APPENDIX A

GSA Formation Documentation

APPENDIX A-1

FCGMA 2015 NOI to Become a GSA and Resolution 2015-01

FOX CANYON
GROUNDWATER MANAGEMENT AGENCY
A STATE OF CALIFORNIA WATER AGENCY

January 26, 2015

Mark Cowin
California Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001

SUBJECT: NOTICE OF INTENT TO BECOME A GROUNDWATER SUSTAINABILITY AGENCY FOX CANYON GROUNDWATER MANAGEMENT AGENCY

Dear Mr. Cowin:

As outlined in the California Water Code, Part 2.74, Sustainable Groundwater Management Act (Act), Section 10723 (c), the Fox Canyon Groundwater Management Agency (FCGMA) shall be deemed the exclusive Groundwater Sustainability Agency (GSA) within its boundaries with powers to comply with Act. On January 09, 2015 the FCGMA held a public hearing and passed Resolution 2015-01, Attachment 1, wherein the FCGMA elected to become the GSA for the Arroyo Santa Rosa Valley, Las Posas Valley (West, South, and East), Oxnard Forebay, Oxnard Plain and Pleasant Valley Basins within the FCGMA boundaries. Therefore, this letter shall service as the Notice of Intent for the FCGMA to assume the role as the GSA for the aforementioned basins, depicted on Attachment 2.

Per Section 10723.2 of the Act, the GSA shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. The FCGMA as enacted has a Board of Directors and operating structure that clearly represents the interests of all users and uses of groundwater and surface water within the FCGMA boundaries. The five member Board of the FCGMA is comprised as follows:

- One member shall be chosen by United Water Conservation District, the member's district or divisions must overlie at least in part the territory of the FCGMA;
- One member shall be chosen by the County of Ventura, the member's district must overlie at least in part the territory of the FCGMA;
- One member shall be chosen from the members of the city councils of the cities whose territory at least in part overlies the territory of the FCGMA;
- One member shall be chosen from the members of the governing boards of the following mutual water companies and special districts not governed by the County Board of Supervisors which are engaged in water activities and whose territory at least in part overlies the territory of the FCGMA: the Alta Mutual Water Company, the Anacapa Municipal Water District, the Berylwood Mutual Water Company, the Calleguas Municipal Water District, the Camrosa County Water District, the Del Norte Mutual Water Company, the Pleasant Valley County Water District, and the Zone Mutual Water Company; and
- The fifth member of the Board shall be chosen by the other four members from a list of at least five nominations from the Ventura County Farm Bureau and the Ventura County Agricultural Association acting jointly for a two-year term to represent agricultural interests within the territory

of the FCGMA. The fifth member shall reside and be actively and primarily engaged in agriculture within the territory of the FCGMA.

Acting as a groundwater management agency since 1983 the FCGMA has undertaken a collaborative and inclusive model to include all users and uses of groundwater as it strives to protect this valuable resource. It has enacted numerous policies and ordinances aimed at protecting the resource. A history of the FCGMA and pertinent ordinances and resolutions are available at http://fcgma.org/.

Should you require additional information or a clarification of this Notice of Intent, please contact me at (805) 654-2073.

