawater Intrusion)

ISSUE SUMMARY

1.8 SEAWATER INTRUSION

1.8.1 Undesirable Results

Overview of Undesirable Results Related to Seawater Intrusion

Elevated salinity in the Subbasin is the result of natural processes and overlying land use activities. Salinity can be measured either by TDS or chloride concentrations. Recent studies, like *Sources of high-chloride water and managed aquifer recharge in an alluvial aquifer in California, USA* by O'Leary, Izbicki, and Metzger (2015) look at sources of high-chloride waters in wells throughout the ESJ Subbasin. Assessing high-chloride water sources involved determining water type from major-ions, and evaluating stable isotope concentrations (O'Leary et al., 2015). The ratio of chloride to iodide is also used to differentiate high-chloride water sources besides seawater (O'Leary et al., 2015). Both of DWR's Bulletin 146 (1967) and O'Leary and other's (2015) work mentioned that groundwater pumping is a cause of increasing chloride concentrations.

Within the Subbasin, the research shows that there are three primary sources of salinity, including:

1. **San Joaquin Delta Sediments** – Naturally occurring soluble salts are emplaced in the San Joaquin Delta sediments from the evaporation of groundwater in discharge areas.
2. **Deep Deposits –** Saline groundwater in the Subbasin is principally the result of the migration of a deep saline water body which originates in regionally deposited marine sedimentary rocks that underlie the San Joaquin Valley. This results in a saline aquifer underlying the freshwater aquifer and well pumping can result in upwelling saline brines into the freshwater aquifer. High TDS water in the Subbasin is naturally occurring from these marine sedimentary rocks and well pumping can result in upwelling saline brines.
3. **Irrigation Return Water –** Irrigation return water is excess surface and subsurface water that flows from a point source following the application of irrigation water. Return water may include contaminants typical of agricultural practices (e.g. pesticides, herbicides) and will act as a conduit delivering these contaminants to the surrounding watershed.

The source of seawater intrusion would be seawater coming from surface waters in the San Joaquin Delta, which is separate from the three current sources of degraded water quality listed above.

The Eastern San Joaquin Subbasin is not in a coastal area and seawater intrusion is not present. The Subbasin does, however, experience water quality issues related to salinity which are addressed under the water quality sustainability indicator, as measured by TDS. As described below, the sources of salinity in the Subbasin are not the result of seawater intrusion. There is, however remote, the possibility of future seawater intrusion due to potential future changes in the San Joaquin Delta that could be caused by sea level rise. Undesirable results related to seawater intrusion are not currently occurring and are not reasonably expected to occur. However, the ESJ Subbasin can develop minimum thresholds and measurable objectives that include starting specific monitoring for chloride and an analysis of isotopic ratios to identify the source of high salinity.

Identification of Undesirable Results

Undesirable results are considered to occur during GSP implementation when 2,000 mg/L chloride reaches the established isocontour line and where these concentrations are caused by intrusion of a seawater source as a result of groundwater management activity.

Potential Causes of Undesirable Results

The Eastern San Joaquin Subbasin is not in a coastal area and seawater intrusion is not present. If seawater intrusion does become an issue in the future, the cause of undesirable results would be seawater coming from surface waters in the San Joaquin Delta.

Potential Effects of Undesirable Results

Similar to the effects of undesirable results for degraded water quality, increased salinity due to seawater intrusion could potentially cause a reduction in usable supply to groundwater users, with domestic wells being most vulnerable as treatment costs or access to alternate supplies can be high for small users. Water quality degradation due to seawater intrusion could cause potential changes in irrigation practices, crops grown, adverse effects to property values, and other economic effects. It could also adversely affect current and projected municipal uses, and users could have to install treatment systems or seek alternate supplies.

Minimum Thresholds and Measurable Objectives

The proposed approach to developing minimum thresholds and measurable objectives for seawater intrusion directly addresses the possibility for the potential for seawater intrusion and includes developing minimum thresholds, measurable objectives, using chloride concentration monitoring to develop an isocontour line. The proposed minimum threshold is a 2,000 mg/L chloride isocontour line was developed consistent with other planning documents addressing seawater intrusion. Proposed measurable objectives are established based on the current condition, using 2015-2018 average chloride concentrations.

An action plan would be in place to trigger additional monitoring and analysis at lower concentrations (proposed at 1,000 mg/L chloride) to confirm seawater source.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** 2,000 mg/L chloride isocontour line
- **Proposed Measurable Objective:** The current condition (2015-2018 average)
- **Proposed Interim Milestone:** 5-year milestones along a linear trend between current condition and the measurable objective
- **Proposed Definition of Undesirable Result:** Undesirable results are considered to occur during GSP implementation when 2,000 mg/L chloride reaches the established isocontour line and where these concentrations are caused by intrusion of a seawater source as a result of groundwater management activity.
- **Trigger and Action Plan:** Put action plan in place at to trigger additional monitoring and analysis to confirm seawater source at lower concentrations at 1,000 mg/L chloride.

ADVISORY COMMITTEE RECOMMENDATION
Advisory Committee made recommendation on April 10, 2019

BOARD RECOMMENDATION
Board to consider on May 8, 2019

Minimum Thresholds and Measurable Objectives (Land Subsidence)

ISSUE SUMMARY

1.9 LAND SUBSIDENCE

1.9.1 Undesirable Results

The ESJ Subbasin has not experienced subsidence historically, in large part due to the hydrogeology of the Subbasin. Potential causes of future undesirable results for land subsidence would include significant increases in groundwater production beyond what is currently projected, resulting in dewatering of compressible clays in the subsurface, which are not known to be common in the ESJ Subbasin. The potential causes of substantial increases in groundwater production are the same as those addressed through the chronic lowering of groundwater levels sustainability indicator.

If land subsidence conditions were to reach undesirable results levels, the adverse effects could potentially cause damage to infrastructure, including water conveyance facilities and flood control facilities. This could impact the ability to deliver surface water, resulting in increased groundwater use, or could impact the ability to store and convey flood water. These could have adverse effects to property values or public safety.

1.9.2 Minimum Thresholds and Measurable Objectives

Justification for Using Groundwater Levels as a Proxy

GSP regulations allow GSAs to use groundwater levels can be used as a proxy metric for any sustainability indicator, provided the GSP demonstrates that there is a significant correlation between groundwater levels and the other metrics. DWR indicates two possible approaches:

1) ***Demonstrate that the minimum thresholds and measurable objectives for chronic declines of groundwater levels are sufficiently protective to ensure significant and unreasonable occurrences of other sustainability indicators will be prevented. In other words, demonstrate that setting a groundwater level minimum threshold satisfies the minimum threshold requirements for not only chronic lowering of groundwater levels but other sustainability indicators at a given site.***

2) *Identify representative groundwater elevation monitoring sites where minimum thresholds and measurable objectives based on groundwater levels are developed for a specific sustainability indicator. In other words, the use of a groundwater level minimum threshold is <u>not</u> intended to satisfy the minimum threshold requirements for chronic lowering of groundwater but is intended solely for establishing a threshold for another sustainability indicator.*

Option 1) above allows the use of groundwater levels as a proxy metric for this sustainability indicator, as there is significant correlation between groundwater levels and land subsidence. Use of groundwater levels as a proxy is necessary, given the lack of direct monitoring for land subsidence in the Subbasin. Additionally, land subsidence is driven by a lowering of groundwater levels in the aquifer, and historical declines in groundwater levels are not known to results in subsidence in the ESJ Subbasin. Additional declines in groundwater levels will be mitigated by the groundwater level thresholds. Subsidence is not expected to occur, based on the minimum thresholds for groundwater levels as compared to historical groundwater levels. The same numeric definitions for undesirable results and minimum thresholds would be applied to both the chronic lowering of groundwater levels sustainability indicator and the land subsidence sustainability indicator.

