EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Board of Directors Meeting

AGENDA

Wednesday, March 13, 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 February 13, 2019 (See Attached)
2. Roadmap Update and Deliverables (See Attached)
3. Outreach & Groundwater Sustainability Workgroup Update (See Attached)
4. DWR Update
5. April Agenda Items

B. Informational Items (see attached):

1. February 23, 2019, Email from Ara Marderosian, "Analysis Says to End Valley's Groundwater Overdraft, Farmland Must be Retired"
2. February 28, 2019, Email Notification From Department of Water Resources, "SGMO News: February Newsletter"
3. February 28, 2019, ppic.org, "Video: Water and the Future of the San Joaquin Valley"
4. March 1, 2019, mercurynews.com, "Sierra Nevada Snowpack through February Fifth Largest in 40 Years"
5. March 4, 2019, waterinthewest.stanford.edu, "Measuring Success in Groundwater Management"
6. March 5, 2019, popsci.com, "Why California's Droughts and Floods Will Only Get Worse"

(Continued on next page)

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

III. Public Comment (non-agendized items)

IV. Directors' Comments

V. Future Agenda Items

VI. Adjournment

Next Regular Meeting
April 10, 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
February 13, 2019

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

The Eastern San Joaquin Groundwater Authority (GWA) Board meeting was convened by Chair Chuck Winn at 11:15 A.M., on February 13, 2019, at the Robert J. Cabral Agricultural Center, 2101 E. Earhart Ave. Stockton, CA. Following the Pledge of Allegiance, the required safety information was presented.

In attendance were Chair Chuck Winn, Vice-Chair Mel Panizza, Directors John Freeman, George Biagi, Jr., Alan Nakanishi, Russ Thomas, Mike Henry, John Herrick, Dale Kuil, Alternate Directors Dr. Mel Lytle, Joe Valente and Doug Heberle, and Secretary Kris Balaji.

II. SCHEDULED ITEMS

A. Discussion/Action Items:

1. Approval of Minutes of November 14, 2018

Motion: Vice-Chair Panizza moved and Director Thomas seconded the approval of the November 14, 2018 minutes, and the motion passed unanimously.

2. Roadmap Update and Deliverables

Ms. Alyson Watson of Woodard & Curran gave a summary of project progress and discussed schedule actions. Board direction was given to allow consultants to work with staff at the administrative level before bringing the GSP chapter deliverables before the Advisory Committee, which could then make the administrative draft a public document. Ms. Jennifer Spaletta, representing North San Joaquin Water Conservation District, noted that it was critical for the Board to give direction today and suggested a workshop be planned to discuss water budget and policy questions. She stated that she has not received a response from the consultant regarding an information request. It was noted that a request for information had been made but not received. Ms. Monica Streeter, legal counsel to the GWA, indicated that the item could be discussed at the Board level, but a Board action could not be taken. She further clarified that a decision is not needed for the Board to direct the staff. Director Russ Thomas noted that they need to better understand the 100,000 AFY estimate. Director John Freeman asked if there are concerns about reaching consensus. Chair Chuck Winn stated he is optimistic and that each GSA will have the opportunity to share concerns and encouraged each member to share information with their respective bodies. After much discussion, there was consensus among the Board (though not taken to a vote), to move forward as quickly as possible.

Ms. Mary Elizabeth (Sierra Club) stated that she has requested this on other occasions as well, that when meeting with GSAs individually, she would like to know if the meetings are going to be public. She stated that it is very important in this process that all of the GSA boards are informed and knowledgeable about the topics in the GSP so that they are making informed decisions. She is concerned that individual GSA boards are not being informed by staff and that the public needs to be informed as well. She stated that regular presentations to the public are necessary and that stakeholder engagement is the means for public to input ideas during the development of the plan. She stated time is running out and is concerned about the idea of putting off releasing drafts to the public. She stated that once the schedule is changed it needs to be made public so it is known when to provide input. She expressed concern about the stakeholder engagement process, including at the GWA Workgroup level during the development of the GSP. She concluded by stating her thoughts that the public has not had any input on the water budget.

3. Informational Meeting Recap

Ms. Alyson Watson provided an overview of the February 12 Informational meeting/open house. Director Mike Henry noted that the orientation presentation was helpful, especially when it was run a second time with a smaller group.

4. Outreach & Groundwater Sustainability Workgroup Update

There was an overview of Workgroup activities. It was stated that there is a Workgroup meeting later this same day.

5. Pathway Toward GSP Preparation

Ms. Alyson Watson provided an overview of next steps toward GSP preparation and noted that coordination with individual GSAs on water balances will take place in the March to April timeframe. Ms. Mary Elizabeth noted that the GWA Advisory Committee discussion on policy issues need to be addressed at the Board level. For instance she referenced the discussion on basin benefits and subsurface flows are treated as a benefit to the whole basin and therefore policies related to these should be decided by individual GSAs and the JPA Board. She stated that the notion that every GSA agrees with that statement is incorrect.

6. Financing

Mr. Toby Fedder (Woodard & Curran) provided an overview of funding and financing options available.

7. **Financial Report**

Ms. Alicia Connelly of San Joaquin County provided a GWA financial status report. Ms. Jennifer Spaletta expressed concern about the spending rate and shared that she feels the bulk of the work is yet to be done. She asked if the remaining balance is adequate and if additional funding is anticipated. Alternate Director Mel Lytle asked if leftover money from the GBA can be contributed to this project. Mr. Brandon Nakagawa stated that GBA funds were returned back to member agencies, with the exception of a reserve of $85,000 retained for the IRWM update. Director Alan Nakanishi asked when the billing goes to City of Lodi. Mr. Brandon Nakagawa answered that this happens around June.

8. Grant Agreement Update

Mr. Paul Wells noted that the draft invoice can be submitted and reviewed prior to the amendment of the final grant agreement. A motion passed from the Board to allow the Board secretary to sign the amendment to the grant agreement.

Motion: Director Herrick moved, and Director Lytle seconded a motion authorizing the GWA Secretary to sign the DWR 2017 Proposition 1 Sustainable Groundwater Planning (SGWP) Grant Amendment, in the amount of $1,500,000, and the motion passed unanimously.

9. Changes to GSAs

Ms. Alyson Watson provided an update on changes to GSAs. The Lathrop basin boundary modification was approved, and the City of Lathrop GSA was removed from the basin. The Woodbridge Irrigation District (WID) Board elected to withdraw as a GSA and gave a 90-day notice to withdraw from GWA as well. The WID area is not covered so ongoing discussions with the County will ensue. Mr. Greg Gibson thanked the Board for involvement. Director Doug Heberle addressed the Board and noted that WID is not involved in groundwater business and that it only deals with surface water diversion and recharge. They will continue to support the basin.

10. March Agenda Items

An updated schedule will be created based on the schedule with GSAs over the next several weeks. Ms. Jennifer Spaletta suggested that March agenda items focus on water budget, sustainable yield, and thresholds and would like the Board to support moving the discussions about these topics in lieu of discussing projects and financing. Ms. Jennifer Spaletta also stated that they will need to tee-up policy issues for April. She stated her concern that not enough substantive issues are presented at the meetings, which raised concerns about process. She added that the presentations are too general and therefore, she would like to start requesting a detailed staff report in preparation for the meetings with issue descriptions and recommendations that would allow for meaningful discussion. Ms. Janice Magdich concurred with Ms. Jennifer Spaletta's suggestions.

B. Informational Items: No discussion was held.

III. Public Comment (non-agendized items):

Mr. Paul Wells gave a DWR update. The Tracy basin is split along the County line and the City of Lathrop GSA will be included in the Tracy Subbasin. Additionally, the WID withdrawal creates an unmanaged area. Alternate Director Doug Heberle questioned whether there were other GSAs withdrawing in other basins, but the DWR representatives indicated they were not aware of any.

Ms. Valerie Kincaid (OID/SSJID) expressed concern that the WID exit results in an unmanaged area. She stated that this is not an isolated problem within the basin. Ms. Jennifer Spaletta asked for clarification and questioned if the County will cover this area. Chair Chuck Winn noted that the County has not made a decision. Ms. Mary Elizabeth noted that DWR has a GSA meeting on March 21, 2019. She encouraged the GSA board members to attend this meeting. She next spoke of our well ordinance and it only prohibits wells within 50 feet of a surface water body whereas other agencies have different distances. She expressed concern about the impact to GDEs and cited a case in Stanislaus County. She noted this is a key management avenue for the GWA and thus far there has been no discussion on it. She requested that the March agenda include background information on management avenues and the well ordinances in Stanislaus, Calaveras, and San Joaquin County.

IV. Directors' Comments:

V. Future Agenda Items:

The agenda items for the March meeting will be revised based on previous comments.

VI. Adjournment:

The meeting was closed at 12:28 pm.