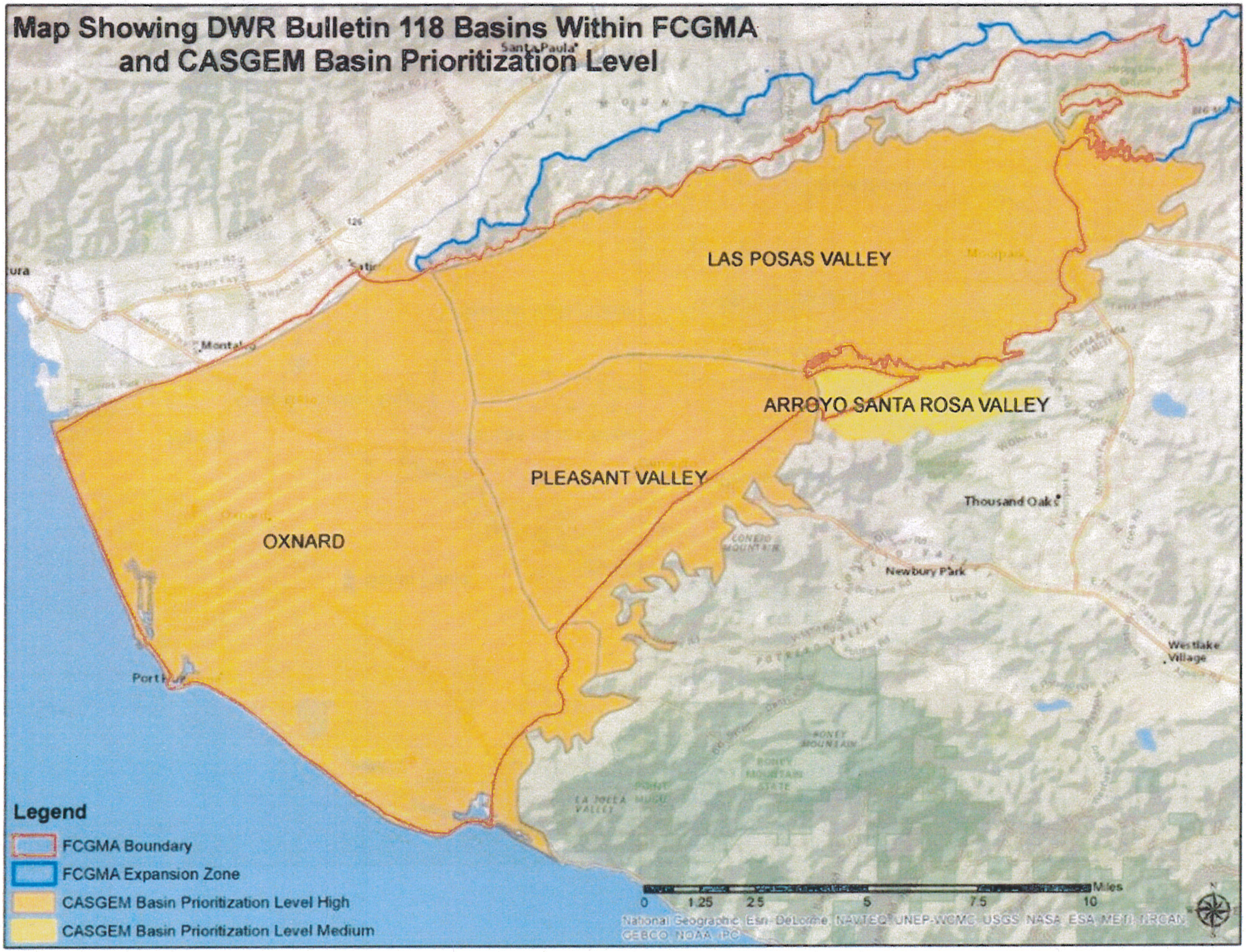
Sincerely,

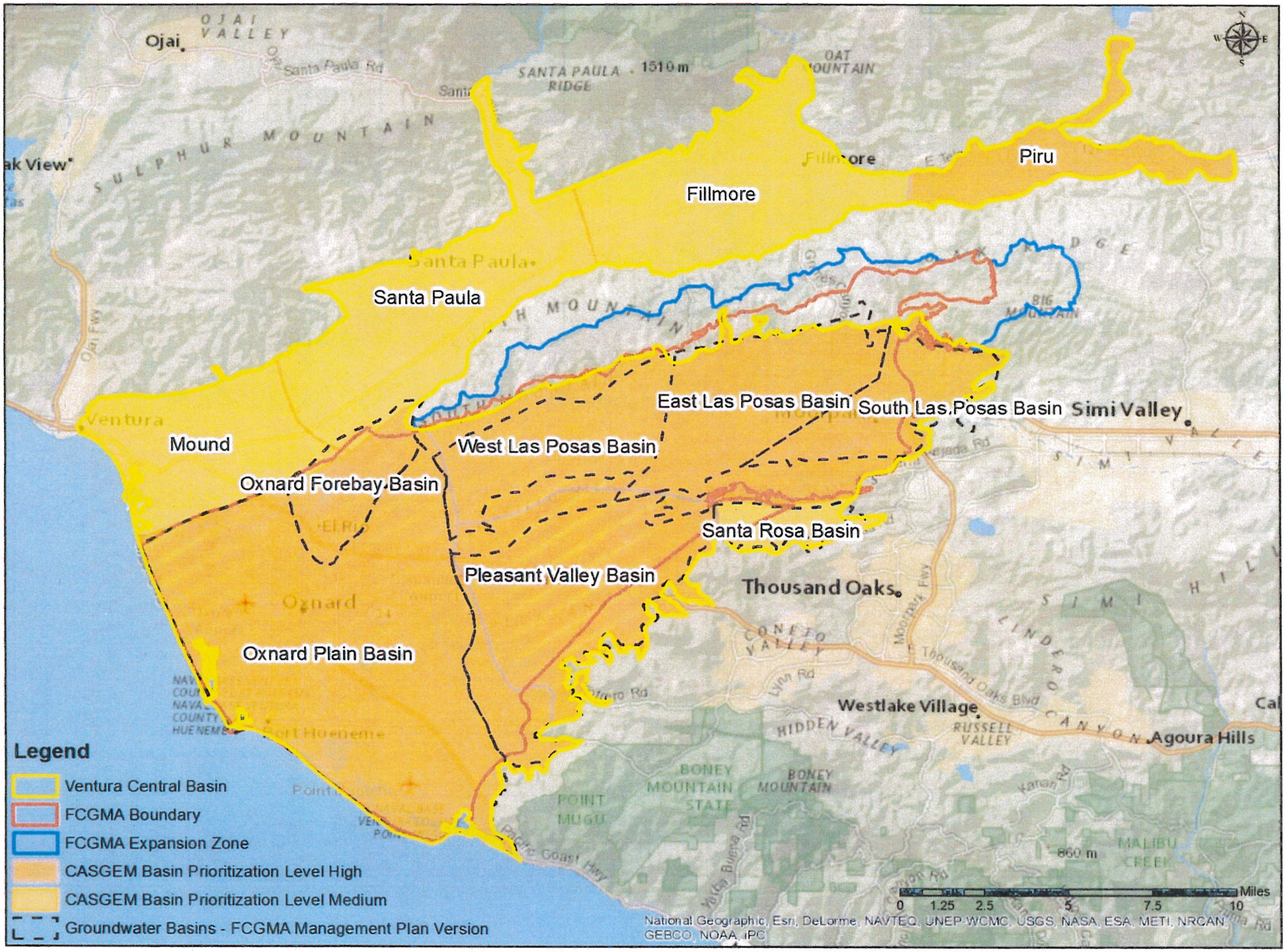
Jeff Pratt

Jeff Pratt, P.E.
FCGMA Executive Officer

Attachments: (1) FCGMA Resolution 2015-01
(2) FCGMA Boundary and Basins

cc: Bob Pierotti, Supervising Engineering Geologist
California Department of Water Resources
Southern Region
770 Fairmont Avenue, Suite 102
Glendale, CA 91203


Map Showing DWR Bulletin 118 Basins Within FCGMA
and CASGEM Basin Prioritization Level
LAS POSAS VALLEY
ARROYO SANTA ROSA VALLEY
PLEASANT VALLEY
OXNARD
Santa Paula
Thousand Oaks
Newbury Park
Westlake Village
Port Hueneme
Legend
FCGMA Boundary
FCGMA Expansion Zone
CASGEM Basin Prioritization Level High
CASGEM Basin Prioritization Level Medium
0 1.25 2.5 5 7.5 10 Miles
National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC


Legend
Ventura Central Basin
FCGMA Boundary
FCGMA Expansion Zone
CASGEM Basin Prioritization Level High
CASGEM Basin Prioritization Level Medium
Groundwater Basins - FCGMA Management Plan Version
Piru
Fillmore
Santa Paula
Mound
Oxnard Forebay Basin
West Las Posas Basin
East Las Posas Basin
South Las Posas Basin
Santa Rosa Basin
Pleasant Valley Basin
Oxnard Plain Basin
Ojai
Simi Valley
Thousand Oaks
Westlake Village
Agoura Hills
Ventura
Oxnard
Port Hueneme
Miles
0 1.25 2.5 5 7.5 10
National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC

Resolution No. 2015-01

of the

Fox Canyon Groundwater Management Agency

A RESOLUTION ELECTING TO BE THE GROUNDWATER SUSTAINABILITY AGENCY FOR THE ARROYO SANTA ROSA VALLEY, (WEST, SOUTH, EAST) LAS POSAS VALLEY, OXNARD FOREBAY, OXNARD PLAIN, AND PLEASANT VALLEY BASINS WITHIN THE BOUNDARIES OF THE FOX CANYON GROUNDWATER MANAGEMENT AGENCY

WHEREAS, Fox Canyon Groundwater Management Agency was formed for the purpose of preserving the groundwater resources within its statutory boundaries and has such powers granted by its enabling legislation and such other powers as are reasonably implied and necessary and proper to carry out its objectives and purposes; and

WHEREAS, the Agency's statutory boundaries overlie the following groundwater basins identified and defined in the Department of Water Resources report entitled "California's Groundwater: Bulletin 118" updated in 2003: the Arroyo Santa Rosa Valley Groundwater Basin, the Las Posas Valley Groundwater Basin, the Oxnard Sub-basin of the Santa Clara River Valley Groundwater Basin, and the Pleasant Valley Groundwater Basins within the boundaries of the Fox Canyon Groundwater Management Agency; and

WHEREAS, in 2014, the Legislature added the Sustainable Groundwater Management Act to the Water Code which grants the Agency additional authority and technical and financial assistance necessary to sustainably manage groundwater; and

WHEREAS, the Act establishes the Agency as the exclusive local agency within its statutory boundaries unless it elects to opt out of being the exclusive groundwater management agency within those boundaries; and

WHEREAS, the Agency wishes to exercise the powers and authorities of a groundwater sustainability agency granted by the Act and has conducted the public hearing required under section 10723 of the Act.