Land subsidence can only occur if two conditions are met: subsurface materials are dewatered, and those dewatered subsurface materials are compressible. Historical declines in groundwater levels have not resulted in subsidence, suggesting that subsurface materials in the geologic units historically affected by groundwater elevation fluctuations are not compressible. If the basin were to operate within the margin of operational flexibility proposed for groundwater levels, future dewatering would continue to occur in the same geologic units historically affected by groundwater elevation fluctuations. It is anticipated

that additional declines in groundwater levels would affect dewatered the materials in a manner consistent with historical dewatering, which resulted in no known subsidence. As a result, projected elevation declines are not expected to result in subsidence, and groundwater level minimum thresholds are protective.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** Consistent with groundwater levels minimum thresholds
- **Proposed Measurable Objective:** Consistent with groundwater levels measurable objectives
- **Proposed Interim Milestones:** Consistent with groundwater levels interim milestones
- **Proposed Definition of Undesirable Result:** Consistent with groundwater levels definition of undesirable result

ADVISORY COMMITTEE RECOMMENDATION

Advisory Committee made recommendation on April 24, 2019

BOARD RECOMMENDATION

Board to consider on May 8, 2019

ISSUE SUMMARY

1.10 DEPLETIONS OF INTERCONNECTED SURFACE WATER

1.10.1 Undesirable Results

Description of Undesirable Results

The undesirable result related to d*epletions of interconnected surface water* is defined in SGMA as:

> *Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.*

The undesirable result for depletions of interconnected surface water in the Eastern San Joaquin Subbasin is depletions that result in reductions in flow or levels of major rivers and streams that are hydrologically connected to the basin such that the reduced surface water flow or levels have a significant and unreasonable adverse impact on beneficial uses of the surface water within the Subbasin over the planning and implementation horizon of this GSP.

Major rivers and streams include the streams that potentially have hydraulic connection to groundwater system in certain reaches: Calaveras River, Mokelumne River, San Joaquin River, and Stanislaus River. Many of the smaller creeks and streams are used for conveyance of irrigation water and do not have impacted natural flow; thus these systems have not been considered in quantifying depletions.

Potential Causes of Undesirable Results

Potential causes of future undesirable results for the depletions of interconnected surface water indicator could result from lowered groundwater levels.

Potential Effects of Undesirable Results

If depletions of interconnected surface water were to reach levels causing undesirable results, effects could include reduced flow and stage within rivers and streams in the Subbasin to the extent that insufficient surface water would be available to support diversions for agricultural uses, diversions for urban uses, or to support regulatory environmental requirements. This could result in increased groundwater production, changes in irrigation practices and crops grown, and could cause adverse effects to property values and the regional economy. Reduced flows and stage, along with potential associated changes in water temperature, could also negatively impact aquatic species in the rivers and streams. Such impacts are tied to the inability to meet minimum flow requirements, which are defined for the Mokelumne, Stanislaus, and San Joaquin Rivers, which, in turn, are managed through operations at Camanche Dam and Woodbridge Dam; Goodwin Dam; and the San Joaquin River at Vernalis gage, respectively.

Justification for Using Groundwater Levels as a Proxy

GSP regulations allow GSAs to use groundwater levels can be used as a proxy metric for any sustainability indicator, provided the GSP demonstrates that there is a significant correlation between groundwater levels and the other metrics. DWR indicates two possible approaches:

1) ***Demonstrate that the minimum thresholds and measurable objectives for chronic declines of groundwater levels are sufficiently protective to ensure significant and unreasonable occurrences of other sustainability indicators will be prevented. In other words, demonstrate that setting a groundwater level minimum threshold satisfies the minimum threshold requirements for not only chronic lowering of groundwater levels but other sustainability indicators at a given site.***

2) *Identify representative groundwater elevation monitoring sites where minimum thresholds and measurable objectives based on groundwater levels are developed for a specific sustainability indicator. In other words, the use of a groundwater level minimum threshold is not intended to satisfy the minimum threshold requirements for chronic lowering of groundwater but is intended solely for establishing a threshold for another sustainability indicator.*

In order to use the minimum thresholds and measurable objectives for chronic lowering of groundwater levels as a proxy for interconnected surface water, the stream depletions experienced below where undesirable results for groundwater levels are reached must be reasonable.

The historical depletion of interconnected surface water is not known to be significant or unreasonable. Therefore, the stream losses in the historical simulation are assumed to have no associated undesirable results. If groundwater levels were to fall to the proposed groundwater level thresholds, there is an associated level of additional stream depletions but undesirable results for this indicator are unlikely. Depletions above this volume are unlikely, as groundwater levels below minimum thresholds and with undesirable results would be required.

The current draft groundwater level minimum thresholds were evaluated to check for groundwater level undesirable results (non-dry year pairings where 25 percent or more wells fall below their minimum thresholds) based on existing future simulations (i.e., projected conditions simulation and sustainable simulation). The sustainable simulation does not result in groundwater level undesirable results, but the projected conditions simulation does result in groundwater level undesirable results. The additional stream losses that occurred in the projected conditions simulation compared to the historical simulation are estimates of depletions as they can be linked directly to increased groundwater pumping. The additional depletions in the projected conditions simulation are 70,000 AFY, which is approximately 1.4 percent of total stream outflows. An additional 70,000 AFY of stream depletions is proposed to not be considered either significant or unreasonable. Depletions greater than an additional 70,000 AFY require groundwater levels that would be classified as undesirable results under the groundwater level sustainability indicator. Therefore, groundwater level thresholds are protective of the depletion of interconnected surface water.

QUESTION FOR CONSIDERATION: Should the approach to defining undesirable results and setting minimum thresholds and measurable objectives be adopted for use in the GSP?

RECOMMENDATION

- **Proposed Minimum Threshold:** Consistent with groundwater levels minimum thresholds
- **Proposed Measurable Objective:** Consistent with groundwater levels measurable objectives
- **Proposed Interim Milestones:** Consistent with groundwater levels interim milestones
- **Proposed Definition of Undesirable Result:** Consistent with groundwater levels definition of undesirable result

ADVISORY COMMITTEE RECOMMENDATION
Advisory Committee made recommendation on April 24, 2019

BOARD RECOMMENDATION
Board to consider on May 8, 2019

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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Eastern San Joaquin Groundwater Authority
Groundwater Sustainability Workgroup
March 13, 2019
4 – 5:30 p.m.
San Joaquin County Public Works Department
1810 E. Hazelton Ave., Stockton – Conference Room A

Committee Members in Attendance

	Name	Organization
	Colin Bailey	The Environmental Justice Coalition for Water
	Barbara Barrigan-Parrilla	Restore the Delta
	Gene E. Bigler	PUENTES
	Drew Cheney	Machado Family Farms
	Robert Dean	Calaveras County Resource Conservation District
X	Mary Elizabeth	Sierra Club
X	David Fries	San Joaquin Audubon
	Joey Giordano	The Wine Group
	Jack Hamm	Lima Ranch
	Mary Hildebrand	South Delta Water Agency
X	George V. Hartmann	The Hartmann Law Firm
X	Michael Machado	Farmer
	Ara Marderosian	Sequoia ForestKeeper
	Ryan Mock	J.R. Simplot Company
	Yolanda Park	Coop
X	Jonathan Pruitt	Catholic Charities of the Diocese of Stockton
	Will Price	University of the Pacific & Vice Chair, SJ County Advisory Water Commission
	Daryll Quaresma	2Q Farming, Inc.
	Jennifer Shipman	Manufacturers Council of the Central Valley
	Chris Shutes	California Sportfishing Protection Alliance
	Michael F. Stieler	CGCS, Spring Creek Golf & Country Club
X	Linda Turkatte	San Joaquin County Environmental Health Department
	Ken Vogel	San Joaquin Farm Bureau Federation
	Ted Wells	Trinchero Family Estates and Sutter Home Winery
	John Lambie	Safe Water for All
	General Public	
X	Jane Wagner-Tyack	League of Women Voters of SJ County
X	Paul Wells	Department of Water Resources
X	Andrew Watkins	Stockton East Water District
X	Bryan Pilkington	Private citizen
	Staff and Consultants	

X	Brandon Nakagawa	County ESJ GSP Project Representative
X	Michael Callahan	County ESJ
	Alicia Connelly	County ESJ
X	Alyson Watson	ESJ GSP Project Manager
X	Christy Kennedy	ESJ GSP Deputy Project Manager
X	Lindsay Martien	ESJ GSP Deputy Project Manager
X	Cindy Thomas	Stakeholder Engagement & Public Outreach Consultant

Meeting Notes

I. Welcome

a. Alyson Watson welcomed the group at 4:07.
b. Alyson Watson reviewed the meeting agenda, emphasizing the focus would be on the preliminary approach to groundwater-dependent ecosystems and would include an interactive mapping exercise.
c. Alyson Watson mentioned the group would be reviewing policy recommendations from the Advisory Committee.