Next Regular Meeting: March 13, 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: 02/13/19 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
RG	Russ Thomas	Eastside San Joaquin GSA Member	209-480-8968	rthomasccwd@hotmail.com
	Walter Ward	Eastside San Joaquin GSA Alternate	209-525-6710	wward@envres.org
DF	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
MH	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
JV	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		
CW	Chuck Winn	San Joaquin County Member	209-953-1160	cwinn@sjgov.org
	Kathy Miller	San Joaquin County Alternate	209-953-1161	kmiller@sjgov.org
JH	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
DK	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
MP	Melvin Panizza	Stockton East Water District Member	209-948-0333	melpanizza@aol.com
AW	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
DH	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
	Fritz Buchman	San Joaquin County	468-3034	fbuchman@sjgov.org
BN	Brandon Nakagawa	San Joaquin County	468-3089	bnakagawa@sjgov.org
MC	Mike Callahan	San Joaquin County	468-9360	mcallahan@sjgov.org
AC	Alicia Connelly	San Joaquin County	468-3531	aconnelly@sjgov.org
KV	Kelly Villalpando	San Joaquin County	468-3073	krvillalpando@sjgov.org
	Nancy Tomlinson	San Joaquin County	468-3089	ntomlinson@sjgov.org
AN	Andy Nguyen	San Joaquin County	953-7948	aynguyen@sjgov.org
AD	Anthony Diaz	San Joaquin County	468-3060	anthonydiaz@sjgov.org
	Rod Attebery	Neumiller & Beardslee / Legal Counsel	948-8200	rattebery@neumiller.com
MS	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: 2/13/19 Time: 11:00 AM

INITIAL	Member's Name	Organization	Phone	Email
JP	Jonathan Pruitt	Catholic Charities	—	jpruitt@ccstockton.org
~~JK~~	~~John Krause~~			
amc	Alicia Connelly	SJC		
SM	Sara Miller	Woodard & Curran	916-999-8769	smiller@woodardcurran.com
BB	Bill Brewster	DWR	916-376-9657	bill.brewster@water.ca.gov
NL	Noel Lim	City of Lodi	—	nlim@lodi.gov
DM	Dennis Mills	Calaveras County		
PW	Paul Wells	DWR		
TK	Travis Kahrs	City of Lodi		
DB	David Breitenbucher	City of Manteca	209 456-2977	
MM	Mark Myles	SJC		
JC	James Cannon	DWR		
JM	Janice Magdich	CA - City of Lodi	333-6701	jmagdich@lodi.gov
GP	Glenn Prasad	SJ County		gprasad@sjgov.org

OTHER INTERESTED PARTIES – SIGN-IN SHEET

INITIAL	Member's Name	Organization	Phone	Email
ME	MElizabeth	Sierra Club		
VCK	Valerie Kincaid	OID (SSJID)		
KEH	Karna Harrigfeld	SEWD		
JW	Jane Wagner Tyack	LWVSJC/Independent Consultant		
BP	Bryan Pilkington	VF		
GB	GEORGE BIAGI	Central Delta AG.		
~~RT~~	~~Russ Thomas~~	~~Calaveras County Water Dist.~~		
VJF	Vincent Farinelli	FARINELLI		
EM	Elba Mijango	City of Manteca		
RS	Rob Schuman	KleinFelder		
AN	ALAN NAKANISHI	LODI		
VAP	Vanessa Piccinini	City of Stockton Mun. Utilities Dept.		
~~FB~~	~~Fritz Buchman~~	SJC		
GS	Gene Schwartz	EBMUD		
CSK	Chrishy Kennedy	Woodard & Curran		

ATTACHMENT II
A.2.

Staff Report for March 13, 2019: ESJ GWA Board Meeting
Agenda Items #2: Roadmap Update & Deliverables

Submitted by: Woodard & Curran

Meeting Agenda

1. Approval of February Meeting Minutes (No accompanying staff report)
2. Roadmap Update & Deliverables
3. Outreach & Groundwater Sustainability Workgroup Update (No accompanying staff report)
4. DWR Update (No accompanying staff report)
5. April Agenda Items (No accompanying staff report)

AGENDA ITEM #2: Roadmap Update & Deliverables

ISSUE SUMMARY
There was a request for an administrative review of draft chapters by GSA attorneys and staff prior to release to the GWA Board, Advisory Committee, and the public. Based on Advisory Committee recommendation and Board direction given at the February 13, 2019 meetings, consultants met with GSA staff and legal counsel to draft an updated deliverable review schedule that builds in an administrative review period. The updated GSP deliverable review schedule is provided below. Note that draft chapters will be released for review on a rolling basis in three packages:

Bundle 1 – Administrative Information, Plan Area, Hydrogeologic Conceptual Model (HCM)
Bundle 2 – Water Budget (at a basin-scale)
Bundle 3 – Undesirable Results & Minimum Thresholds, Monitoring Network, and Projects & Management Actions

Updated GSP Deliverable Review Schedule

Deliverable	Public Draft#1 goes to Board for Review	BOARD MEETING JPA Board - Discussion (if areas of disagreement)	Possible Public Draft#2 goes to Board for Review	BOARD MEETING JPA Board – Action	Public Review Period	Staff provide response to comments/ discussion of proposed revisions	GSA Review	Final Draft of GSP Distributed	BOARD MEETING JPA Board Action	GSA Final Approval
Bundle 1 (Administrative Information; Plan Area; HCM)	May 1	May 8	June 5	June 12	July 10-Aug 25	Sept 15	Oct 15	Nov 5	Nov 13	Dec/Jan
Bundle 2 (Water Budget – at basin-scale)	June 5	June 12	July 1	July 10	July 10-Aug 25	Sept 15	Oct 15	Nov 5	Nov 13	Dec/Jan
Bundle 3 (Undesirable Results & Minimum Thresholds, Monitoring Network, Projects)	June 5	June 12	July 1	July 10	July 10-Aug 25	Sept 15	Oct 15	Nov 5	Nov 13	Dec/Jan

QUESTION FOR CONSIDERATION: Should the updated schedule serve as the basis for directing release of GSP draft chapter deliverables?

CONSULTANT RECOMMENDATION
The consultant recommendation is to move forward with the schedule as updated.

ADVISORY COMMITTEE RECOMMENDATION
Advisory Committee recommendation provided February 13, 2019

BOARD RECOMMENDATION
Board to consider on March 13, 2019

ATTACHMENT II
A.3.

Eastern San Joaquin Groundwater Authority
GSA Outreach Activities - March 2019

Agency Name	Update Website	Use Outreach Slides	Post to Social Media	Other
Cal Water				
Central Delta Water Agency				
Central San Joaquin Water Conservation District				
City of Lathrop				
City of Lodi				
City of Manteca				
City of Stockton				
Eastside San Joaquin GSA				
Linden County Water District				
Lockeford Community Services District				Monthly bill and SGMA info
North San Joaquin Water Conservation District				
Oakdale Irrigation District	Updated for March	Added to website		
San Joaquin County				
South Delta Water Agency				
South San Joaquin Groundwater Sustainability Agency				
Stockton East Water District				
Woodbridge Irrigation District GSA				

Please indicate which of the above outreach activities your GSA has planned for the upcoming month. Please approximate date of completion.

Eastern San Joaquin Groundwater Authority
GSA Outreach Activities - April 2019

Agency Name	Update Website	Use Outreach Slides	Post to Social Media	Other
Cal Water				
Central Delta Water Agency				
Central San Joaquin Water Conservation District				
City of Lathrop				
City of Lodi				
City of Manteca				
City of Stockton				
Eastside San Joaquin GSA				
Linden County Water District				
Lockeford Community Services District				
North San Joaquin Water Conservation District				
Oakdale Irrigation District				
San Joaquin County				Advisory Water Commission meeting 4/17/19
South Delta Water Agency				
South San Joaquin Groundwater Sustainability Agency				
Stockton East Water District				
Woodbridge Irrigation District GSA				

Please indicate which of the above outreach activities your GSA has planned for the upcoming month. Please approximate date of completion.

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

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

Eastern San Joaquin Groundwater Authority
Groundwater Sustainability Workgroup
January 9, 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
X	Gene E. Bigler	PUENTES
	Drew Cheney	Machado Family Farms
	Robert Dean	Calaveras County Resource Conservation District
X	Mary Elizabeth	Sierra Club
	David Fries	San Joaquin Audubon
X	Joey Giordano	The Wine Group
	Jack Hamm	Lima Ranch
	Mary Hildebrand	South Delta Water Agency
X	George V. Hartmann	The Hartmann Law Firm
	Michael Machado	Farmer
	Ara Marderosian	Sequoia ForestKeeper
	Ryan Mock	J.R. Simplot Company
X	Yolanda Park	Catholic Charities of the Diocese of Stockton
X	Jonathan Pruitt	Catholic Charities of the Diocese of Stockton
X	Will Price	University of the Pacific & Vice Chair, SJ County Advisory Water Commission
X	Daryll Quaresma	2Q Farming, Inc.
	Jennifer Shipman	Manufacturers Council of the Central Valley
X	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
X	Ted Wells	Trinchero Family Estates and Sutter Home Winery
	General Public	
X	Jane Wagner-Tyack	League of Women Voters of SJ County
X	Paul Wells	Department of Water Resources
	Andrew Watkins	Stockton East Water District
	Staff and Consultants	
X	Brandon Nakagawa	County ESJ GSP Project Representative
	Michael Callahan	County ESJ
	Alicia Connelly	County ESJ

	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. Christy Kennedy welcomed the group at 4:06 p.m.
b. Christy Kennedy reviewed the meeting agenda, emphasizing the focus would be on the updated roadmap and charter, projects and management actions, and an introduction on approach to project financing.