NOW, THEREFORE, IT IS HEREBY PROCLAIMED AND ORDERED that:

1. Fox Canyon Groundwater Management Agency elects to be the exclusive groundwater management agency within its statutory boundaries with powers to comply with the Sustainable Groundwater Management Act;

and

2. The Executive Officer is authorized to submit to the Department of Water Resources on behalf of the Agency a notice of intent to undertake sustainable groundwater management in accordance with Part 2.74 of the Water Code.

On motion by Director Craven, and seconded by Director Kelley, the foregoing resolution was passed and adopted on January 9, 2015 by the following vote.

AYES – Chair Maulhardt, Directors Craven, Bennett, and Kelley
NOES – None
ABSTAINS – None
ABSENT – Director Borchard

By: Lynn E. Maulhardt

Lynn E. Maulhardt, Chair, Board of Directors
Fox Canyon Groundwater Management Agency

ATTEST: I hereby certify that the above is a true and correct copy of Resolution No. 2015-01.

By: Jessica Kam

Jessica Kam, Clerk of the Board

APPENDIX A-2

County of Ventura 2017 Resolution – GSA-Unmanaged Areas

BOARD MINUTES
BOARD OF SUPERVISORS, COUNTY OF VENTURA, STATE OF CALIFORNIA

SUPERVISORS STEVE BENNETT, LINDA PARKS,
KELLY LONG, PETER C. FOY AND JOHN C. ZARAGOZA
June 20, 2017 at 10:30 a.m.

Public Hearing Regarding Adoption of a Resolution to Become the Groundwater Sustainability Agency for Unmanaged Areas Within the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin.
(Public Works Agency)

(X) All Board members are present.

(X) The Board holds a public hearing.

(X) The following person is heard: Arne Anselm.

(X) Upon motion of Supervisor Foy, seconded by Supervisor Bennett, and duly carried, the Board hereby approves recommendations as stated in the Board letter.

I hereby certify that the annexed instrument is a true and correct copy of the document which is on file in this office.
Dated: 6/23/17
MICHAEL POWERS
Clerk of the Board of Supervisors
County of Ventura, State of California

By: Lori Gaines
Deputy Clerk of the Board

By: [signature]
Brian Palmer
Chief Deputy Clerk of the Board

Item #55
6/20/17

RESOLUTION NO. 17-088

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF VENTURA TO BECOME THE GROUNDWATER SUSTAINABILITY AGENCY FOR UNMANAGED AREAS WITHIN THE SANTA PAULA AND OXNARD SUB-BASINS OF THE SANTA CLARA RIVER VALLEY GROUNDWATER BASIN, AND THE PLEASANT VALLEY AND LAS POSAS VALLEY GROUNDWATER BASINS

WHEREAS, the California Legislature has adopted, and the Governor has signed into law,the Sustainable Groundwater Management Act of 2014 ("SGMA"), which authorizes local agencies to manage groundwater in a sustainable fashion; and

WHEREAS, SGMA provides that for all groundwater basins designated by the Department of Water Resources (DWR) as a high- or medium priority basin a local agency, or combination of agencies, must decide to become the groundwater sustainability agency or agencies (GSAs) for the entire basin to avoid state intervention; and

WHEREAS, DWR has designated the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin (Basins) as high- or medium priority basins; and

WHEREAS, SGMA further provides that in the event there is an area within a high- or medium priority basin that is not within the management area of a GSA, the County of Ventura will be presumed to be the GSA for that area unless the County opts out of being the GSA for that area; and

WHEREAS, there are currently areas within the Basins that are not within the management area of a GSA and are considered unmanaged under SGMA; and

WHEREAS, SGMA requires the County to provide notification to DWR of the County's decision to become a GSA for any unmanaged area within a high- or medium priority basin on or before June 30, 2017;

WHEREAS, the Board of Supervisors of the County has determined it to be in the County's best interest and in the public interest for the County to act as the GSA for any areas within the Basins that are unmanaged as of June 30, 2017; and

WHEREAS, adoption of this resolution does not constitute a "project" under California Environmental Quality Act Guidelines Section 15378(b)(5), including organization and administrative activities of government, because there would be no direct or indirect physical change in the environment.

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of the County of Ventura as follows:

1. The County of Ventura shall become the groundwater sustainability agency for areas within the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, the Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin that are unmanaged as of June 30, 2017;

2. The Director of the Public Works Agency is authorized to: (a) notify the Department of Water Resources (DWR) of the action taken by this resolution and to develop and file with DWR the information required to be submitted as part of the notification, (b) withdraw or modify the County's notification to DWR to fulfill the purposes of this resolution and (c) take such further actions as are necessary to carry out the intent of this resolution.

Upon a motion of Board Member Foy, seconded by Board Member Bennett, and duly carried, the Board hereby approves and adopts this resolution on the 20 day of June, 2017.

Chair, Board of Supervisors
County of Ventura

ATTEST:

MICHAEL POWERS, Clerk of the
Board of Supervisors, County of Ventura
State of California

By: Lori Gaines
Deputy Clerk of the Board

APPENDIX A-3

CWD 2017 Attachment 1: Resolution for CWD to Act as GSA

CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

Resolution No: 17-11

A Resolution of the Board of Directors
of Camrosa Water District

Declaring Camrosa Water District's Intent to Act as the Groundwater Sustainability Agency for the Portions of the Pleasant Valley Basin, Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin Outside the Boundaries of the Fox Canyon Groundwater Management Agency and Within the Camrosa Service Area

Whereas, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act (SGMA); and,

Whereas, the SGMA went into effect on January 1, 2015; and,

Whereas, the SGMA requires all high- and medium-priority groundwater basins, as designated by the California Department of Water Resources (DWR), to be managed by a Groundwater Sustainability Agency (GSA); and,

Whereas, the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin, as defined by DWR's California's Groundwater Bulletin 118, have been characterized by DWR as high-priority basins; and,