II. Meeting Objectives

a. Alyson Watson discussed the meeting objectives.
    i. Review and discuss groundwater-dependent ecosystems (GDEs).
    ii. Review and discuss Advisory Committee recommendations on policy decisions related to implementation plan.
    iii. Consider approaches to addressing undeveloped agricultural land.

III. Roadmap and Deliverables Update

a. Alyson Watson provided an updated schedule based on the desire for an administrative review period. The GSP chapters in each are:
    i. Bundle 1 – Administrative Information, Plan Area, HCM.
    ii. Bundle 2 – Water Budget (at basin scale).
    iii. Bundle 3 – Undesirable Results and Minimum Thresholds, Monitoring Network, Projects.
b. Alyson Watson noted Bundles 2 and 3 will be released in June.

IV. Groundwater-Dependent Ecosystems

a. Alyson Watson presented the preliminary methodology for identifying GDEs in the basin.
b. The draft results will be reviewed with GSAs to ground-truth areas that have and have not been identified as GDEs through this analysis.
c. DWR's groundwater dataset was used and The Nature Conservancy was consulted
d. Areas with access to supplemental water supplies were removed, including:
    i. Managed wetlands and areas without shallow groundwater.
    ii. Areas adjacent to canals and ditches, irrigated agricultural fields, losing streams, perennial rivers, and managed wetlands.
e. Alyson Watson reviewed the maps and the topography while explaining the criteria and buffers used.

f. Alyson Watson asked if there were questions or if any information on the maps that were incorrectly coded.
g. Mary Elizabeth said she has been informed that receiving surface water does not preclude an environment from being groundwater dependent. Eliminating areas that get water from another source may have eliminated GDEs.
h. Mary Elizabeth suggested reducing the water level in screening so that groundwater dependent ecosystems could consider well locations and well construction levels.
i. Bryan Pilkington said The Nature Conservancy published a book that is SGMA-compliant and has pictorials with guidance on GDEs. You can find the information on their website. (https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf)
j. Brandon Nakagawa stated Oak Grove Park has been mapped using the screening criteria, although it is not necessarily a GDE.
k. Mary Elizabeth noted the water that the County is using to irrigate the grass is not enough for the trees.
l. Alyson Watson indicated that there may be GDEs missing that were not caught in the screening. She encouraged reaching out if there are any GDEs that were missed.
m. Bryan Pilkington asked how golf courses fit into GDEs.
n. Alyson Watson said they may be in the original dataset. Looking at the depth of water, a golf course would not be included if groundwater levels were not shallow.

V. Working Session

a. Alyson Watson described how the basin is divided up into four maps for the working session. She asked the group to identify known GDEs.
    i. George V. Hartmann said that groundwater irrigation is not used in the Delta. The water table is high and a lot of crops use groundwater that is absorbed into the peat soil. With the exception of a few locations, anything along a water course has riparian rights and don't need to use groundwater. You can use a gravity siphon to get water.
    ii. Alyson Watson clarified that we are looking for a high ground water table.
    iii. George V. Hartmann stated the Delta does not conform due to the tidal influences. The Delta is like a bowl, not like a tributary. The biggest problem is getting rid of water.
    iv. George V. Hartmann said McDonald Island had an engineer do calculations related to diversion recording. They pump and divert twice as much water as they take in from seepage, rainfall and underground springs. If you shut off the pumps, Delta islands would flood and waste a lot of water.
    v. David Fries said everything would be 15-20 feet underwater.
    vi. George V. Hartmann said these areas are dependent on groundwater but not in jeopardy. If sea level rises as forecasted, it will all be underwater anyway.
    vii. Mary Elizabeth noted that she was surprised that there were not more GDEs in the South County or farther inland.
    viii. Alyson Watson said they are going to reach out to the individual GSAs to capture missing areas.
    ix. Alyson Watson described each screen in the analysis again.
    x. Mary Elizabeth asked about the 50 feet adjacent to the agriculture screen.
    xi. Alyson Watson explained supplemental supply and irrigation supply.

xii. Alyson Watson said the maps will be distributed for feedback.

VI. Policy Elements Related to Implementation Plan

a. Alyson Watson discussed the direction updates from GSA staff and legal counsel. She reviewed identified policy questions and recommendations made by the Advisory Committee.
b. Policy elements related to implementation plan:
    i. Water budget planning estimates
    ii. Sustainability indicators
    iii. Monitoring, measuring and model refinements
    iv. Project implementation
    v. Management actions
c. Water budget planning estimates – the GSP needs to develop a sustainable yield on a long-term average basis. The consultant recommendation was to use the low end estimate and verify and validate the modeling. There is a staff report with more information. The Advisory Committee and Board will consider this topic next month.
d. Mary Elizabeth asked why the average was selected.
e. Alyson Watson said the averages from past, present and predicted future were used for an average. When we look at achieving sustainability, we need to look at the sustainable yield number. There is a 78,000 deficit to make up by 2040.
f. Linda Turkatte asked about pumping offset and increased demands.
g. Alyson Watson explained what is needed by 2040 and how to refine a plan once validating numbers.
h. Michael Machado asked for the deficit today.
i. Alyson Watson said it is not significantly different due to little change in cropping patterns.
j. Michael Machado said that people are making investments today based on the sustained plan for over 20 years.
k. Alyson Watson asked what can be done to recharge to continue support for agriculture development.
l. David Fries noted that salinity may increase and those using river water will need to find other sources.
m. Alyson Watson said there is data to suggest no Delta saline intrusion. A network will be monitoring potential increases.
n. George V. Hartmann asked about the mixing zone, noting it used to be 15 miles further west than it is now.
o. David Fries said tunnels will bring salinity closer.
p. Alyson Watson said that the focus, for our purposes, is on salinity in groundwater only.
q. George V. Hartmann said they are all interconnected. Delta farmers are storing salt during the irrigation season, then floods release the salt back in. Farming there causes a salt banking. In the south Delta, where they don't have adequate flow, the salt content in the land is significant. Part of the Bay Delta Water Quality Control Plan is to increase the salt level.
r. Alyson Watson said the concern is groundwater quality, as it is controlled by groundwater actions.

s. Mary Elizabeth asked if agricultural water usage was reduced, since municipal usage is so much less than agricultural usage.
t. Brandon Nakagawa said previous agricultural land has been turned into municipal land.
u. Mary Elizabeth asked if there is data to determine if having more municipal land decreases use.
v. George V. Hartmann asked what the plan is for Woodbridge Irrigation District pulling out of the JPA.
w. Alyson Watson said the County has not made a decision and they are not sure what intervention will look like.
x. Alyson Watson discussed the six sustainability indicators as well as monitoring, measuring and model refinements.
y. Mary Elizabeth asked about one of the study projects. She thinks there should be more studies, as well as a to-do list for the evaluation.
z. Alyson Watson discussed project implementation.
    i. SGMA projects that go into the GSP Implementation Plan can be developed and implemented at the GSA level, at a regional level, or the subbasin level.
    ii. The level at which projects are implemented could have implications for project implementation, authority, control and cost.
aa. Alyson Watson said they did not get to item five. The recommendation is a mix of management and supply.