II. Meeting Objectives

a. Christy Kennedy reviewed the meeting objectives, which were:
    i. Review Workgroup roles and meeting structure
    ii. Identify gaps in project portfolio themes
    iii. Introduce approach to project financing

(Moving forward, meeting objectives will be clearly identified at the start of each meeting.)

III. Roadmap

a. Christy Kennedy reviewed the roadmap between January 2019 and May 2019 and how the remainder of the meetings will be laid out. Specifically, she covered the input that will be needed from the group and how it will be distributed in chapters.
    i. Period
    ii. Meeting Topics
    iii. Objectives
    iv. Deliverables
b. Mary Elizabeth asked if we will be sticking to a Wednesday meeting or going back to Tuesday. She asked for timing on the deliverables.
c. Lindsay Martien noted the documents will be distributed to the Workgroup members a week prior to the Board meeting. Workgroup members will have a month to provide comments.
d. Will Price asked when the next Workgroup meeting will take place.
e. Christy Kennedy noted that more people are in the room, and we will consider moving the meetings to Wednesdays moving forward.

IV. Charter

a. Christy Kennedy reviewed the roles and responsibilities identified in the charter as presented in the meeting materials. She noted that this document is intended to provide clarity.

V. Projects and Management Actions

a. Christy Kennedy gave an overview on projects and management actions and the project portfolios. She reminded the group that they have seen the projects listed before – during the November meeting (supplemental PPT).
b. Chris Shutes asked for additional information on each of the projects listed. He noted it would be important to know the details around each project, not just the summaries.
c. Lindsay Martien asked the group to reach out individually for additional information.
d. Christy Kennedy reviewed the project/portfolio development process and the nine portfolios being considered. She reminded the group that the Advisory Committee developed the criteria for project review.
    i. Implementability
    ii. Location/Proximity to Area of Overdraft
    iii. Cost per Volume Water Savings
    iv. Environmental Benefit/Impact
    v. Disadvantaged Community Benefit
    vi. Water Quality Impact (Positive or Negative)
    vii. Affordability
e. Mary Elizabeth suggested considering detriment to DACs. Yolanda Parks noted she had the same comment.
f. Christy Kennedy reviewed the preliminary project portfolio themes and discussed the grouping process of the portfolios.
g. George V. Hartmann asked if each portfolio has to hit the 100,000 AF criteria, or if it is the individual projects. Christy Kennedy said it was each portfolio – or grouping of projects.
h. Christy Kennedy discussed the preliminary portfolio themes:
    i. Cost-effectiveness
    ii. Regional Diversity
    iii. Minimized Infrastructure
    iv. Environmental Benefit
    v. DAC Benefit
    vi. Impact of Cone of Depression
    vii. Fast Implementation
    viii. Small-Volume Projects
    ix. Large-Volume Projects
i. Christy Kennedy discussed Portfolio 1: Cost Effectiveness
    i. George V. Hartmann asked if everyone in the room knew where the cone of depression is located.
    ii. Christy Kennedy showed the group on a map where the largest hole in groundwater is located.
    iii. George V. Hartmann asked if there was a scale weight to the cost-effectiveness. Christy Kennedy noted there was not.
j. Christy Kennedy discussed Portfolio 2: Regional Diversity
k. Christy Kennedy discussed Portfolio 3: Minimized Infrastructure
    i. Will Price asked if this was based on real projects or conceptual projects. Christy Kennedy explained that they are real planned projected, and that they have worked with GSAs individually to understand each of the projects. They are actual projects and not conceptual.
l. Christy Kennedy discussed Portfolio 4: Environmental Benefit

m. Christy Kennedy discussed Portfolio 5: DAC Benefit
n. Christy Kennedy discussed Portfolio 6: Impact to Cone of Depression
o. Christy Kennedy discussed Portfolio 7: Fast Implementation
p. Christy Kennedy discussed Portfolio 8: Large-volume
q. Christy Kennedy discussed Portfolio 9: Small-volume
    i. Christy Kennedy compared all of the portfolios against each other and opened the floor for discussion. She noted the intent is to hybridize and optimize the portfolios.
    ii. Gene E. Bigler asked what the difference is between portfolios and themes. Christy Kennedy said they are interchangeable. They are the same thing.
    iii. Mary Elizabeth asked for the cost of each of the portfolios. Christy Kennedy noted that information is in the package.
    iv. George V. Hartmann asked if balancing the cone of depression was the highest ranked priority. Christy Kennedy said no. She noted it is most important to bring the basin into balance and meet thresholds to get to sustainability.
    v. Will Price asked if the thresholds are met, will the cone of depression be eliminated?
    vi. Will Price asked if each of the objectives are weighted equally. Christy Kennedy said, "Yes."
    vii. Daryll Quaresma wanted to know if every GSA is willing to contribute financially. Christy Kennedy said, "They are in discussion about financing right now."
    viii. Gene E. Bigler noted he thinks we need to discuss the relationships between GSAs that are doing well vs. those that need to be supplemented. He discussed the difference in consumption during the drought.
    ix. Daryll Quaresma noted a DAC portfolio could work as long as the cone of depression is addressed.
    x. George V. Hartmann noted that many DACs are located above the cone of depression.
    xi. Yolanda Park noted that there are a lot of benefits in the DAC spider web diagram compared to the other portfolios. She noted she would like a balanced portfolio.
    xii. Mary Elizabeth noted that we could eliminate the large and small projects because of the limited benefit to the portfolio.
    xiii. Christy Kennedy noted that the intent is not to knock out any of the portfolios but to balance the entire group and develop a hybrid. She noted that there are multiple projects that meet all the criteria.
    xiv. George V. Hartmann asked about the deficit in the cone of depression as opposed to the subbasin as a whole.
    xv. George V. Hartmann noted that we need to figure out the amount in the cone of depression then allocate the rest. It adds a weight to the evaluation.
    xvi. Ted Wells said we want to enhance the good behavior we want to see in the future. He asked: How do we put good behavior enhancement in this process?
    xvii. George V. Hartmann told a story of tomato irrigation during the drought and the trade-offs of drip vs. flood irrigation.

xviii. Chris Shutes noted that creating efficiency may have unintended consequences of lowering the groundwater table
xix. George V. Hartmann noted that there are permanent crops in the cone of depression. There could be an incentive to move to drip irrigate vs. flood.
xx. Ted Wells wanted to know if the size of project is influenced by behaviors. George V. Hartmann agreed it is important to include that in evaluation.
xxi. Christy Kennedy noted management actions cover that.
xxii. Daryll Quaresma noted that in the south county, the water table goes up in the summer due to the flood irrigation.
xxiii. Chris Shutes noted that there may be deficiency if things change. There needs to be a balance. There is a benefit to maintaining groundwater where there is a lower use of water.
xxiv. Will Price would like a model that simulates groundwater.
xxv. Chris Shutes circled back to what is missing. That is why we all need to know the full story of each of the projects. We need to understand how to efficiently use water for irrigation and recharge.
xxvi. Mary Elizabeth noted the environmental benefit portfolio. She noted some projects were expensive, and the water savings was not significant. She asked: which other portfolios had outliers?
xxvii. Christy Kennedy noted that recycled water projects were added to the environmental benefit portfolio for balance.
xxviii. Mary Elizabeth asked to consider removing those very expensive projects.
xxix. Yolanda Park asked to add a portfolio just focused on recharge.
xxx. Joey Giordano wanted to know the dollar amount for each of the portfolios.
xxxi. Jane Wagner-Tyack noted that many of the projects rely on water transfers.
xxxii. Mary Elizabeth noted that the department is trying to make it easier for getting a beneficial use for surface water/stormwater. It is not tied to SGMA. She noted she thinks it is FloodMAR.
xxxiii. Christy Kennedy tabled the discussion to move to financing.

VI. Project Financing

a. Christy Kennedy discussed identifying funding opportunities. She noted the Workgroup will be tasked with identifying potential paths toward financing projects.
    i. Grant funding
    ii. Tax
    iii. Fees – Gene E. Bigler suggested using the word assessment vs. fee

- Chris Shutes asked about a regional pricing vs. at the GSA level.
- Daryll Quaresma noted we need to work as a group but focus on behavior. Someone needs to oversee it all so no one area is taking advantage of another.
- George V. Hartmann asked Paul Wells if one area is out of compliance, does that mean the whole basin out of compliance?
- George V. Hartmann noted that if the State Water Board has to come in the fees imposed are very costly.
- Brandon Nakagawa noted that all of the portfolios meet the criteria set – some better than others. Ne noted we are lucky in this subbasin that we do not need to talk about fallowing. Other subbasins are having that discussion.