Whereas, the majority of said basins are under the jurisdiction of the Fox Canyon Groundwater Management Agency (FCGMA) and Section 10723 (c) of Senate Bill 1168 defines the FCGMA as the exclusive local agency within its respective statutory boundaries with the power to comply with the SGMA; and,

Whereas, Section 10723.2 of Senate Bill 1168 requires that GSAs consider the interests of all beneficial uses and users of groundwater; and

Whereas, the SGMA requires that the GSA notify the Department of Water Resources of its intent to undertake sustainable groundwater management within thirty days of its election; and

Whereas, the SGMA requires that the GSA develop and implement a groundwater sustainability plan, according to guidelines to be developed forthwith by DWR;

Now, Therefore, Be It Resolved by the Camrosa Water District Board of Directors that Camrosa will act as the Groundwater Sustainability Agency for the portions of the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin outside the boundaries of the Fox Canyon Groundwater Management Agency and within the Camrosa Service area; and

Be It Further Resolved that the Board of Directors of Camrosa Water District will act as the governing board of the newly created GSAs; and

Be It Further Resolved that, abiding by Section 10727 (b) (3) of Senate Bill 1168, Camrosa will develop a coordination agreement with the FCGMA to ensure that the groundwater sustainability plans covering the entirety of the three basins are coordinated; and

Be It Further Resolved the Camrosa Water District will notify DWR of its intent to sustainably manage the portions of the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin outside the boundaries of the FCGMA within thirty days of the date this resolution is signed; and

Be It Further Resolved that such notification shall include the service area boundaries of the portions of the three basins that Camrosa intends to manage, a copy of this resolution, a list of interested parties developed pursuant to Section 10723.2 of Senate Bill 1168 and described above, and an explanation of how their interests will be considered in the development and operation of the groundwater sustainability agency and the development and implementation of the agency's sustainability plan.

Adopted, Signed and Approved this 8th day of June, 2017.

Eugene F. West, President
Board of Directors
Camrosa Water District

(ATTEST)
Tony L. Stafford, Secretary
Board of Directors
Camrosa Water District

APPENDIX A-4

Public Draft GSP Comments

FCGMA Draft Groundwater Sustainability Plan Comments

September 2019

Las Posas Valley Basin

Commenter			Chapter	Section	Subsection	Comment
Susan	Paulsen	Exponent, Inc	Executive Summary	ES.1-Introduction	N/A	Please find our attached document with all comments on the entirety of the GSP. Thank you.
Susan	Pan	County of Ventura, Public Works Agency, Water and Sanitation	3 - Sustainable Management Criteria	3.4-Minimum Thresholds	3.4.2-East Las Posas Management Area	Section 3.4.2.4 Degraded Water Quality "Groundwater modeling suggests that groundwater production rates exerts little influence over the area of the ELPMA that will eventually be impacted by higher concentrations of TDS (Figures 3-3 through 3-7)." The continuous groundwater quality deterioration in the East Las Posas Basin may not be directly related to groundwater pumping and more related to the source of surface water recharge from the regional wastewater treatment plants, which is a main source of water supply that the Basin continues to rely on. As shown in Figures 3-3 through 3-7, the groundwater modeling shows that all five scenarios projected the salt plume expansion to about double in size/area in the next 50 years. It means that the groundwater well production from the salt plume impacted area may become limited in use or unusable as certain farm crops can not tolerate high salt level. Blending with imported water or field leaching are not permanent solutions, as salts remain deposited and built up in the East Las Posas Basin. The issue of salt removal from the basin needs to be managed.
Dan	Detmer	UWCD	5 - Project Management Actions	5.2-Project No. 1 – Purchase of Imported Water from CMWD for Basin Replenishment	N/A	Section 5.2.4 The schedule for implementation of Project No. 1 appears to be described in just one sentence, “Therefore, the project could be implemented after agreements have been completed for the purchase and delivery of the water from CMWD.” Will such a vague schedule satisfy the DWR’s reviewers of this GSP, or stakeholders in the basin? We recommend including a graphic timeline or chart in this section that illustrates anticipated dates for achieving design/construction milestones for each project, and how those dates relate to the schedule for achieving sustainability in the WLPMA. Section 5.5.7 The schedule for implementation of Management Action No. 1 boils down to the following sentence from the second paragraph, “Because of the existing uncertainty associated with future conditions in the LPVB, a plan for exact reductions and groundwater elevation triggers for those reductions has not been developed as part of this GSP.” Will such vague language regarding whether or when Management Action No. 1 would be implemented satisfy DWR or local stakeholders that the GSP can achieve sustainable groundwater conditions in the LPVB by 2040? We recommend including a graphic timeline or chart in this section that illustrates anticipated dates for achieving design/construction milestones for each project, and how those dates relate to the schedule for achieving sustainability in the LPVB.
Dan	Detmer	UWCD	3 - Sustainable Management Criteria	3.3-Undesirable Results	3.3.1-Chronic Lowering of Groundwater Levels	Section 3.3.1 In the subsection describing criteria for defining undesirable results for chronic lowering of groundwater levels in the West Las Posas Management Area, it would be helpful if the first paragraph clarified that “the 2015 saline water impact front” being referenced was the saline water front occurring in the Oxnard subbasin. In the subsection describing criteria for defining undesirable results for chronic lowering of groundwater levels in the East Las Posas Management Area, the GSP stats that “Limiting the long-term loss of storage to no more than 20% in these areas of the ELPMA was determined to be a reasonable approach by the FCGMA Board to avoid significant and unreasonable loss of supply.” It would be helpful if the text provided more information regarding the basis or rationale that the FCGMA Board used to select 20% as “reasonable,” and how that number relates in a quantitative sense to “significant and unreasonable loss of supply.” What were the potential impacts of any higher or lower values (than 20%) that the Board considered, and why were those impacts deemed more or less “significant” or “unreasonable” than 20%?
Dan	Detmer	UWCD	2 - Basin Setting	2.4-Water Budget	2.4.5-Projected Water Budget and Sustainable Yield	Section 2.4.5.1.9 The third paragraph of this section includes the phrase “this produces an estimate of 1,000 AFY for the aquifer system and 11,500 AFY for the LAS.” We suspect the word “shallow” should be inserted before the words “aquifer system” in this phrase, if we are correctly understanding the context. The fourth paragraph of this section states “Additional modeling is recommended for the 5-year update process to understand how changes in pumping patterns can increase the overall sustainable yield of the PVB.” We suspect that the reference to “PVB” in this sentence is mistaken, and should be replaced with “WLPMA,” which is the area being discussed by this section of the GSP.