VII. Policy Elements Related to Implementation Plan: Approach to Undeveloped Ag. Land

a. Brandon Nakagawa said he has been taking comments from the public and there is an expectation of County action. He asked: Should the County have monitoring policies and if so, what do they look like?
b. George V. Hartmann said it depends on location.
c. Mary Elizabeth said if there is no change of cropping patterns then you need to expand to include permanent cropping.
d. Michael Machado said to bring in balance groundwater overdraft it has been estimated that up to 500,000 acres of farmland in the Central Valley would have to be fallowed and that to do so on a piecemeal basis would be expensive and not necessarily meet the goals of SGMA.
e. George V. Hartmann indicated that weeds use more water than crops. The best option is to practice efficient agriculture.
f. Andrew Watkins said some of the areas to the east side being developed are an economic engine that fuels jobs to the community. If a moratorium is put on these wells, then we should stop all development. The state would have to do away with all building permits and wells permits. They will have to change agricultural water to urban water.
g. Michael Machado said basin surface water should not be allowed to be exported.
h. Mary Elizabeth said that the cones of depressions should not be allowed to have new wells until they recover. Wells can be put in with the sustainable yield and new pumping should be temporarily reduced until it is sustainable.
i. Bryan Pilkington said to look at what EBMUD and Camanche are doing. He noted the efforts the district is making to go around the water. It would be helpful to have access to that water via in-lieu or conjunctive use.

j. Mary Elizabeth said groundwater recharge should have a policy where currently undeveloped land can be assessed for recharge ability. Funds can be set aside for us as a basin to acquire the land for purposes of recharge. Once it is developed, it is lost forever.
k. Jane Wagner-Tyack said we do not do a good job at capturing stormwater. We do not have a lot of low impact urban development.
l. Bryan Pilkington said it is urgent to get this information out to the public.
m. George V. Hartmann said during the drought, they enacted legislation about water usage. They had such a favorable response that other water providers had to raise their rates to keep operations up.
n. Alyson Watson said outreach is going to be important when an implementation and finance plan is ready.
o. Brandon Nakagawa said another option is building and recharging our way into sustainability. He suggested an impact development fee or a sales tax.
p. George V. Hartmann said a sales tax is regressive, people who irrigate with groundwater should pay for the cost of replenishing it.
q. Michael Machado asked if there will be credit for those districts that are already practicing extraction taxes. If it is universal, then some people would be paying twice.
r. Mary Elizabeth said we need to work on dual projects that reduce flood risk and recharge ground water.

VIII. Announcements

a. The next meeting takes place on April 10

IX. Other Topics

Comments by Joey Giordano

In Section III.b., it says that GSP Bundles 2 & 3 will be released in June. When will Bundle 1 of the GSP be released?

Comments by Mary Elizabeth (March)

I am not sure about this statement, She noted that there is an approach for addressing enforcement or monitoring from the GWA. I think this is in reference to the JPA but not sure.

Here are some excerpts from the JPA:
To the extent the Members are not successful at jointly implementing the GSP within the Basin, or to the extent that any Member wishes to implement the GSP within its boundaries, the Authority intends to allow any individual Member to implement the GSP within its boundaries, and to work together with all Members to coordinate such implementation in accordance with the requirements of SGMA

2.6 The Members expressly intend that the Authority will not have the authority to limit or interfere with the respective Member's rights and authorities over their own internal matters, including, but not limited to, a Member's legal rights to surface water supplies and assets, groundwater supplies and assets, facilities, operations, water management and water supply matters. The Members make no commitments by entering into this Agreement to share or otherwise contribute their water supply assets as part of the development or implementation of a GSP.

6.2 Noncompliance. In the event any Member (1) fails to comply with the terms of this Agreement, or (2) undertakes actions that conflict with or undermine the functioning of the Authority or the preparation or implementation of the GSP, such Member shall be subject to the provisions for involuntary removal of a Member set forth in of Section 6.3 of this Agreement. Such actions of a Member shall be as determined by the Board of Directors and may include, for example, failure to pay its agreed upon contributions when due; refusal to participate in GSA activities or to provide required monitoring of sustainability indicators; refusal to enforce controls as required by the GSP; refusal to implement any necessary actions as outlined by the approved GSP minimum thresholds that are likely to lead to "undesirable results" under SGMA.
6.3 Involuntary Termination. The Members acknowledge that SGMA requires that multiple GSAs within Bulletin 118 groundwater basins designated as high- or medium-priority must coordinate, and are required to use the same data and consistent methodologies for certain required technical assumptions when developing a GSP, and that the entire Basin must be managed under one or more GSPs or an alternative in lieu of a GSP for the Basin to be deemed in compliance with SGMA. As a result, upon the determination by the Board of Directors that the actions of a Member (1) fail to comply with the terms of this Agreement, or (2) conflict with or undermine the functioning of the Authority or the preparation and implementation of the requirements of the GSP, the Board of Directors may terminate that Member's membership in this Authority, provided that prior to any vote to remove a Member involuntarily, all of the Members shall meet and confer regarding all matters related to the proposed removal. The Board of Directors shall terminate the membership in the Authority of any Member that fails, on or before June 30, 2017, to (i) elect to become a GSA duly established in accordance with SGMA, or (ii) participate, through a joint exercise of powers agreement or other legal agreement, in a GSA duly established in accordance with SGMA.

2018 Basin Boundary Modifications - FINAL Decisions
February 11, 2019

Basin(s)/Subbasin(s)	Requesting Agency	Modification Type	FINAL Decision	Basis for Denial	Notes
SHASTA VALLEY	Siskiyou County Flood Control and Water Conservation District	Scientific External	Approve	NA	Request met regulatory criteria.
SANTA ROSA PLAIN WILSON GROVE FORMATION HIGHLANDS	City of Sebastopol	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
WILSON GROVE FORMATION HIGHLANDS PETALUMA VALLEY	City of Petaluma	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
WILSON GROVE FORMATION HIGHLANDS SAND POINT AREA	Marin County	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
SONOMA VALLEY NAPA-SONOMA LOWLANDS	Sonoma Valley Groundwater Sustainability Agency	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
BOLSA AREA HOLLISTER AREA SAN JUAN BAUTISTA AREA TRES PINOS VALLEY	San Benito County Water District	Jurisdictional Consolidation	Approve	NA	Request met regulatory criteria.
UPPER VALLEY AQUIFER PASO ROBLES AREA	Salinas Valley Basin Groundwater Sustainability Agency	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
PASO ROBLES AREA	Heritage Ranch Community Services District	Scientific External	Approve	NA	Request met regulatory criteria.
CARPINTERIA	Carpinteria Valley Water District	Scientific External	Approve	NA	Request met regulatory criteria.
CARPINTERIA MONTECITO	Montecito Water District	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
OXNARD MOUND SANTA PAULA	Mound Basin Groundwater Sustainability Agency	Scientific External Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
FILLMORE PIRU SANTA PAULA	United Water Conservation District	Scientific External Scientific Internal Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
ARROYO SANTA ROSA VALLEY	Arroyo Santa Rosa Basin Groundwater Sustainability Agency	Scientific External	Approve	NA	Request met regulatory criteria.
BOWMAN ROSEWOOD	Tehama County Flood Control and Water Conservation District	Jurisdictional Consolidation	Approve	NA	Request met regulatory criteria.
MILLVILLE SOUTH BATTLE CREEK	Tehama County Flood Control and Water Conservation District	Jurisdictional Consolidation	Approve	NA	Request met regulatory criteria.
SIERRA VALLEY	Plumas County	Scientific External	Approve	NA	Request met regulatory criteria.
WEST BUTTE EAST BUTTE	Butte County Department of Water and Resource Conservation	Jurisdictional Internal Jurisdictional Consolidation	Approve	NA	Request met regulatory criteria.
COLUSA WEST BUTTE	Colusa Groundwater Authority	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
SUTTER NORTH AMERICAN EAST BUTTE	Sutter County	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
LOS MOLINOS VINA DYE CREEK	Tehama County Flood Control and Water Conservation District	Jurisdictional Consolidation	Approve	NA	Request met regulatory criteria.
WEST BUTTE EAST BUTTE	Reclamation District No. 1004	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
EAST BUTTE WYANDOTTE CREEK	Butte County Department of Water and Resource Conservation	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
SOLANO YOLO	Yolo Subbasin Groundwater Agency	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
SOLANO TRACY	Sacramento County Water Resources	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
WYANDOTTE CREEK NORTH AMERICAN SUTTER SOUTH YUBA NORTH YUBA	Yuba County Water Agency	Scientific External Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
EASTERN SAN JOAQUIN TRACY	Lathrop City Of	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
CHOWCHILLA	Madera County	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
MADERA KINGS	Madera County	Scientific Internal Jurisdictional Internal	Approve	NA	Request met regulatory criteria.
CHOWCHILLA DELTA-MENDOTA	San Joaquin River Exchange Contractors Water Authority	Jurisdictional Internal	Approve	NA	Request met regulatory criteria.