- Jane Wagner-Tyack noted that Lodi and other communities that have made infrastructure investments benefit from farming taking place in the cone of depression area, where growers use groundwater because they do not have access to surface water as many users in other parts of the basin, including the south county, do
- Daryll Quaresma reinforced the need for balance.
- Jane Wagner-Tyack noted that 80% of water statewide is used for agriculture. This is an agricultural area and we all benefit from that.
- Mary Elizabeth noted there used to be a lot of canneries in the area so we are only getting a portion of the benefit of the crops grown in our county. We are not realizing all of the worth of the products in our county.
- Daryll Quaresma noted some irrigation districts have excess water capabilities. They sell the water. Maybe there should be a tax if the water is sold out of the county. The tax should go back into our GSP.
- Yolanda Parks said you cannot drink money generated via a tax or fee. We need to focus on recharge, not money.
- Mary Elizabeth said we need to look at conservation vs. water rates.
    b. Christy Kennedy noted that we will take a deeper dive into financing next month.

VII. Announcements

a. Christy Kennedy updated the group on the third informational meeting
    i. Christy Kennedy said we will follow the same style as the last informational meeting.
b. Christy Kennedy updated the group on the Situation Assessment next steps
c. The next Workgroup meeting will be held on February 13 at the County Public Works Department. Park in the back – do not park on the street.

VIII. Other Topics

a. Mary Elizabeth requested the methodology being used for GDEs. She noted she would like the contact at Fish & Wildlife. She requested to have the large maps from deliverables printed and provided.

IX. Public Comment

a. None

Christy adjourned the meeting at 5:29

<u>Comments by Jane Wagner-Tyack</u>

Under Projects and Management Actions, please note that I asked why the project portfolios themselves were not provided to the Workgroup for the discussion. As I recall, Christy said that the decision was based on the volume of material that doing so would add to the slide deck. There was a general sense among participants that they were being asked to discuss material they didn't actually have in front of them.

Comments by Mary Elizabeth

- The list of deliverables should be included in the minutes. The website link as of 2.5.19 http://www.esjgroundwater.org/Portals/0/assets/docs/agendas/2019/ESJ-Workgroup-2018-Deliverables.pdf for the deliverables is the roadmap instead.
- I specifically identified the City of Escalon Wastewater Reuse Project $30,000,000 for 672 acre feet at $1,488.98/acre foot as an expensive project that should not have been included. Christie stated that they could do a sensitivity analysis to evaluate the effect of projects on portfolios.
- There were several questions about project descriptions and cost with participants directed to the packet which I assume is the project background information presented November 2018 (missed this meeting) but when checking back to November 2018 meeting materials the background information in that slide was considerable different from the January 2019 TAC information. I used the TAC Jan 2019 meeting information to specifically identify the Escalon Reuse project as extraordinarily expense. The Workgroup should have access to the most contemporary data and I believe the flow of information was an area that has been identified as an area of improvement.
- The project polling that occurred in October 2018 should have been included with the project descriptions.
- The Charter which was an agenda item is not included on the website for January's 2019 meeting material.
- My comment regarding conservation vs water rates specifically referred to municipal water rates throughout the county and average household consumption. California Water Service metered rates are the highest and had the lowest water consumption.

ATTACHMENT II
B.1-6.

Villalpando, Kelly

From: Ara Marderosian <ara@sequoiaforestkeeper.org>
Sent: Saturday, February 23, 2019 6:28 AM
To: 'Judie Talbot'; 'Mary Elizabeth'; goldrushdean@yahoo.com; kensvogel@yahoo.com; twells@tfewines.com; wprice@pacific.edu; ypark@ccstockton.org; daryllpq@gmail.com; Linda Turkatte [EH]; 'Restore the Delta'; Dfries.audubon@gmail.com; 'George Hartmann'; 'Mary Hildebrand'; jennifer@mccv.org; jgiordano@thewinegroup.com; ryan.mock@simplot.com; Mooovers@aol.com; michael.machado@ymail.com; colin@ejcw.org; mike@springcreekcc.com; machadofamilyfarms@gmail.com; 'Christy Kennedy'; 'Lucy Eidam Crocker'; 'Lindsay Martien'; Nakagawa, Brandon; ESJGroundwater; awatson@woodardcurran.com; Todd Shuman
Subject: RE: Analysis says to end Valley's groundwater overdraft, farmland must be retired

Rich Kangas wrote as pasted below.
Ara

Maybe the author should have substituted "benefit one special group of businessmen" for 'benefit one basin". Then we would know who would get the benefit. As it is, any extra water shoved down the Friant-Kern Canal in this wetter year will end up in some big private water bank (which of course is part of a basin). Maybe that extra water best serves all by being distributed to all areas for groundwater recharge. Those now using practices requiring groundwater for drip irrigation should be required to use ditch water instead. Then not so much will be shoved down the Friant-Kern Canal. And plenty should be allowed to flow down natural channels to the ocean for all those environmental and economic benefits.

Rich

From: Ara Marderosian [mailto:ara@sequoiaforestkeeper.org]
Sent: Friday, February 22, 2019 2:29 PM
To: 'Judie Talbot' <talbot.judie@gmail.com>; 'Mary Elizabeth' <mebeth@outlook.com>; 'goldrushdean@yahoo.com' <goldrushdean@yahoo.com>; 'kensvogel@yahoo.com' <kensvogel@yahoo.com>; 'twells@tfewines.com' <twells@tfewines.com>; 'wprice@pacific.edu' <wprice@pacific.edu>; 'ypark@ccstockton.org' <ypark@ccstockton.org>; 'daryllpq@gmail.com' <daryllpq@gmail.com>; 'LTurkatte@sjcehd.com' <LTurkatte@sjcehd.com>; 'Restore the Delta' <barbara@restorethedelta.org>; 'Dfries.audubon@gmail.com' <Dfries.audubon@gmail.com>; 'George Hartmann' <gvhlaw@gmail.com>; 'Mary Hildebrand' <hildfarm@gmail.com>; 'jennifer@mccv.org' <jennifer@mccv.org>; 'jgiordano@thewinegroup.com' <jgiordano@thewinegroup.com>; 'ryan.mock@simplot.com' <ryan.mock@simplot.com>; 'Mooovers@aol.com' <Mooovers@aol.com>; 'michael.machado@ymail.com' <michael.machado@ymail.com>; 'colin@ejcw.org' <colin@ejcw.org>; 'mike@springcreekcc.com' <mike@springcreekcc.com>; 'machadofamilyfarms@gmail.com' <machadofamilyfarms@gmail.com>; 'Christy Kennedy' <cskennedy@woodardcurran.com>; 'Lucy Eidam Crocker' <Lucy@crockercrocker.com>; 'Lindsay Martien' <LMartien@woodardcurran.com>; 'Nakagawa, Brandon' <bnakagawa@sjgov.org>; 'ESJgroundwater@sjgov.org' <ESJgroundwater@sjgov.org>; 'awatson@woodardcurran.com' <awatson@woodardcurran.com>; Todd Shuman <tshublu@yahoo.com>
Subject: RE: Analysis says to end Valley's groundwater overdraft, farmland must be retired

Alison Sheehey wrote as pasted below and attached.
Ara Marderosian

It would be interesting if the powers that be would measure the economic loss from all of the human related projects on infrastructure.

https://earthobservatory.nasa.gov/images/89761/san-joaquin-valley-is-still-sinking

Alison

From: Ara Marderosian [mailto:ara@sequoiaforestkeeper.org]
Sent: Friday, February 22, 2019 1:36 PM
To: 'Judie Talbot' <talbot.judie@gmail.com>; 'Mary Elizabeth' <mebeth@outlook.com>; 'goldrushdean@yahoo.com' <goldrushdean@yahoo.com>; 'kensvogel@yahoo.com' <kensvogel@yahoo.com>; 'twells@tfewines.com' <twells@tfewines.com>; 'wprice@pacific.edu' <wprice@pacific.edu>; 'ypark@ccstockton.org' <ypark@ccstockton.org>; 'daryllpq@gmail.com' <daryllpq@gmail.com>; 'LTurkatte@sjcehd.com' <LTurkatte@sjcehd.com>; 'Restore the Delta' <barbara@restorethedelta.org>; 'Dfries.audubon@gmail.com' <Dfries.audubon@gmail.com>; 'George Hartmann' <gvhlaw@gmail.com>; 'Mary Hildebrand' <hildfarm@gmail.com>; 'jennifer@mccv.org' <jennifer@mccv.org>; 'jgiordano@thewinegroup.com' <jgiordano@thewinegroup.com>; 'ryan.mock@simplot.com' <ryan.mock@simplot.com>; 'Mooovers@aol.com' <Mooovers@aol.com>; 'michael.machado@ymail.com' <michael.machado@ymail.com>; 'colin@ejcw.org' <colin@ejcw.org>; 'mike@springcreekcc.com' <mike@springcreekcc.com>; 'machadofamilyfarms@gmail.com' <machadofamilyfarms@gmail.com>; 'Christy Kennedy' <cskennedy@woodardcurran.com>; 'Lucy Eidam Crocker' <Lucy@crockercrocker.com>; 'Lindsay Martien' <LMartien@woodardcurran.com>; 'Nakagawa, Brandon' <bnakagawa@sjgov.org>; 'ESJgroundwater@sjgov.org' <ESJgroundwater@sjgov.org>; 'awatson@woodardcurran.com' <awatson@woodardcurran.com>; Todd Shuman <tshublu@yahoo.com>
Subject: RE: Analysis says to end Valley's groundwater overdraft, farmland must be retired

George Whitmore responded as pasted below.
Ara

"Trading water can significantly reduce the costs of ending groundwater overdraft, because it allows farmers to maintain the crops that generate the most revenue and jobs."