Commenter			Chapter	Section	Subsection	Comment
Susan	Pan	County of Ventura, Water and Sanitation Department	3 - Sustainable Management Criteria	3.5-Measurable Objectives	3.5.2-East Las Posas Management Area	VCWWD No. 1 owns and operates Well No. 15, State Well No. 03N19W31B01S. This well is used as a key well for the Las Posas Basin GSP. Figure 3-10d shows that three of the five future scenarios analyzed, the well water level continues to decline in future years to below minimum threshold level. The only two scenarios that groundwater levels are maintained at sustainable level above the minimum threshold level are with 25% pumping reduction in Fox Canyon Aquifer (FCA) & Grimes Canyon Aquifer (GCA) without projects and with 10% pumping reduction in FCA & GCA with projects implementation. Most of the key wells in the FCA show similar trends in these future scenario analyses. These trends indicate the need for project implementation along with some level of pumping reduction.
Alma	Quezada	La Loma Ranch Mutual Water Company	1 - Administrative Information	1.8-Notification and Communication	1.8.1-Notification and Communication Summary	See attached letter.
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.8-Notification and Communication	1.8.2-Summary of Beneficial Uses and Users	Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)] • Section 1.8.2, pp. 1-32 We find the characterization of the Arroyo Simi–Las Posas GDE as a losing stream to mischaracterize the groundwater-surface water interconnection and thus it inappropriately concludes that the riparian plants are "using percolating surface water rather than groundwater." The Arroyo Simi–Las Posas should be characterized as a complex system of losing-gaining-losing reaches across the LPVB; groundwater is shallow and the riparian ecosystem likely uses a combination of unsaturated soil pore water and groundwater to supply its water needs. The GSA has included representation of environmental users on their TAG, in a special meeting on GDEs and in GSP email and meeting notifications. We also recommend that the GSP specifically list the natural resource agencies, NOAA Fisheries, US Fish and Wildlife Service, CA Department of Fish and Wildlife, as stakeholders since they are important parties representing the public trust. In addition, both the CA DFW and the US FWS agencies have attended the special TAG GDE meeting.
Ruthie	Redmond	The Nature Conservancy	Tables	1-9-Past and Present Land Use in Las Posas Valley, 1990–2015	N/A	Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)] • Table 1-9 (p.1-46) Please revise the Land Use Category from "Vacant" to "Open Space". As noted in Section 1.3.2.3 - Historical, Current, and Projected Land Use and Section 1.6.1 – General Plans, this is a substantial acreage that is valued highly in Ventura County as open space, with ordinances such as the 1998 Save Open Space and Agricultural Resources ordinance. We need to do a better job of delineating open space and native habitat from the "vacant" category, as this devalues the environment and its water need. The Executive Summary (p. ES-3) correctly describes the land use as open space.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.3-Groundwater Conditions	2.3.1-Groundwater Elevation Data	• 2.3.1.2.1 Shallow Alluvial Aquifer: Vertical Gradients (p.2-20) o This section only refers to the one nested well pair in the Shallow Alluvial Aquifer. That one data point indicates a small upward gradient and thus presents a very confusing picture of the flow from the Shallow Alluvial Aquifer to the Upper San Pedro since it is very well established that there is a downward vertical gradient through the Shallow Alluvial Aquifer through the San Pedro and also down to the Fox Canyon.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.2-Hydrogeologic Conceptual Model	2.2.1-Geology	Hydrogeologic Conceptual Model [Checklist Items 6, and 7 (23 CCR §354.14)] • Section 2.2 o Section 2.2 should be revised to incorporate the latest knowledge provided by the ELPMA groundwater model (Intera, 2018). The characterization provided both in the analysis (e.g., Section 5.0 Groundwater Occurrence and Movement) and by the numerical model provide a much fuller understanding of the hydrogeological conceptual model. o The Hydrogeologic Conceptual Model should describes the shallow groundwater that is interconnected with surface waters and GDEs. There is a brief mention of a "shallow aquifer system" in the WLPMA in Section 2.2, Hydrogeologic Conceptual Model. There is no discussion of it in Section 2.2.1, Geology; the description of the Recent Alluvium mentions only the "aquifer beneath the floodplain of Arroyo Simi–Las Posas." In Section 2.2.4, Principal Aquifers and Aquitards, in the description of the Shallow Alluvial Aquifer, which was specifically stated as being in the ELPMA, there is a statement that doesn't belong: "The alluvium is also present in the WLPMA in Beardsley Wash and Ferro Ditch (Figure 2-2)." Presumably, this is an attempt to discuss the "shallow aquifer system" in the WLPMA. Figure 2-4 shows the "Shallow Alluvial Aquifer" extending from the Wright Road fault to Bradley Road. In contrast, the UWCD model only includes aquifers of the UAS extending to about ½ mile east of the Wright Road fault (UWCD, 2018). As summarized in Table 2-10a, the pumping data (average of 1,397 AF/yr) for the shallow aquifer system and the water budget numbers from the UWCD numerical model indicate this is a water producing aquifer. These different statements lead to a significant amount of confusion by the reader. This shallow aquifer system should be much better characterized in Section 2.2.4. In particular, our concern for clarity is in regards the potential for this shallow aquifer to support any potential GDEs, such as the riparian ecosystem identified in the Beardsley Wash. Earlier discussions during TAG meetings had indicated that there was not a shallow aquifer unit in WLPMA. Thus the riparian habitat along the Beardsley Wash were assumed to be supported during dry summer periods by agricultural runoff, and/or residential development outdoor water use and excluded from further consideration (see Appendix I). This needs to be reconsidered. o Section 2.2.4, p.2-10: Statement regarding "Currently, there are few wells that produce water from the Shallow Alluvial Aquifer, which is likely a result of the marginal-quality water and low well yields compared to the FCA" is misleading. The CMWD numerical model report (Figure 7-11, Intera, 2018), shows at least 30 production wells in the Shallow Alluvial Aquifer. Figure 1-7 shows a significantly different set of wells. Section 2.4, Water Budget, indicates an average pumping rate in the Shallow Alluvial Aquifer of 383 AF/yr, with a range from 203 to 972 AF/yr over the historical period.
Ruthie	Redmond	The Nature Conservancy	Executive Summary	ES.2-Summary of Basin Setting and Conditions	N/A	Interconnected Surface Waters (ISW) [Checklist Items 8, 9, and 10 – (23 CCR §354.16); Identification of ISWs is a required element of Current and Historical Groundwater Conditions (23 CCR §354.16).] • Executive Summary, Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K Arroyo Simi–Las Posas is a complex series of losing, gaining and losing reaches that is connected to the Shallow Alluvial Aquifer. Interconnected surface waters have been spatially identified, including a brief overview of the gaining/losing reaches of the Arroyo Simi–Las Posas based on source water data, streamflow gages, and a field study of the gain/losing reaches with an estimated recharge rate from Arroyo Simi–Las Posas to Shallow Groundwater. This study was performed in September 2011, during an average water year and reveals that the arroyo is a complex series of losing, gaining and losing reaches. In fact, the groundwater levels are sufficiently high and water surfaces back to the arroyo in the middle stretch of the arroyo. Figure 2-16 maps out the losing and gaining reaches and presents a clear understanding of the interconnected system in ELPMA. We strongly disagree with misleading language throughout the GSP stating that the arroyo is a losing stream and that the surface water and groundwater are disconnected. This includes: o Executive Summary, ES.2, Summary of Basin Setting and Conditions (p.ES-6) "Increased surface water flow and infiltration along Arroyo Simi–Las Posas also resulted in the establishment of riparian vegetation, along the banks of the arroyo. This riparian vegetation, which is dominated by non-native Arundo (Arundo donax), has been identified as a potential groundwater-dependent ecosystem. Within the boundaries of the ELPMA, Arroyo Simi–Las Posas is generally a losing stream, meaning that the groundwater table is below the stream bed, and water from Arroyo Simi–Las Posas percolates into the underlying sediments to recharge the groundwater. This leads to the conclusion that the riparian habitat along Arroyo Simi–Las Posas may rely on soil moisture from percolating surface water, rather than groundwater. As surface flows and recharge decrease in Arroyo Simi–Las Posas, groundwater elevations and soil moisture content in the vicinity of the potential groundwater-dependent ecosystem are anticipated to decline. These declines may impact the health of the riparian vegetation." This language is misleading as it portrays a disconnected groundwater-surface water ecosystem. The Arroyo Simi–Las Posas is a mix of gaining and losing reaches and is connected to the Shallow Alluvial Aquifer. Only at the Las Posas Valley Basin boundary, where the Arroyo Las Posas has gone dry since 2012, is there a disconnection between the surface water and groundwater. Ecosystems often rely both on groundwater and surface water to meet their water needs (see Best Management Practice #3 in Attachment C of this letter). A strictly binary approach, designating all GDEs as either 100 percent reliant on groundwater or 100 percent reliant on surface water supplies is therefore inconsistent with the available science. The above "conclusion" is conjecture and statement should revised.