2018 Basin Boundary Modifications - FINAL Decisions
February 11, 2019

Basin(s)/Subbasin(s)	Requesting Agency	Modification Type	FINAL Decision	Basis for Denial	Notes
KINGS	North Kings Groundwater Sustainability Agency	Scientific External	Approve	NA	Request met regulatory criteria.
TRACY	Brentwood City Of	Jurisdictional Subdivision	Approve	NA	Request met regulatory criteria.
OWENS VALLEY	Starlite Community Services District	Scientific External	Approve	NA	Request met regulatory criteria.
WARREN VALLEY	Mojave Water Agency	Scientific Internal	Approve	NA	Request met regulatory criteria.
SAN TIMOTEO	Southwest San Timoteo Groundwater Sustainability Agency	Scientific External	Approve	NA	Request met regulatory criteria.
SAN DIEGO RIVER VALLEY	City of San Diego	Scientific External	Approve	NA	Request met regulatory criteria.
LOS OSOS VALLEY	San Luis Obispo County	Jurisdictional Subdivision Scientific External	Approve Deny Portion (Northern fringe)	345.2(c) - Insufficient scientific evidence to support modification.	Agency did not provide adequate technical studies to demonstrate that the referenced "Minor Fringe Exclusion Area" did not represent basin; remaining portions of request were approved.
SANTA MARIA	Santa Maria Basin Fringe Areas - County of San Luis Obispo Groundwater Sustainability Agency	Scientific External Scientific Internal	Approve Deny Portion (Ziegler Canyon)	345.2(c) - Insufficient scientific evidence to support modification.	Agency did not provide adequate technical studies to demonstrate the referenced fault and geologic contact significantly impede groundwater flow for the Ziegler Canyon area; remaining portions of request were approved.
KERN COUNTY	West Kern Water District	Scientific External	Approve Deny Portion (Little Santa Maria Valley, QP with Anticlines, and QP at Little Santa Maria Valley)	345.2(c) - Insufficient scientific evidence to support modification.	Request to subdivide and create Little Santa Maria Valley as subbasin is not supported with sufficient scientific information. Agency did not provide adequate technical studies to demonstrate the referenced alluvial units (QP with Anticlines) do not represent aquifer or basin.
SAN JACINTO	Eastern Municipal Water District	Scientific External Scientific Internal	Approve Deny Portion (Lake Perris)	345.2(c) - Insufficient scientific evidence to support modification.	Agency did not provide adequate technical studies to demonstrate that area 6 (Lake Perris) does not represent basin material; remaining portions of request were approved.
SANTA MARIA	Santa Barbara County Water Agency	Scientific External	Deny	345.2(c) - Insufficient scientific evidence to support modification.	Agency did not provide adequate technical studies to support external boundaries to match adjudication boundaries and did not consistently follow geologic features.
SOUTH AMERICAN EASTERN SAN JOAQUIN SOLANO	Northern Delta Groundwater Sustainability Agency	Jurisdictional Subdivision	Deny	345.2(d) - Failure to provide all required information.	Agency did not provide the required 3/4 support of local agencies and public water systems in affected basins.
SOUTH AMERICAN COSUMNES	Sloughhouse Resource Conservation District	Jurisdictional Internal	Deny	345.2(a) - May limit opportunity or likelihood of sustainable groundwater management.	Agency did not demonstrate proposed modification would result in improved groundwater management. Opposition to proposal by Sacramento Central Groundwater Authority and City of Sacramento.
COASTAL PLAIN OF SAN DIEGO	Sweetwater Authority	Scientific External	Deny	345.2(c) - Insufficient scientific evidence to support modification.	Agency did not provide adequate technical studies to demonstrate that the referenced area did not represent basin material.

Emily Honn

From: John Lambie <jlambie@e-purwater.com>
Sent: Wednesday, April 10, 2019 10:46 AM
To: Ara Marderosian
Cc: Colin@ejcw.org; barbara@restorethedelta.org; gbigler@puentesca.org; machadofamilyfarms@gmail.com; goldrushdean@yahoo.com; mebeth@outlook.com; Dfries.audubon@gmail.com; jgiordano@thewinegroup.com; Mooovers@aol.com; Hildfarm@gmail.com; George V. Hartmann; michael.machado@ymail.com; ryan.mock@simplot.com; jpruitt@ccstockton.org; wprice@pacific.edu; daryllpq@gmail.com; jennifer@mccv.org; blancapaloma@msn.com; mike@springcreekcc.com; LTurkatte@sjcehd.com; kensvogel@yahoo.com; twells@tfewines.com; joelm@ccwd.org; zenet.negron@asm.ca.gov; andrew@latinotimes.org; Taylor Curtis; Brent@bartonranch.com; ypark@cafecoop.org; HDanielson@boethingtreeland.com; Paul.Wells@water.ca.gov; Brandon Nakagawa; janetyack@me.com; Alyson Watson; Christy Kennedy; Lindsay Martien; lucy@lucycompanypr.com; cindy@lucycompanypr.com; aconnelly@sjgov.org; Kelly R. Villalpando; Michael Callahan; dbarney@sjgov.org; Todd Shuman; Kris Balaji PE, PMP; Fritz Buchman
Subject: Re: links to recent information on where to best store groundwater

Follow Up Flag: Follow up
Flag Status: Flagged

Ara,

I feel the need to write you and this group to **quickly** dissuade you of the notion that the Stanford research links you offered have any relevance to where field flooding or any other surface spreading of water will be effective. I have written the author of the primary article you highlighted and recommended that they revise the title. Both the Stanford articles referenced **properly** describe that they are distinguishing clays and sand intervals in the **saturated** subsurface not the near surface unsaturated zone using airbomne electormagnetic (AEM) methods. However that article's title does not accurately or properly reflect what AEM is capable of doing. Due to the variable moisture content of the near surface unsaturated soils and sediments AEM provides no data that has any utility and thus it does not and cannot map where field flooding may be most effective. The success of field flooding is subject to the permeability and interconnected pathways of higher permeability and a few other equally important factors.

Conversely, the DWR article on Flood MAR reflects a solid effort on the part of the State and others to look at where Flood MAR could be done in a positive fashion without crop damage or other unintneded or adverse consequences.

I'd be pleased to discuss this with you and others if there was the right forum to do so.

Sincerely,

John Lambie, PE, PG, CEG, CWRE
Principal Groundwater Hydrologist

Stockton Office (209) 451-5933
Cell (503) 381-6043

On Wed, Apr 10, 2019 at 9:53 AM Ara Marderosian <ara@sequoiaforestkeeper.org> wrote:

> I am out of the country for the 10 April meeting.
>
> But here are links to recent information on where to best store groundwater.
>
> Ara
>
> **Stanford study offers a way to map where flooded fields best replenish groundwater**: *"In California, the amount of water exiting aquifers under the state's most productive farming region far surpasses the amount of water trickling back in. That rampant overdraft has caused land across much of the region to sink like a squeezed out sponge, permanently depleting groundwater storage capacity and damaging infrastructure. The trend – and a 2014 mandate for sustainable groundwater management in the state – has ignited interest in replenishing aquifers in California's Central Valley through managed flooding of the ground above them. …"* Read more from Stanford News here: Stanford study offers a way to map where flooded fields best replenish groundwater
>
> **RELATED CONTENT: CA WATER COMMISSION:** Using flood water for Managed Aquifer Recharge

Ara

Mr. Ara Marderosian

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(760) 376-4434

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Emily Honn

From: info@esjgroundwater.org
Sent: Thursday, April 18, 2019 11:25 AM
To: Lindsay Martien
Subject: Fw: ESJ Groundwater Authroity Board and Advisory Committee Meeting AGENDAS for April 10, 2019

From: John Lambie <jlambie@e-purwater.com>
Sent: Wednesday, April 10, 2019 11:53 AM
To: Buchman, Fritz
Cc: Nakagawa, Brandon; Balaji, Kris; Callahan, Michael; info@esjgroundwater.org
Subject: Re: ESJ Groundwater Authroity Board and Advisory Committee Meeting AGENDAS for April 10, 2019

I can answer my own question further. Siskiyou County where there are large open spaces of undistircted and unincorporated lands.