That sentence struck me as illustrating the heart of the problem.

It used to be that crops would not be planted unless there was some prospect of having water to grow them to maturity. I.e. Agricultural practices were somewhat in sync with the realities of California's "feast or famine" precipitation patterns.

We had family friends who owned land in the former Tulare Lake bed. Some years the lake would not rise as high and they could grow a crop. Other years they got flooded out. They lived within the parameters dictated by nature.

But that concept has become outmoded. Now the land owner plants orchards which must be irrigated every year, whether nature provides the water or not. And then demands government action to provide water regardless of the cost to society.

All in the name of "generating the most revenue,"(for the individual land owner) which the op-ed seems to regard as a God-given right.

If farmers cannot control themselves, perhaps it is time to consider regulating which crops may be planted.

George

Villalpando, Kelly

From:	Michael Machado <michael.machado@ymail.com>
Sent:	Friday, February 22, 2019 3:37 PM
To:	'Judie Talbot'; 'Mary Elizabeth'; goldrushdean@yahoo.com; kensvogel@yahoo.com; twells@tfewines.com; wprice@pacific.edu; ypark@ccstockton.org; daryllpq@gmail.com; Linda Turkatte [EH]; 'Restore the Delta'; Dfries.audubon@gmail.com; 'George Hartmann'; 'Mary Hildebrand'; jennifer@mccv.org; jgiordano@thewinegroup.com; ryan.mock@simplot.com; Mooovers@aol.com; colin@ejcw.org; mike@springcreekcc.com; machadofamilyfarms@gmail.com; 'Christy Kennedy'; 'Lucy Eidam Crocker'; 'Lindsay Martien'; Nakagawa, Brandon; ESJGroundwater; awatson@woodardcurran.com; Todd Shuman; Ara Marderosian
Subject:	Re: Analysis says to end Valley's groundwater overdraft, farmland must be retired

George makes a good point. Land use is at the heart of managing water. Local officials are timid to address the elephant in the room and at the state level there is often over reaction at the legislative level and regulators have good intentions but are concerned more with checking boxes then effecting results, i.e. Cal Fed, Delta Authority, Twin Tunnels, and in-channel flow!

Intra-basin water trading has merit, but the marketing of water needs to be transparent. Inter basin trading has the risk of externalities that benefit one basin at the expense of another. Additionally, employing irrigation efficiency should not be a means to expand irrigated acreage, especially on crops that harden demand.

Now, what is really going to happen with SGMA?

Mike

On Friday, February 22, 2019, 1:36:39 PM PST, Ara Marderosian <ara@sequoiaforestkeeper.org> wrote:

George Whitmore responded as pasted below.

Ara

"Trading water can significantly reduce the costs of ending groundwater overdraft, because it allows farmers to maintain the crops that generate the most revenue and jobs."

That sentence struck me as illustrating the heart of the problem.

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We had family friends who owned land in the former Tulare Lake bed. Some years the lake would not rise as high and they could grow a crop. Other years they got flooded out. They lived within the parameters dictated by nature.

From: Ara Marderosian [mailto:ara@sequoiaforestkeeper.org]
Sent: Friday, February 22, 2019 1:19 PM
To: 'Judie Talbot' <talbot.judie@gmail.com>; 'Mary Elizabeth' <mebeth@outlook.com>; 'goldrushdean@yahoo.com' <goldrushdean@yahoo.com>; 'kensvogel@yahoo.com' <kensvogel@yahoo.com>; 'twells@tfewines.com' <twells@tfewines.com>; 'wprice@pacific.edu' <wprice@pacific.edu>; 'ypark@ccstockton.org' <ypark@ccstockton.org>; 'daryllpq@gmail.com' <daryllpq@gmail.com>; 'LTurkatte@sjcehd.com' <LTurkatte@sjcehd.com>; 'Restore the Delta' <barbara@restorethedelta.org>; 'Dfries.audubon@gmail.com' <Dfries.audubon@gmail.com>; 'George Hartmann' <gvhlaw@gmail.com>; 'Mary Hildebrand' <hildfarm@gmail.com>; 'jennifer@mccv.org' <jennifer@mccv.org>; 'jgiordano@thewinegroup.com' <jgiordano@thewinegroup.com>; 'ryan.mock@simplot.com' <ryan.mock@simplot.com>; 'Mooovers@aol.com' <Mooovers@aol.com>; 'michael.machado@ymail.com' <michael.machado@ymail.com>; 'colin@ejcw.org' <colin@ejcw.org>; 'mike@springcreekcc.com' <mike@springcreekcc.com>; 'machadofamilyfarms@gmail.com' <machadofamilyfarms@gmail.com>; 'Christy Kennedy' <cskennedy@woodardcurran.com>; 'Lucy Eidam Crocker' <Lucy@crockercrocker.com>; 'Lindsay Martien' <LMartien@woodardcurran.com>; 'Nakagawa, Brandon' <bnakagawa@sjgov.org>; 'ESJgroundwater@sjgov.org' <ESJgroundwater@sjgov.org>; 'awatson@woodardcurran.com' <awatson@woodardcurran.com>; Todd Shuman <tshublu@yahoo.com>
Subject: RE: Analysis says to end Valley's groundwater overdraft, farmland must be retired

My mid-August 2018 alternate, Todd Shuman, sent a comment/recommendation that I have pasted below.
Ara

I recommended that the SJV groundwater advisory body consider within-basin water trading back in August, similar to what is being tested out in the Ventura County area currently. And of course, if land is to be taken out of production, ultimately, it should be land that is typically used to grow feed for methane-belching, climate-cooking dairy and beef cows. You are welcome to share this comment with the broader group.

Todd Shuman, mid-August 2018 alternate for Ara Marderosian

From: Ara Marderosian [mailto:ara@sequoiaforestkeeper.org]
Sent: Friday, February 22, 2019 9:58 AM
To: 'Judie Talbot' <talbot.judie@gmail.com>; 'Mary Elizabeth' <mebeth@outlook.com>; 'goldrushdean@yahoo.com' <goldrushdean@yahoo.com>; 'kensvogel@yahoo.com' <kensvogel@yahoo.com>; 'twells@tfewines.com' <twells@tfewines.com>; 'wprice@pacific.edu' <wprice@pacific.edu>; 'ypark@ccstockton.org' <ypark@ccstockton.org>; 'daryllpq@gmail.com' <daryllpq@gmail.com>; 'LTurkatte@sjcehd.com' <LTurkatte@sjcehd.com>; 'Restore the Delta' <barbara@restorethedelta.org>; 'Dfries.audubon@gmail.com' <Dfries.audubon@gmail.com>; 'George Hartmann' <gvhlaw@gmail.com>; 'Mary Hildebrand' <hildfarm@gmail.com>; 'jennifer@mccv.org' <jennifer@mccv.org>; 'jgiordano@thewinegroup.com' <jgiordano@thewinegroup.com>; 'ryan.mock@simplot.com' <ryan.mock@simplot.com>; 'Mooovers@aol.com' <Mooovers@aol.com>; 'michael.machado@ymail.com' <michael.machado@ymail.com>; 'colin@ejcw.org' <colin@ejcw.org>; 'mike@springcreekcc.com' <mike@springcreekcc.com>; 'machadofamilyfarms@gmail.com' <machadofamilyfarms@gmail.com>; 'Christy Kennedy' <cskennedy@woodardcurran.com>; 'Lucy Eidam Crocker' <Lucy@crockercrocker.com>; 'Lindsay Martien' <LMartien@woodardcurran.com>; 'Nakagawa, Brandon' <bnakagawa@sjgov.org>; 'ESJgroundwater@sjgov.org' <ESJgroundwater@sjgov.org>; 'awatson@woodardcurran.com' <awatson@woodardcurran.com>; Todd Shuman <tshublu@yahoo.com>
Subject: Analysis says to end Valley's groundwater overdraft, farmland must be retired

Analysis says to end Valley's groundwater overdraft, farmland must be retired

By Ellen Hanak,

Alvar Escriva-Bou, and

Sarge Green

https://www.fresnobee.com/opinion/op-ed/article226574034.html

February 21, 2019 10:31 AM,
A federal Central Valley Project pumping plant near Tracy delivers water to the San Joaquin Valley from the Sacramento-San Joaquin Delta. The Trump administration wants to increase deliveries. Sacramento Bee File Sacramento Bee

The San Joaquin Valley is on the brink of a major transition as it seeks to balance its groundwater accounts. California's largest farming region has the state's biggest groundwater deficit — almost 2 million acre-feet per year by our estimates. To put it in context, that's about one Don Pedro Reservoir's worth of water a year.