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	Executive Summary	ES.3- Overview of Sustainability Criteria	N/A	Interconnected Surface Waters (ISW) [Checklist Items 8, 9, and 10 – (23 CCR §354.16); Identification of ISWs is a required element of Current and Historical Groundwater Conditions (23 CCR §354.16).] • Executive Summary, Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K Arroyo Simi–Las Posas is a complex series of losing, gaining and losing reaches that is connected to the Shallow Alluvial Aquifer. Interconnected surface waters have been spatially identified, including a brief overview of the gaining/losing reaches of the Arroyo Simi–Las Posas based on source water data, streamflow gages, and a field study of the gain/losing reaches with an estimated recharge rate from Arroyo Simi–Las Posas to Shallow Groundwater. This study was performed in September 2011, during an average water year and reveals that the arroyo is a complex series of losing, gaining and losing reaches. In fact, the groundwater levels are sufficiently high and water surfaces back to the arroyo in the middle stretch of the arroyo. Figure 2-16 maps out the losing and gaining reaches and presents a clear understanding of the interconnected system in ELPMA. We strongly disagree with misleading language throughout the GSP stating that the arroyo is a losing stream and that the surface water and groundwater are disconnected. This includes: o Executive Summary, ES.2, Summary of Basin Setting and Conditions (p.ES-6) "Increased surface water flow and infiltration along Arroyo Simi–Las Posas also resulted in the establishment of riparian vegetation, along the banks of the arroyo. This riparian vegetation, which is dominated by non-native Arundo (Arundo donax), has been identified as a potential groundwater-dependent ecosystem. Within the boundaries of the ELPMA, Arroyo Simi–Las Posas is generally a losing stream, meaning that the groundwater table is below the stream bed, and water from Arroyo Simi–Las Posas percolates into the underlying sediments to recharge the groundwater. This leads to the conclusion that the riparian habitat along Arroyo Simi–Las Posas may rely on soil moisture from percolating surface water, rather than groundwater. As surface flows and recharge decrease in Arroyo Simi–Las Posas, groundwater elevations and soil moisture content in the vicinity of the potential groundwater-dependent ecosystem are anticipated to decline. These declines may impact the health of the riparian vegetation." This language is misleading as it portrays a disconnected groundwater-surface water ecosystem. The Arroyo Simi–Las Posas is a mix of gaining and losing reaches and is connected to the Shallow Alluvial Aquifer. Only at the Las Posas Valley Basin boundary, where the Arroyo Las Posas has gone dry since 2012, is there a disconnection between the surface water and groundwater. Ecosystems often rely both on groundwater and surface water to meet their water needs (see Best Management Practice #3 in Attachment C of this letter). A strictly binary approach, designating all GDEs as either 100 percent reliant on groundwater or 100 percent reliant on surface water supplies is therefore inconsistent with the available science. The above "conclusion" is conjecture and statement should revised. o Executive Summary, ES.3, Overview Of Sustainability Criteria (p.ES-9) "Depletion of interconnected surface water is not occurring within the LPVB, where Arroyo Simi–Las Posas is a losing stream, with groundwater elevations that have been below the bottom of the stream channel for decades." This is not an accurate statement, as Arroyo Simi–Las Posas is a mix of losing and gaining reaches and the groundwater elevations have been stable and high enough to intersect the stream channel for the past few decades. We do agree that depletions of interconnected surface water are not occurring for the majority of the GDE, except along the LPVB boundary with Pleasant Valley as noted above.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.3- Groundwater Conditions	2.3.6 - Groundwater–Surface Water Connections	Interconnected Surface Waters (ISW) [Checklist Items 8, 9, and 10 – (23 CCR §354.16); Identification of ISWs is a required element of Current and Historical Groundwater Conditions (23 CCR §354.16).] • Executive Summary, Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K Arroyo Simi–Las Posas is a complex series of losing, gaining and losing reaches that is connected to the Shallow Alluvial Aquifer. Interconnected surface waters have been spatially identified, including a brief overview of the gaining/losing reaches of the Arroyo Simi–Las Posas based on source water data, streamflow gages, and a field study of the gain/losing reaches with an estimated recharge rate from Arroyo Simi–Las Posas to Shallow Groundwater. This study was performed in September 2011, during an average water year and reveals that the arroyo is a complex series of losing, gaining and losing reaches. In fact, the groundwater levels are sufficiently high and water surfaces back to the arroyo in the middle stretch of the arroyo. Figure 2-16 maps out the losing and gaining reaches and presents a clear understanding of the interconnected system in ELPMA. We strongly disagree with misleading language throughout the GSP stating that the arroyo is a losing stream and that the surface water and groundwater are disconnected. These include: o Executive Summary, ES.2, Summary of Basin Setting and Conditions (p.ES-6) "Increased surface water flow and infiltration along Arroyo Simi–Las Posas also resulted in the establishment of riparian vegetation, along the banks of the arroyo. This riparian vegetation, which is dominated by non-native Arundo (Arundo donax), has been identified as a potential groundwater-dependent ecosystem. Within the boundaries of the ELPMA, Arroyo Simi–Las Posas is generally a losing stream, meaning that the groundwater table is below the stream bed, and water from Arroyo Simi–Las Posas percolates into the underlying sediments to recharge the groundwater. This leads to the conclusion that the riparian habitat along Arroyo Simi–Las Posas may rely on soil moisture from percolating surface water, rather than groundwater. As surface flows and recharge decrease in Arroyo Simi–Las Posas, groundwater elevations and soil moisture content in the vicinity of the potential groundwater-dependent ecosystem are anticipated to decline. These declines may impact the health of the riparian vegetation." This language is misleading as it portrays a disconnected groundwater-surface water ecosystem. The Arroyo Simi–Las Posas is a mix of gaining and losing reaches and is connected to the Shallow Alluvial Aquifer. Only at the Las Posas Valley Basin boundary, where the Arroyo Las Posas has gone dry since 2012, is there a disconnection between the surface water and groundwater. Ecosystems often rely both on groundwater and surface water to meet their water needs (see Best Management Practice #3 in Attachment C of this letter). A strictly binary approach, designating all GDEs as either 100 percent reliant on groundwater or 100 percent reliant on surface water supplies is therefore inconsistent with the available science. The above "conclusion" is conjecture and statement should revised. o Executive Summary, ES.3, Overview Of Sustainability Criteria (p.ES-9) "Depletion of interconnected surface water is not occurring within the LPVB, where Arroyo Simi–Las Posas is a losing stream, with groundwater elevations that have been below the bottom of the stream channel for decades." This is not an accurate statement, as Arroyo Simi–Las Posas is a mix of losing and gaining reaches and the groundwater elevations have been stable and high enough to intersect the stream channel for the past few decades. We do agree that depletions of interconnected surface water are not occurring for the majority of the GDE, except along the LPVB boundary with Pleasant Valley as noted above.