John Lambie, PE, PG, CEG, CWRE
Principal Groundwater Hydrologist

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Stockton Office (209) 451-5933
Cell (503) 381-6043

On Wed, Apr 10, 2019 at 11:51 AM John Lambie <jlambie@e-purwater.com> wrote:

Fritz,

Let me be sure to clarify as my wording may have been poorly crafted. The meeting was undoubtedly of great value to those stakeholders in attendance. There was little value in my attending in my view.

I will keep an eye on what's going on toward the GSP development and how water resources of the region are being administered. I do intend to advocate strongly that the County stop trying to be the adminstrator. I can't think of another County save maybe San Francisco where a County is the water resources administrator. Can you?

John Lambie, PE, PG, CEG, CWRE
Principal Groundwater Hydrologist

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On Wed, Apr 10, 2019 at 11:44 AM Buchman, Fritz <fbuchman@sjgov.org> wrote:

Thank you John. We will revise the sign-in sheet to clarify as you suggested.

I'm sorry you felt that the meeting you attended was of little value. SGMA presents a number of significant challenges for us, and I believe our effort to comply with it would benefit from your active involvement. We welcome your input at any of the three monthly public meetings associated with our ongoing GSP development.

Thanks,

…Fritz

Fritz Buchman, C.E., T.E., CFM
Deputy Director – Development Services
San Joaquin County Public Works | www.sjgov.org/pubworks
Voice: 209-468-3101 | Fax: 209-468-2999
1810 E. Hazelton Avenue / PO Box 1810, Stockton, CA 95205

From: John Lambie <jlambie@e-purwater.com>
Sent: Tuesday, April 09, 2019 9:27 AM
To: Buchman, Fritz <fbuchman@sjgov.org>
Cc: Nakagawa, Brandon <bnakagawa@sjgov.org>; Balaji, Kris <kbalaji@sjgov.org>; Callahan, Michael <mcallahan@sjgov.org>; info@esjgroundwater.org
Subject: Fwd: ESJ Groundwater Authroity Board and Advisory Committee Meeting AGENDAS for April 10, 2019

Fritz,

I need to request revision of the attached packet of information at page 19 or at a minimum ask whether there is some intent here on your part to make me some sort of Groundwater Sustainability Workgroup - Committee Member. I came for a short while to the Workgroup meeting on February 13, 2019 at Public Works offices thanks to your attention to making me aware of when they happen, and Kris Balaji had thought perhaps I could have something to offer at such a forum. I introduced myself as a member of the public, local resident, as it were. As did my colleague Kevin Kauffman (who is not listed. I quickly recognized that this was not a meeting I could gain much from that I could learn elsewhere and I was not a "member" at the table from whom input was being solicited (I had acutally leaned in to ask Joey Giordano what was up with the "table hats") to learn that those were committee members at the table). I may have overlooked a table hat for me on the far side of the room?

In any event I don't think I should be more than a local resident, albeit one who knows a great deal about groundwater, and I do not work for an organization called Safe Water for All; that happens to be a registered

trademark of E-PUR LLC but I did not attend in a professional capacity on anyone's behalf. I attended as a local resident with salty groundwater under his home. . I wrote Kris Balaji to thank him for the invitation but that I did not feel these were good meetings for me to attend although it was interesting to note that there was a great deal of information being withheld by order of the GWA Board. I think the notes/minutes accurately reflect that and I'm happy to see that.

I see a lot of effort in the latest meeting and presentation materials. I do wish you folks well in your work to develop a GSP. However, I see that my hoped for outcome to see the County get out of the business of trying to manage groundwater for a disparate group of stakeholders does not appear likely. I mean no offense to you or your staff. It's just a goal alignment type problem that is in need of a different functional model in my view. No one can really predict the future but this structure has not worked for nearly 30 years now.I'll tell you now that I'll almost certainly write a letter to this effect to both the GWA Board and the County Board of Supervisors as its long past time to say something about a structure that is not helping the region. SGMA provides a structure for it to happen differently now as there are entitites with real policing authority, with real skin in the game, with the financial mechanisms to fund their actions and with real lawyers to make it so.

Best for the day.

- John

John Lambie, PE, PG, CEG, CWRE

Principal Groundwater Hydrologist

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Stockton Office (209) 451-5933

Cell (503) 381-6043

---------- Forwarded message ---------
From: **info@esjgroundwater.org** <info@esjgroundwater.org>
Date: Fri, Apr 5, 2019 at 12:53 PM
Subject: ESJ Groundwater Authroity Board and Advisory Committee Meeting AGENDAS for April 10, 2019
To: Nakagawa, Brandon <bnakagawa@sjgov.org>

Good afternoon,

Attached are agendas for next week's Eastern San Joaquin Groundwater Authority (GWA) Board of Directors meeting, as well as the GWA Advisory Committee meeting.

The meetings will be held Wednesday, April 10, 2019, with the **GWA Advisory Committee meeting beginning at 9:00 a.m.**, and the **GWA Board Meeting beginning at 11:00 a.m**.

Presentation materials for both meetings, as well as a staff report for the recommendations being considered by the Advisory Committee will be emailed out separately. As a reminder, presentation materials and meeting agendas will be posted to ESJGroundwater.org and copies are available at the meetings. The meeting location will be at the San Joaquin County – Robert J. Cabral Agricultural Center located at 2101 E. Earhart Ave., Assembly Room #1, Stockton, CA.

The Eastern San Joaquin Groundwater Basin Authority (GBA) does not have a scheduled meeting.

Lindsay Martien

Stanford News (http://news.stanford.edu/)

APRIL 10, 2019

Stanford study offers a way to map where flooded fields best replenish groundwater

Overpumping in California's Central Valley has depleted groundwater storage capacity and caused the land to sink. A new model based on remote sensing data could help zero in on where water managers can replenish aquifers by flooding fields.

BY JOSIE GARTHWAITE

In California, the amount of water exiting aquifers under the state's most productive farming region far surpasses the amount of water trickling back in. That rampant overdraft has caused land across much of the region to sink like a squeezed out sponge, **permanently depleting (https://news.stanford.edu/press-releases/2017/04/12/groundwater-over-storage-ability/)** groundwater storage capacity and damaging infrastructure.

The trend – and a 2014 mandate for sustainable groundwater management in the state – has ignited interest in replenishing aquifers in California's Central Valley through managed flooding of the ground above them. But until now there has been no reliable way to know where this type of remedy will be most effective. New research from Stanford University suggests a way to map precisely where and how to use groundwater recharge to refill the aquifers and stop the sinking.

Hills and dry grass surround farmland in Tulare County, California, where extensive agriculture combines with low precipitation, warm temperatures, a need to pump groundwater and an abundance of clay that tends to compact when pumped dry. *(Image credit: Serj Malomuzh / Shutterstock)*

Parts of the Central Valley sunk by as much as **28 feet (https://ca.water.usgs.gov/projects/central-valley/land-subsidence-san-joaquin-valley.html)** during the first half of the 20th century, and in recent decades some locations have dropped by nearly 8 inches per year. Modeling in the new study, **published (https://doi.org/10.1029/2018WR024185)** in the peer-reviewed journal *Water Resources Research*, indicates the ground will sink by another 13 feet or more at some sites over the next 20 years unless pumping slows down.