Groundwater overdraft — pumping more than is replenished over the long term — makes wells go dry, increases energy required to pump water and causes land to sink, which in turn damages major regional infrastructure. These harmful impacts have become increasingly costly to address.

The state responded to this challenge by mandating that areas with shrinking groundwater supplies bring their basins into balance by the 2040s. To attain balance, groundwater sustainability agencies in the Valley will have to increase supplies, reduce demands, or both.

Our new research includes a detailed analysis of a wide range of options to address this deficit. Although ending overdraft will bring long-term benefits, it entails near-term costs. We find that only about a quarter of the Valley's groundwater deficit can be filled with new supplies at prices farmers can afford. The rest must come from managing demand. We estimate that ending the overdraft will require taking at least 500,000 acres of irrigated cropland out of production.

In addition to water scarcity, the Valley also must deal with a host of other related issues. These include poor groundwater quality, a lack of safe drinking water in rural communities, and a degraded natural environment. Top priorities for addressing these linked issues are:

▪ Capture more local runoff. The best option for increasing supply is capturing and storing additional water from big storms. In particular, recharging groundwater could deliver significant new supplies at a cost farmers can afford. Coordinating management of surface and groundwater storage — both locally and across the entire Central Valley — can also help boost overall water storage capacity. In contrast, big investments to increase water imports — for example, California WaterFix or expanding Shasta Reservoir — are relatively expensive for Valley farmers.

▪ Expand water trading. Trading water can significantly reduce the costs of ending groundwater overdraft, because it allows farmers to maintain the crops that generate the most revenue and jobs. Overall, we estimate that if farmers can freely trade water within their basin, it will reduce the costs of this transition by nearly half. And trading more broadly across the region will cut costs by nearly two-thirds.

▪ Address groundwater quality challenges. Providing safe drinking water to rural communities is an urgent priority. Stakeholders in the Valley will also need to work on managing water quantity and quality together, since recharge could affect groundwater quality. For instance, some recharge practices could flush pollutants from soils into groundwater.

▪ Foster beneficial water and land-use transitions. There are opportunities to put lands coming out of production to good use and gain "more pop per drop" from limited water resources. Multiple-benefit approaches to water and land management can enhance groundwater recharge and provide new recreational opportunities, additional flood protection, improved habitat, and new revenue for landowners.

Gov. Newsom has acknowledged the need to address the Valley's water supply, water quality, poverty, and economic development challenges. State leadership can help on a number of fronts — including providing clarity on how much water is available for groundwater recharge, establishing a reliable funding source for safe drinking water solutions, and supporting regional planning processes to address these issues.

Although state and federal partners can help, the Valley's future is in the hands of its residents. A Valley-wide conversation on the changes that lie ahead can help determine the next steps for creating a better future. The stakes are high — but the costs of inaction are higher.

Ellen Hanak is director of the Public Policy Institute of California's Water Policy Center and can be contacted at hanak@ppic.org. Alvar Escriva-Bou is a research fellow at the PPIC Water Policy Center and can be contacted at escriva@ppic.org. Sarge Green is a water management specialist with the California Water Institute at California State University, Fresno, and can be contacted at sgreen@mail.fresnostate.edu.

Read more here: https://www.fresnobee.com/opinion/op-ed/article226574034.html#storylink=cpy

"With snowpack thick and rivers running fast, you might not guess California is in the midst of a water crisis. But as many as 750,000 acres of farmland may need to be fallowed in the coming years, or about 14 percent of the San Joaquin Valley cropland, the Public Policy Institute of California reports.

- **The cost:** $2 billion in lost crops.

- **The reason:** In 2014, the Legislature approved the Sustainable Groundwater Management Act, a landmark law that for the first time regulated groundwater, which has been severely overdrafted in much of the valley.
- **The report:** "To protect their bottom line, farmers would try to adapt by first reducing acreage of less profitable crops, and avoiding cutbacks in nuts, fruits, and vegetables. But in areas with high shares of these crops and large water cutbacks, some would need to be fallowed, at significant cost."

https://calmatters.org/articles/newsletters/oakland-teachers-soda-taxes-unions-california-water/

And previously cited analysis on More California Groundwater Pumping. **https://www.watereducation.org/western-water/california-leans-heavily-its-groundwater-will-court-decision-tip-scales-against-more**

Ara

Mr. Ara Marderosian,
Executive Director
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http://www.youtube.com/c/SequoiaForestkeeper

Villalpando, Kelly

From: Emard, Joyia@DWR <Joyia.Emard@WATER.CA.GOV>
Sent: Thursday, February 28, 2019 1:59 PM
To: DWR_SGMP@LISTSERVICE.CNRA.CA.GOV
Subject: SGMO News: February Newsletter

CALIFORNIA DEPARTMENT OF WATER RESOURCES
SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

TODAY'S TOPICS
February 28, 2019
Updates from the California Department of Water Resources' Sustainable Groundwater Management Office

News
- Final 2018 Basin Boundary Modifications Released

Upcoming Events
- DWR GSA Forum on March 21, 2019

SAVE THE DATE Location Announced for DWR's March GSA Forum

The Department of Water Resources (DWR) is hosting a free Groundwater Sustainability Agency (GSA) Forum for GSA members and stakeholders on March 21, 2019, in West Sacramento, to facilitate the exchange of ideas, establish professional networks and foster successful stakeholder engagement. Two panel discussions will focus on communication, coordination, engagement and outreach. A diverse group of GSAs will be represented, with up to five GSA members on each panel. Panelists will showcase various governance structures, stakeholder outreach and engagement strategies and will provide presentations, followed by a Q&A session. The GSA Forum is free to attend, but space is limited so please register. Boxed lunches for the networking lunch can be ordered when reservations are made.

GSA Forum
March 21, 2019, 10 a.m. to 3 p.m.
Civic Center Galleria
1110 West Capitol Avenue
West Sacramento
Register

NEW Final 2018 Basin Boundary Modifications Released

DWR's Sustainable Groundwater Management Office released the 2018 Final Basin Boundary Modifications decisions and accompanying documents. In the final decisions, 35 basin boundary modifications requests were approved, four were denied, and four were partially approved.
Click on the following links to view 2018 Final Basin Boundary Modifications results:
Summary Table
Summary of Individual Basins
Modified Basins Map

For additional information, please refer to the Basin Boundary Modifications webpage.

For questions, email sgmps@water.ca.gov.

REMINDER Alternative Submittals Annual Report Deadline is April 1, 2019

SGMA established a process for local agencies to develop an Alternative in lieu of a Groundwater Sustainability Plan (GSP) for evaluation by DWR. An Alternative was required to be submitted to DWR for review by January 1, 2017, with annual reports for the preceding water year due by April 1 of each year. **The water year 2018 annual report submittal deadline is April 1, 2019.**

DWR has developed an online Alternative Reporting System that allows local agencies to submit Alternatives and the public to review and comment on the Alternatives.
For more information on requirements and evaluation criteria, click here and go to Alternative Submittal and for reference view the Groundwater Sustainability Plan Regulations.

For more information, contact Craig Altare at Craig.Altare@water.ca.gov or call (916) 651-0870.

REMINDER Submit Your GSP Initial Notification

Groundwater sustainability agencies (GSA) are required to notify DWR, in writing, prior to initiating development of a groundwater sustainability plan (GSP). GSAs must submit all applicable GSP initial notification information to DWR using the SGMA Portal – GSP Initial Notification System. The SGMA Portal – GSP Initial Notification System also allows edits to be made to a previously submitted Initial Notification, including the ability to withdraw a submittal.

Also, remember, *"If the geographic area to be covered by the plan includes a public water system regulated by the Public Utilities Commission, the groundwater sustainability agency shall provide the written statement to the commission."* See Water Code § 10727.8.

For more information, please see Frequently Asked Questions on GSP Initial Notification Requirements or contact the Regional Coordinators in DWR's four Regional Offices.
For assistance with the system, please email monica.reis@water.ca.gov.

Connect with Your Basin Point of Contact

DWR has designated Basin Points of Contact to assist local agencies and GSAs as GSPs are developed and implemented and to assist with applications for Technical Support Services and Facilitation Support Services.

Northern Region

North Central Region

South Central Region

Southern Region

For regional inquiries, please contact sgmp_rc@water.ca.gov.

For general inquiries, please contact sgmps@water.ca.gov.

Video: Water and the Future of the San Joaquin Valley

LORI POTTINGER FEBRUARY 28, 2019

The San Joaquin Valley is at a critical juncture in determining its water future. California's largest agricultural region is ground zero for many of the state's most difficult water management problems, including groundwater overdraft, drinking water contamination, and declines in habitat and native species.

A state mandate to bring groundwater use to sustainable levels will have a broad impact on valley agriculture and the regional economy in coming years, likely including some permanent idling of farmland.