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.3- Groundwater Conditions	2.3.7- Groundwater-Dependent Ecosystems	Identification, Mapping and Description of GDEs [Checklist Items 11 to 20 (23 CCR §354.16)] • Executive Summary and Section 2.3.7 GDEs have been identified and mapped during the GSP development process using an earlier version of the statewide database of GDE indicators (iGDE v0.3.1; TNC, 2017) and TNC's GDE Guidance document (Rohde et al., 2018). This evaluation is described in Appendix I, with a brief summary in Section 2.3.7. In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the GDEs and potential GDEs. The Arroyo Simi–Las Posas should be considered a GDE. It should not be characterized as a potential GDE. Non-native flows from the Simi Valley and Moorpark waste water treatment plants and the Simi Valley groundwater dewatering wells have both provided perennial flows in the Arroyo Simi-Las Posas and filled the Shallow Alluvial Aquifer such that under current conditions, the Arroyo Simi-Las Posas and Shallow Alluvial Aquifer is an interconnected system. There are sufficient data and studies (CMWD 2012, 2013) that demonstrate the connectivity of GDE and the surface water itself. It must be emphasized that the recognition of the non-native source waters does not negate this groundwater-surface water connectivity. GDEs are "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (23 CCR §351 (m)). By definition, the water source does not play a part in the identification of GDEs. The focus on "native flow" as defining a GDE is a fundamental flaw. The source of water entering an aquifer has never been a factor in defining groundwater. In fact, about 93% of the inflows into the ELPMA are from non-native sources (see Table 2-7) yet the GSP considers all of it groundwater. There are many misleading statements that attempt to discount the groundwater-surface water connection and the Arroyo Simi–Las Posas GDE by overemphasizing the water source. We request that such statements be revised or removed. These include: o Executive Summary – see above listed language o However, the riparian vegetation in the Arroyo Simi–Las Posas composing these potential GDEs was established and is maintained by discharges from wastewater plants and Simi Valley dewatering discharges to Arroyo Simi. (Section 2.3.7, p.2-36) o The gaining reach is caused by surface water that is resurfacing rather than by discharge of native groundwater (CMWD 2012, 2013). (Section 2.3.7, p.2-36 - 2-37) o Until a connection between groundwater elevations under native flow conditions and the potential GDE is established, the Arroyo Simi–Las Posas potential GDE cannot be conclusively determined to be a GDE. (Section 2.3.7, p.2-38) • Section 2.3.7 The confusing information about the shallow aquifer in WLPMA, which was not presented in the 2017 Preliminary Draft GSP, need to be assessed as to whether there is a hydrologic connection to any potential GDEs, such as the riparian ecosystem identified in the Beardsley Wash. Earlier discussions during TAG meetings had indicated that there was not a shallow aquifer unit in WLPMA. Thus the riparian habitat along the Beardsley Wash were assumed to be supported during dry summer periods by agricultural runoff, and/or residential development outdoor water use and excluded from further consideration (see Appendix I). This needs to be reconsidered and described in Section 2.3.7. Again, the source of the groundwater, native or otherwise, does not alter the fact that it is groundwater and therefore should be considered as such when evaluating whether it supports a potential GDE.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	Executive Summary	ES.2-Summary of Basin Setting and Conditions	N/A	Identification, Mapping and Description of GDEs [Checklist Items 11 to 20 (23 CCR §354.16)] • Executive Summary and Section 2.3.7 GDEs have been identified and mapped during the GSP development process using an earlier version of the statewide database of GDE indicators (iGDE v0.3.1; TNC, 2017) and TNC's GDE Guidance document (Rohde et al., 2018). This evaluation is described in Appendix I, with a brief summary in Section 2.3.7. In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the GDEs and potential GDEs. The Arroyo Simi–Las Posas should be considered a GDE. It should not be characterized as a potential GDE. Non-native flows from the Simi Valley and Moorpark waste water treatment plants and the Simi Valley groundwater dewatering wells have both provided perennial flows in the Arroyo Simi-Las Posas and filled the Shallow Alluvial Aquifer such that under current conditions, the Arroyo Simi-Las Posas and Shallow Alluvial Aquifer is an interconnected system. There are sufficient data and studies (CMWD 2012, 2013) that demonstrate the connectivity of GDE and the surface water itself. It must be emphasized that the recognition of the non-native source waters does not negate this groundwater-surface water connectivity. GDEs are "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (23 CCR §351 (m)). By definition, the water source does not play a part in the identification of GDEs. The focus on "native flow" as defining a GDE is a fundamental flaw. The source of water entering an aquifer has never been a factor in defining groundwater. In fact, about 93% of the inflows into the ELPMA are from non-native sources (see Table 2-7) yet the GSP considers all of it groundwater. There are many misleading statements that attempt to discount the groundwater-surface water connection and the Arroyo Simi–Las Posas GDE by overemphasizing the water source. We request that such statements be revised or removed. These include: o Executive Summary – see above listed language o However, the riparian vegetation in the Arroyo Simi–Las Posas composing these potential GDEs was established and is maintained by discharges from wastewater plants and Simi Valley dewatering discharges to Arroyo Simi. (Section 2.3.7, p.2-36) o The gaining reach is caused by surface water that is resurfacing rather than by discharge of native groundwater (CMWD 2012, 2013). (Section 2.3.7, p.2-36 - 2-37) o Until a connection between groundwater elevations under native flow conditions and the potential GDE is established, the Arroyo Simi–Las Posas potential GDE cannot be conclusively determined to be a GDE. (Section 2.3.7, p.2-38) Again, the source of the groundwater, native or otherwise, does not alter the fact that it is groundwater and therefore should be considered as such when evaluating whether it supports a potential GDE.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.4-Water Budget	2.4.2-Sources of Water Discharge	Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)] • Section 2.4 The water budget includes the Shallow Alluvial Aquifer in the ELPMA and the shallow aquifer in the WLPMA. In the ELPMA, the Arroyo Simi-Las Posas is a net recharge to the Shallow Alluvial Aquifer and the Arroyo Simi-Las Posas riparian vegetation evapotranspiration (ET) is a discharge from the Shallow Alluvial Aquifer. The riparian ET is estimated as Arundo. Section 2.4.2.2, Riparian Evapotranspiration Losses incorrectly describes the use of the consumptive water use of 24 AF/ac; the second paragraph correctly describes the calculation method of the ETo and crop coefficient. Table 2-7 lists riparian ET rates that are not consistent with the rates in the Technical Memorandum: Summary of Additional Refinements to the Groundwater Model of East and South Las Posas Sub-Basins (Intera, 2018).
Ruthie	Redmond	The Nature Conservancy	Tables	2-7-Water Balance for the ELPMA from the CMWD Model	N/A	Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)] • Section 2.4 The water budget includes the Shallow Alluvial Aquifer in the ELPMA and the shallow aquifer in the WLPMA. In the ELPMA, the Arroyo Simi-Las Posas is a net recharge to the Shallow Alluvial Aquifer and the Arroyo Simi-Las Posas riparian vegetation evapotranspiration (ET) is a discharge from the Shallow Alluvial Aquifer. The riparian ET is estimated as Arundo. Section 2.4.2.2, Riparian Evapotranspiration Losses incorrectly describes the use of the consumptive water use of 24 AF/ac; the second paragraph correctly describes the calculation method of the ETo and crop coefficient. Table 2-7 lists riparian ET rates that are not consistent with the rates in the Technical Memorandum: Summary of Additional Refinements to the Groundwater Model of East and South Las Posas Sub-Basins (Intera, 2018).