Even under a scenario where pumping never exceeds the amount of water going into aquifers, the model predicts continued sinking as past overdrafts take their toll. "There is a time delay in the system," said geophysicist Rosemary Knight, senior author on the study and a professor at Stanford's **School of Earth, Energy & Environmental Sciences (http://earth.stanford.edu/)**. "The only way we can stop it is to be strategic about what we do with our available recharge water."

A perfect storm

In a normal year, water in canals, reservoirs and rivers is sufficient for most irrigation in the Central Valley, while aquifers provide a supplement. In recent drought years, however, surface supplies came up short and farmers contributing to the region's **$17 billion agricultural industry (https://ca.water.usgs.gov/projects/central-valley/about-central-valley.html)** relied more heavily on groundwater.

"It's a perfect storm of an extensive agricultural industry combined with low precipitation, warm temperatures, the need for pumping groundwater and an abundance of clay that is prone to subsidence," said Knight. Clays here that compact when pumped dry also tend to be rich in arsenic, which intensive pumping can **release into water supplies (https://earth.stanford.edu/news/arsenic-unlocked-overpumping-may-contamination-risk#gs.483jm7)**. "So you have problems with water quantity and water quality," Knight said.

A helicopter flies over farmland near Tulare, California carrying equipment to transmit electromagnetic signals that will help gauge the structure of sand and clay layers underground. *(Image credit: Aaron Fukuda)*

Recharge methods now in use or under serious consideration in California involve flooding fields or orchard groves during the winter months or creating year-round recharge ponds. "The key question is where does the water go?" Knight said. "If you're going to flood a farmer's field, you should be sure it's going to work."

Knowing where water will go underground depends on mapping the intricate channels of sand and gravel that interlace tightly packed clays and silts. In California, that information often comes from drilling contractors' **reports (https://water.ca.gov/Programs/Groundwater-Management/Wells)** to state regulators, which are expensive to acquire and do not cover areas between or beneath the drilled wells. As a result, the most common approach to dealing with subsidence is reactive. "If we are proactively managing then we can prevent unrecoverable storage loss," said lead author **Ryan Smith (https://people.mst.edu/faculty/smithryang/index.html)**, a professor at Missouri University of Science and Technology who completed the research as a PhD student in geophysics at Stanford.

Above and below ground

The new approach, based on a marriage of two types of remote sensing data, could be applied across large agricultural regions at relatively low cost. Knight and Smith analyzed the structure of sand and clay layers that had been measured in **a previous study (https://onlinelibrary.wiley.com/doi/full/10.1111/gwat.12656)** by transmitting electromagnetic signals from a helicopter at three sites in Tulare County, about 45 miles south of Fresno, California. They also processed data from public satellite images to measure how much the ground had sunk.

"I realized that both of the datasets were linked to clay content," Smith said. "I thought, if there's a mathematical way to connect these two, then we could build a predictive model of subsidence." The study describes a method for adapting existing math and physics algorithms to integrate the two datasets into one model.

Only a sliver of California has been mapped with both types of remote sensing data, noted Tim Godwin, a senior engineering geologist with the California Department of Water Resources, which has supported Knight's efforts to expand airborne electromagnetic surveys in the state. But as these datasets grow, he said, coupling them with tools to predict sinking will help answer questions about the best ways to meet sustainability goals. "Groundwater managers will be able to more accurately predict susceptibility to subsidence conditions and have greater confidence in proposed projects," he said.

According to Smith, subsidence in the coming years could be even more severe than the current model indicates if drillers deepen the region's wells to cope with future water shortages. "There are still deeper, largely untapped aquifers that, if pumped, would have a dramatic pressure loss," he said. "That would cause the clays to compact more than they do in the portions of the aquifer being used today."

To read all stories about Stanford science, subscribe to the biweekly ***Stanford Science Digest (http://eepurl.com/dLmCng)****.*

Knight is the George L. Harrington Professor in the School of Earth, Energy & Environmental Sciences and affiliated faculty with the ***Woods Institute for the Environment*** **(https://woods.stanford.edu/)***.*

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LOCAL // POLITICS

Gov. Newsom issues executive order demanding drought-climate plan

Kurtis Alexander

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An aqueduct along Mountain House Road near Byron carries water to Southern California.
Photo: Carlos Avila Gonzalez / The Chronicle 2018

Like many governors before him, Gov. Gavin Newsom is seeking to get his arms around California's myriad water problems, issuing an executive order Monday that calls for his administration to do nothing less than ensure safe and sufficient water for the next century.

The order directs state agencies to review and come up with plans to improve policies addressing such issues as California's chronic water shortages, contaminated drinking water, unaffordable water rates, and the declining health of rivers and lakes.

Newsom has already said he intends to downsize but continue his predecessor's effort to tunnel water beneath the Sacramento-San Joaquin River Delta, a closely watched project that aims to deliver more water to thirsty Southern California while protecting the state's largest estuary. Finalizing the plan is listed as a priority in the executive order.

Another priority is getting some of the state's biggest water agencies, including the San Francisco Public Utilities Commission, to voluntarily give up river water to protect endangered salmon runs. The city is among several suppliers that are suing the state over environmental restrictions.

The order also underscores the impact that climate change will have. It stresses the need to make sure flood-control systems and waterfront towns are prepared for rising seas and that the state's water supplies don't run short.

"Each year we're going to have less and less water, more and more variability on how the water comes, and more people in this state," said Jared Blumenfeld, secretary for Environmental Protection. "We need to be resilient to a fairly uncertain water future."

Blumenfeld is among a handful of new appointments to executive posts in the Newsom administration who will carry out the governor's executive order. At his side will be fellow newcomers Wade Crowfoot, secretary for Natural Resources, and Karen Ross, Food and Agriculture secretary.

Blumenfeld said part of any new portfolio of water strategies will be conservation. Capturing storm water and boosting water recycling are musts. While this past winter was one of California's wettest, memories of water supplies drying up and mandatory rationing during the state's recent five-year drought remain fresh.

Crowfoot said he expects that state agencies will develop many new and innovative ways to protect water supplies as they fulfill Newsom's call for a coordinated approach to tackling water problems.

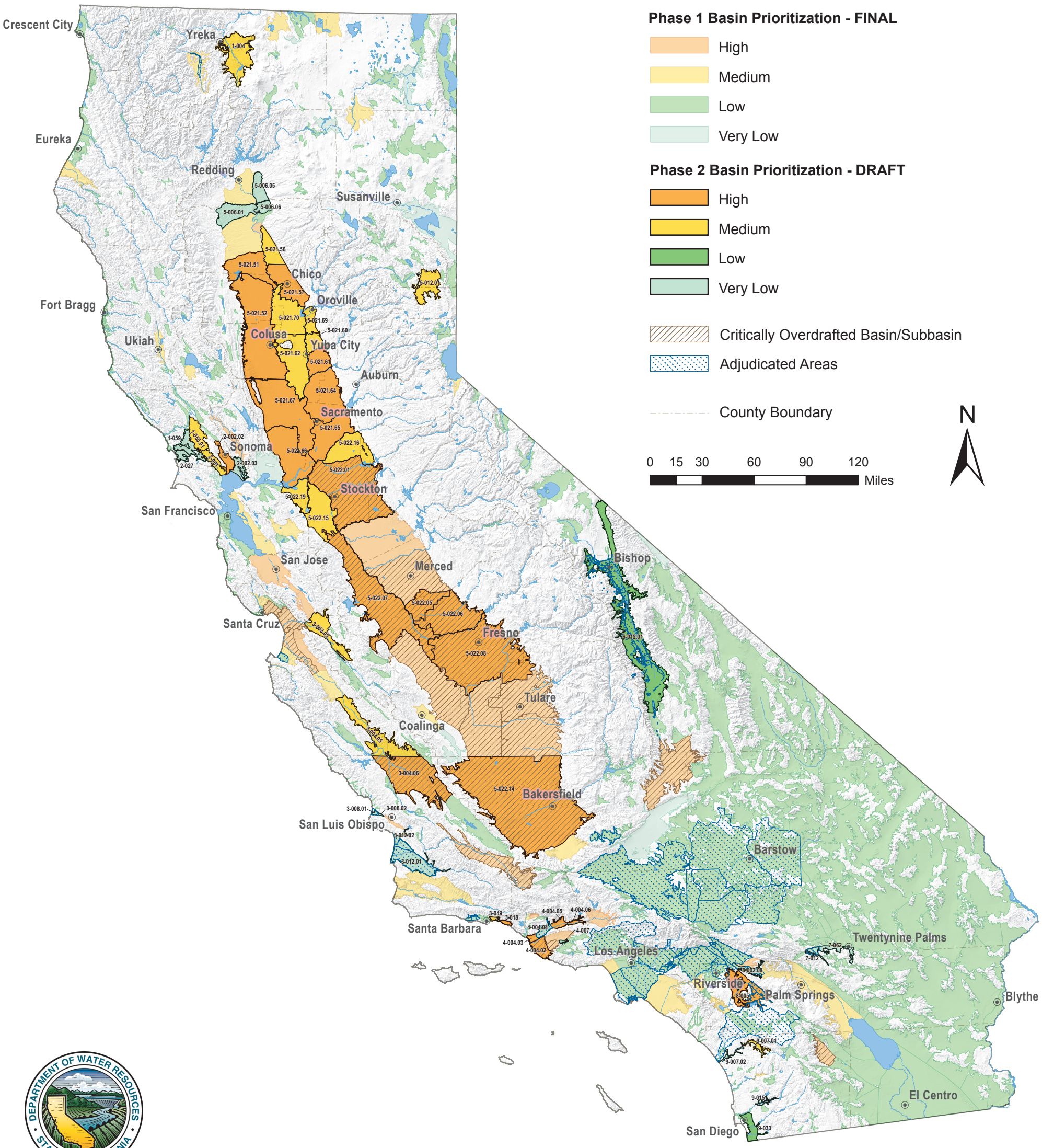
"We can't say now what specific priorities will be recommended as part of the portfolio. That's the purpose of the next several months," he said.