The PPIC Water Policy Center assembled a group of regional experts last week for a half-day public event at Fresno State to discuss three overarching challenges: balancing the valley's water supplies and demands, addressing water quality problems, and planning for beneficial water and land use transitions.

Ellen Hanak, director of the PPIC Water Policy Center, launched the day's discussions with a summary of the valley's water-related challenges and approaches that could help address them. "The valley faces unprecedented challenges and a lot of change," she said. Drawing from a new PPIC report on the valley's water future, she noted that an all-hands-on-deck approach will be needed as the scope of the problems can't be addressed farm by farm. "The most promising approaches are those that increase flexibility, provide incentives to encourage folks to make decisions that are beneficial, and can be done cooperatively."

The first panel focused on ways to balance supply and demand in the face of an annual groundwater deficit of nearly 2 million acre-feet a year. Some of the approaches discussed included assessing opportunities to use infrastructure and farmland to augment groundwater recharge, crediting landowners for helping to recharge aquifers, and providing flexibility to farmers—for instance with water trading—so they can avoid fallowing the most profitable crops.

"The goal is to put as many tools into the hands of the landowners to give them the opportunity to manage [groundwater sustainability] to the best of their ability," said Eric Averett of the Rosedale-Rio Bravo Water Storage District.

The second panel tackled the complex and pressing groundwater quality issues the valley faces—from resolving safe drinking water problems in poor rural communities to addressing ongoing nitrate and salt contamination of groundwater and soils. Key challenges include finding ways to pay for safe drinking water for affected communities; identifying cost-

effective approaches to reduce nitrate contamination, especially on farmlands managed by dairies; and ensuring that flooding farmland to recharge basins doesn't harm groundwater quality.

The final panel explored ways to manage fallowed land to get multiple benefits for people and nature. "We can think about ways to manage recharge basins to create wildlife habitat," said Nat Seavy of Point Blue Conservation Science, one of the authors of the PPIC report. "There are opportunities to restore retired land and create habitat for San Joaquin desert species, and we can restore floodplains in a way that provides flood benefits for people."

A common theme to the day's discussions was finding ways that local stakeholders can work together on these difficult problems. As Hanak noted, "The leadership on this has to come from the valley. State and federal support can help, but folks in the valley will need to drive the change."

We invite you to watch the videos from this event and hope you find the discussions helpful:

- Welcome and Introduction by Ellen Hanak
- Balancing the Valley's Water Supplies and Demands
- Managing for Water Supply and Water Quality
- Valley 2040: Planning for Water and Land Use Transitions

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Sierra Nevada snowpack through February fifth largest in 40 years

11

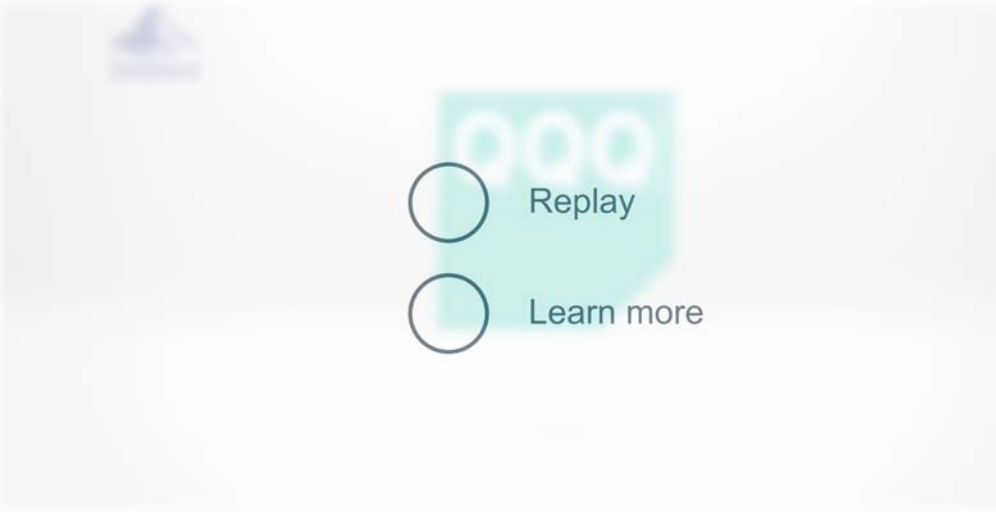
Ski resorts recorded as much as 25 feet of snow in February

Officials from the California Dept. of Water Resources take a monthly snowpack reading at Phillips Station just off Highway 50 near Sierra-at-Tahoe.

By **MARK GOMEZ** | mgomez@bayareanewsgroup.com | Bay Area News Group
PUBLISHED: February 28, 2019 at 1:47 pm | UPDATED: March 1, 2019 at 4:48 am

In the span of two months, California's Sierra Nevada snowpack has gone from a discouraging, below-average amount to a level seen only a handful of times in the previous 40 years.

Fueled by a parade of "atmospheric river" storms in February that blanketed the Sierra Nevada with as much as 25 feet of snow, California's statewide snowpack surged to 152 percent of its historical average, according to a survey done Thursday. The statewide snowpack measured at 73 percent of normal on Dec. 31.



Since 1980, the statewide snowpack through the end of February has measured 150 percent of normal or higher just five times, according to data from the California Dept. of Water Resources.

"This winter's snowpack gets better each month, and it looks like California storms aren't done giving yet," said Karla Nemeth, director of the state's Department of Water Resources. "This is shaping up to be an excellent water year."

The 2019 snowpack through February is the third highest in 22 years, behind 2017 (185 percent) and 1998 (180 percent). Going back to 1980, the highest snowpack through February was measured in 1983 (211 percent), followed by 1993 (205 percent).

Every winter, around the start of each month, state water officials and other scientists from more than 50 local, state and federal agencies collect data from more than 300 locations throughout California. The measurement at one of those locations, Phillips Station in El Dorado County off Highway 50, is regularly done in front of journalists and usually broadcast live on the Dept. of Water Resources' Facebook page.

Thursday, the snowpack reading at Phillips Station measured 113 inches of snow depth, and a snow water equivalent of 43.5 inches, more than double what was recorded last month at the same location. By measuring the snow water equivalent — the depth of water that theoretically would result if the entire snowpack melted instantaneously– the state's water managers can more accurately forecast spring runoff.

The amount of snow that has piled up across the Sierra Nevada represents 133 percent of the statewide historical snowpack average on April 1, considered the end of winter by state water managers.

And more snow is expected in March. The National Weather Service in Reno issued a winter storm watch for Friday night through Saturday in the Sierra Nevada, with initial snowfall estimates ranging from 6 to 10 inches in the Tahoe basin and 1 to 2 feet possible at higher elevations.

The weather service said another storm system "looms on the horizon" and may hit sometime Tuesday or Wednesday.

The potential for additional storms, and possibly more "atmospheric rivers," will bring renewed concerns for flooding across Northern California. This week, several towns along the Russian River in Sonona County experienced the worst flooding there in 24 years as waters rose nearly 14 feet above flood stage. The flooding was fueled by an "atmospheric river" storm that stalled over the North Bay and dropped a record-breaking 20.79 inches of rain over Venado, a spot in rural Sonoma County situated just above the Russian River.

"Along with the water supply benefits of the heavy rain and snow, there is also increased flood risk," said John Paasch, the chief of flood operations for the department of water resources. "We've activated the Flood Operations Center, a joint effort between DWR and the National Weather Service, to closely monitor weather, reservoir, river and flood conditions. Our goal is to share timely and accurate information about changing conditions to help people and communities respond to flood events and stay safe."

At Squaw Valley Alpine Meadows in the Tahoe area, 313 inches (or 25 feet) of snow fell during February (with a few more inches expected before Thursday's end), breaking the ski resort's all-time record for snow in any month, 282 inches in January 2017. Snowfall records at Squaw Valley Alpine Meadows date back to 1970.

Heavenly, Northstar and Kirkwood ski resorts announced Thursday plans today to extend this winter's ski and snowboard season into mid to late-April. Heavenly Mountain Resort plans to extend the season through April 28 (with a bonus three-day weekend of May 3-5); Northstar California Resort plans to extend the season through April 21; and Kirkwood Mountain Resort plans to extend the season through April 14 (with a bonus three-day weekend of April 19-21).

Thursday, the state's largest six reservoirs currently hold between 84 percent (Oroville) and 137 percent (Melones) of their historical averages for this date. Lake Shasta, California's largest surface reservoir, is 112 percent of its historical average.

Staff writer Paul Rogers contributed to this report.

Tags: California Weather, Editors' Picks, Regional, Sierra Nevada, Water

Measuring Success in Groundwater Management

March 04, 2019 | Water in the West | News
By **Megan Glatzel (/about/people/megan-glatzel)**

New report provides insight into the role of quantitative metrics in achieving groundwater management goals under California law.