The exercise piggybacks on Gov. Jerry Brown's water action plan, which similarly sought to tackle California's never-ending water woes.

"To meet these challenges, we need to harness the best in science, engineering and innovation to prepare for what's ahead and ensure long-term water resilience and ecosystem health," Newsom said in a statement. "We'll need an all-of-above approach to get there."

Kurtis Alexander is a San Francisco Chronicle staff writer. Email: kalexander@sfchronicle.com Twitter: @kurtisalexander

Statewide Map of SGMA 2019 Basin Prioritization Results



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subject to change

Department of Water Resources, Public Affairs Office April 30, 2019

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

Funding Opportunities

This fact sheet lists some funding opportunities for groundwater sustainability agencies (GSAs) and other organizations involved with the Sustainable Groundwater Management Act (SGMA). This fact sheet, and others, are available at www.waterboards.ca.gov/gmp.

Groundwater is a limited natural resource that Californians use for many purposes. In the state's high- and medium- priority groundwater basins, SGMA requires local GSAs to develop and implement groundwater sustainability plans (plans) so that these uses can continue in the future.

As of April 2019, applications are being accepted for approximately $581 million in grant funding and financing available to GSAs. An additional $1.06 billion is earmarked for application periods opening in the future. Application period dates and other details are provided in the table on the following pages. Public agencies, public utilities, tribes, non-profits, and mutual water companies are eligible to apply for numerous planning implementation grants which may assist with development of plan components, such as recharge projects, groundwater contamination cleanup, and water recycling projects described under Additional Plan Elements (Water Code § 10727.4(h)) and other projects and management actions that a GSA has determined will achieve the sustainability goal for the basin (GSP Regulations § 354.44).

For More Information

Instructions on the application process, timelines, and example projects are available at the State Water Board funding webpage: (https://www.waterboards.ca.gov/water_issues/programs/grants_loans/)

Submit questions about State Water Board funding to: gwquality.funding@waterboards.ca.gov

These online resources may be updated. Parties interested in funding updates are encouraged to subscribe to the State Water Board's email lists in the Financial Assistance section at: https://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.html.

Additional information is also available at the Department of Water Resources (DWR) funding webpage:(https://water.ca.gov/Work-With-Us/Grants-And-Loans).

Submit questions about DWR funding to: funding@water.ca.gov.

Administered by the State Water Board

Funding Type	Program	Purpose	Project Limit	Amount Remaining as of April 2019	Due Dates
Planning and construction grants and financing	Water Recycling Funding Program (Prop 1 and 13)	Water recycling projects	$75,000 (planning grant) to $5M (construction grant)	$49M for planning and construction grants $137M for construction loans	Planning applications accepted on continuous basis Construction applications received by December 31st each year will be used to develop a priority score. Projects which receive a priority score equal to or greater than the yearly fundable list cutoff score will be placed on the fundable list for the upcoming fiscal year.
Planning and construction grants and financing	Small Community Grant Fund (Prop 1 and CWSRF)	Wastewater treatment projects for small communities, disadvantaged communities, and severely disadvantaged communities	$500,000 (planning grant) to $8M (construction grant)	$78M	Applications accepted on continuous basis
Planning and construction grants and financing	Drinking Water Grants (Prop 1 and 68, and DWSRF)	Public water system infrastructure improvements	$500,000 (planning grant) to $5M (construction grant)	$215M	Applications accepted on continuous basis

Sustainable Groundwater Management Act

Funding Opportunities

Funding Type	Program	Purpose	Project Limit	Amount Remaining as of April 2019	Due Dates
Planning and implementation grants	Groundwater Grant Program (Prop 1)	Cleanup projects to benefit drinking water	$2M (planning grant) to $50M (construction grant)	$550M	Round 2 awards late 2019, Round 3 Solicitation to be released 2020
Implementation grants	Groundwater Treatment and Remediation Grant Program (Prop 68)	Cleanup projects to benefit drinking water, including operations and maintenance costs	TBD	$74M	Draft guidelines to be released Spring 2019. Solicitation period anticipated for Summer 2019
Implementation grants	Storm Water Grant Program (Prop 1)	Stormwater recharge projects	$10M	$95M[1]	Solicitation Period Summer/Fall 2019

Administered by the Department of Water Resources

Funding Type	Program	Purpose	Project Limit	Amount Remaining as of April 2019	Due Dates
Planning Grant	Sustainable Groundwater Planning Grant Program (Prop 68)	Plan development. Priority on GSAs that didn't receive funding last round	TBD	Around $50M	Proposal solicitation package to be released May 2019, Draft awards August 2019
Implementation Grant	Prop 68	Implementation of plans	TBD	Around $100M	Planned for release in 2020

[1] Projects must comply with Storm Water Resource Plan requirements and be included in an adopted Integrated Regional Water Management Plan.

Sustainable Groundwater Management Act

Funding Opportunities

Funding Type	Program	Purpose	Project Limit	Amount Remaining as of April 2019	Due Dates
Facilitation Support Services	Facilitation Support Services for plan Development	Assist GSAs with stakeholder communication during plan development	$50,000 in general but flexible	$250,000 $2M additional will be available mid 2019	Applications accepted on continuous basis
Implementation Grant	IRWM Implementation Grant Program (Prop 1)	For projects that are included and implemented in an adopted IRWM Plan	None listed	$194M for Round 1	Solicitation planned for release spring 2019. Round 1 applications likely due summer 2019. Round 2 solicitation in 2020.
Not Applicable	Region Acceptance Process (RAP)	For IRWM regions to become accepted into the IRWM Grant Program	Not applicable	Not applicable	Applications accepted on continuous basis
Planning and implementation grants	Water Desalination Grant Program (Prop 1)	Development of potable water for municipal uses	$500,000 (environmental planning) to $10M (construction)	$100M	Applications accepted on continuous basis until funds are exhausted. Next release of draft funding recommendations expected March 2019

M = million, Prop = Proposition, CWSRF = Clean Water State Revolving Fund, DWSRF = Drinking Water State Revolving Fund, IRWM = Integrated Regional Water Management, TBD = to be determined.

Last Updated: April 2019