The passage of the Sustainable Groundwater Management Act (SGMA) in 2014 was a watershed moment, establishing the first statewide framework for managing California's critical groundwater resources. Under this framework, one of the key challenges facing newly formed local government agencies responsible for groundwater management is to establish and implement quantitative metrics for sustainability. To help local agencies do this, a new report (https://stanford.io/2NFXSMb) from Water in the West examines how four special act districts in California have used quantitative thresholds to adaptively manage groundwater. These case studies provide valuable insights on the development and implementation of performance metrics and will be important in guiding local agencies.

"SGMA introduces new requirements for local agencies to establish quantitative metrics for groundwater management. This isn't just a scientific and technical challenge. As the experiences of our four case study agencies illustrate, there are often institutional barriers to defining usable metrics and updating decisions in order to stay on track," said Esther Conrad (https://haas.stanford.edu/people/esther-conrad), former postdoctoral fellow at the Water in the West Program and Stanford Law School's Gould Center on Conflict Resolution.

Under SGMA, the newly formed Groundwater Sustainability Agencies (GSAs) are tasked with creating plans to achieve sustainable groundwater management by 2040 or 2042, depending on the basin. The plans require agencies to define minimum thresholds, measurable objectives and interim milestones to eliminate six "undesirable results'' during plan implementation. Defining these thresholds for the first time and using quantitative metrics to gauge their progress will be a critical component of SGMA's success.

"Understanding what constitutes a significant and unreasonable impact and translating that into minimum thresholds is a difficult task. Fortunately, there are agencies in the state that we can learn from. This report identifies lessons learned and makes recommendations intended to help GSAs as they develop the quantitative metrics required under SGMA," said Tara Moran (http://waterinthewest.stanford.edu/about/people/tara-moran-phd), Sustainable Groundwater Program Lead at Stanford's Water in the West Program.

Keep It Simple

The report makes a number of recommendations to guide GSAs in designing meaningful metrics. First, metrics should be as simple as possible while remaining technically robust. Special care must also be given when the metrics concern conditions over which the agency does not have full control, such as water quality. In order to be effective, metrics need to be linked with decision-making processes. For example, in Santa Clara Valley Water District and Zone 7 Water Agency each have defined "stages" of drought that are linked to specific management actions. Deadlines are also key; buffers should be included, but there need to be clear consequences for not achieving goals on time. Finally, metrics themselves should be revised over time and when new information is made available.

Keep it Nimble

In the face of political resistance, institutional inertia and other constraints, GSAs will need to maintain flexibility to adapt their management approach over time. This will be crucial as California water managers cope with a changing climate that is expected to experience more frequent and severe droughts. To better understand what this looks like in practice, the report analyzes how the four special act districts responded to the 2012-2016 drought and provides important lessons to guide GSAs. Specifically, the report recommends that all GSAs consider including drought contingency plans as part of GSP development and implementation.

"Understanding how best to define performance metrics and incorporating processes for adaptive management based on those metrics will be crucial to agencies as they work to achieve sustainable groundwater management," said Conrad.

A ribbon cutting ceremony of the first advanced metering infrastructure installation in Fox Canyon in 2018.

Photo Credit: Fox Canyon Groundwater Management Agency.

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Why California's droughts and floods will only get worse

This is bad news for water storage and flood risk.

By ULA CHROBAK MARCH 5, 2019

The Golden State's had a harsh winter. Between October 1 and March 3, most California weather stations across the state were reporting greater-than-normal amounts of precipitation. And the state's snowpack has grown to be the fifth largest in 40 years, with up to 25 feet of powder in some places.

Article Continues Below:

It's needed moisture after a six-year-long drought from 2011 to 2017 and last year's dry winter. Snowpack and reservoirs are stocked right now. But persistent rain has flooded many areas, including towns along Northern California's Russian River. In Guerneville, residents paddled around after the river swelled to 45 feet high. Rain, floods, and mudslides have also wrecked homes and roads in areas across the state.

The dramatic shift from dry to wet this winter hints at what's to come. Scientists predict that California's total precipitation will remain close to constant in the future, but it will fall in a shorter window of time, with more of it as rain. The state will also experience greater variability—more very wet *and* more very dry years. These findings highlight the need to capture rainfall and improve aging infrastructure.

Here's what to expect from California's wet seasons, now and in the future:

An already-variable climate

When it comes to rain and snow, California tends to be all-or-nothing. "We have the most variable climate in the continental U.S.," says Heather Cooley, director of research at the Pacific Institute, a water policy think tank. "We have very, very wet years, and we have very, very dry years."

The timing of California's precipitation is unique, too. The state has a Mediterranean climate, which means wet, mild winters and warm, dry summers. But California uses most of its water in the summer, a lot of it to grow irrigated crops. (Much of the United States' fruit, vegetables and nuts are grown in the California's Central Valley.) To help boster water supplies in summer, farms and cities alike rely on water melted from Sierra Nevada snowpack. Californians also store surplus water in reservoirs and underground aquifers.

A lot of the state's rain and snow falls from atmospheric rivers, "long, ephemeral corridors of intense moisture transport" in the sky, says Alexander Gershunov, research meteorologist at the University of California, San Diego. Fed by moisture from the ocean, these rivers flow with winds, holding their moisture until it's somehow squeezed out. In California, that happens when the atmospheric rivers crash into the Sierra Nevada mountains, raining and snowing across the western Sierras and leaving the eastern part of the state relatively dry.

"We've seen a large number of colder [atmospheric rivers]" this winter, says Daniel Swain, climate scientist at the University of California, Los Angeles. Atmospheric rivers are usually associated with warm storms, but this year California had both warm and cold storms. Swain traces these cold storms to the stratospheric polar vortex breakdown, which led to a mass of polar air sitting over Canada, occasionally moving south. Additionally, this winter's polar vortex disruption led to a wavy jet stream, a bend of which is located the West Coast. Because of the jet stream's position, "we've had this persistent region that favors increased storminess," says Swain.

Droughts and floods in the future

While California's climate has always been variable, this century's big swings from wet to dry foreshadow an overall shift to an even more dramatic future climate.

Because the planet's poles are warming faster than the tropics, the difference in temperature between these two climate zones is becoming smaller. This leads to an expanding subtropical, arid region. This subtropical zone is pushing into Mediterranean climates, including those in Chile, South Africa, Australia, and the Mediterranean Basin, causing total precipitation in these places to decrease.

California is defying this trend—it's annual average precipitation is expected to remain about the same, according to a study by Gershunov in 2017. But the intensity of rain is expected to increase, meaning more will fall in less time. This is thanks to atmospheric rivers. As temperatures warm, the atmosphere holds more water. So while California's overall dry season will lengthen, due to expanding subtropics and warming temperatures, its winter atmospheric rivers will dump more water than before.

In a 2018 study, Swain's team evaluated the number of extreme storms and droughts expected as the climate warms, projecting that wet extremes will go up by 100 to 200 percent by the end of this century. Extreme dry years, similar to the 2013 to 2014 drought year, will become more common by 2050, especially in Southern California. "Precipitation whiplash," or the immediate shift from a drought to flooded winter will go up by about 50 percent. This will eliminate the so-called "shoulder season" that typically acts a buffer between weather extremes.When it does rain, it'll be within a shorter window in the winter. "We're making an already narrow season more concentrated, at the expense of the shoulder season," says Swain.

These changes could have disastrous consequences. In his study, Swain considered the risk of floods like the 1862 Great Flood—which killed thousands of people and formed a 300-mile-long inland sea. There's about a 50-50 chance of another event of the same scale occurring again by 2060, he found. "It would essentially inundate land that is now home to millions of people," says Swain.

Opportunities to adapt

Heavy rains could cause catastrophes if they overwhelm the state’s aging dams. A recent Army Corps of Engineers report found that a rare, powerful storm could cause the Whittier Narrows Dam, near Los Angeles, to breach, threatening lives in downstream communities.

Future droughts will also test California’s water reserves. And they’ll be made worse by the fact that temperatures will be warmer, drying out landscapes. A single wet winter like the one California’s having is not enough to restore the state’s groundwater aquifers, says Pacific Institute’s Cooley. Groundwater is key to weathering droughts, when snowpack and surface water are less and less available. And much of the water raining down on the Golden State right now is funneled straight to the ocean, thanks to paved surfaces and channelized waterways.

The good news is, there’s a lot that the state can do—or is already doing—to adapt to a wet and dry warmer future. “I think there are huge opportunities for us to rethink how we manage water and land use,” says Cooley.

Officials in California are looking to a number of ways to enhance recharge, including infiltration basins and directly injecting water into the ground. Requiring industrial and commercial developments to design with permeable surfaces and add features like bioswales can help store stormwater, too, says Cooley.

According to a 2014 Pacific Institute report, Southern California and the San Francisco Bay Area could store an extra 420,000 to 630,000 acre-feet of water per year by capturing stormwater, close to the amount of water Los Angeles uses annually.

Swain says the Yolo Bypass, located outside Sacramento, is also a great example of flood control. Officials route excess flows from the Sacramento River to this floodplain, where the water saturates rice farms and creates wetland habitat. It’s a win for farmers, wildlife, and flood prevention. It’s cheaper and less risky than building more dams, too, says Swain. “It certainly seems like there may be opportunity to harness one extreme to mitigate the risks of the other.”

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