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.1-Introduction to Sustainable Management Criteria	N/A	Sustainability Goal [Checklist Items 23 to 25 (23 CCR §354.24)] • Section 3.1 Sustainability Goal (p. 3-2)] Fox Canyon Groundwater Management Agency (FCGMA) Board of Directors (Board) adopted planning goals in 2015 that "Promote water levels that mitigate or minimize undesirable results (including pumping trough depressions, surface water connectivity [emphasis added], and chronic lowering of water levels)." The GDEs should be considered in the sustainability goal. GDEs are a beneficial use of groundwater and the criteria are intended to prevent significant and undesirable impacts to beneficial uses of groundwater under current and future conditions.
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.3-Undesirable Results	3.3.6-Depletions of Interconnected Surface Water	Undesirable Results [Checklist Items 30 to 46 (23 CCR §354.26)] • Section 3.3.6 Depletions of Interconnected Surface Water (p. 3-14 - 3-15) o The undesirable result associated with depletion of interconnected surface water in the LPVB is unequivocally stated to be the loss of GDE habitat. We applaud that recognition. We do not agree with the misleading language continues to be used to dismiss the groundwater-surface water connection. Please see comments above with respect to Interconnected Surface Waters and Identification, Mapping and Description of GDEs. This nonsensical concept of resurfacing surface water not being groundwater is used to conclude that there will not be significant and unreasonable effects on beneficial uses of surface water such as GDEs. We do agree that current groundwater conditions in the LPVB do not impact the volume of flow in Arroyo Simi–Las Posas and groundwater production from the ELPMA will not result in depletion of interconnected surface water with significant and unreasonable adverse effects on beneficial uses of surface water. However, in the future, an anticipated cause of groundwater conditions that would lead to depletions of interconnected surface water and impacts to the Arroyo Simi-Las Posas GDE is decreased discharge from the Simi Valley and Moorpark wastewater discharges and Simi Valley dewatering wells. These discharges are a very important source of inflow to the ELPMA providing nearly 40% of the total annual recharge, and would also lead to decreased surface water flows, disconnection of the surface water and groundwater, and lowering of chronic lowering of groundwater levels in the Shallow Alluvial Aquifer and Fox Canyon Aquifer, and interbasin interflow from the Las Posas Valley Basin to the Pleasant Valley Basin. Such a change, however, is unrelated to groundwater production from the Shallow Alluvial Aquifer, and is outside of the jurisdictional powers of the FCGMA to prevent. However, given the SGMA goal of management of groundwater that will promote water levels that mitigate or minimize any potential future undesirable results of depletions of interconnected surface water and the associated Arroyo Simi–Las Posas potential GDE, The Nature Conservancy proposes inclusion of this aspirational goal (Section 354.30(g), Measurable Objectives) with recognition of the dependence on the continuation of these external water sources. Recognition that external constraints (i.e., potential future loss of out-of-basin source waters) can result impacts to interconnected surface waters and GDEs was discussed with the California Department of Water Resources and State Water Resources Control Board (June 8, 2017 meeting). In particular, DWR was noted that SGMA §354.30(g) states: "An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." It was recognized that striving for an "aspirational goal" would be appropriate in this circumstance. We recommend inclusion of the "aspirational goal" when setting sustainability criteria for interconnected surface waters and the associated Arroyo Simi-Las Posas GDE. Therefore, the sustainability goal would recognize that under circumstances where external constraints result in impacts to the GDE, the Fox Canyon Groundwater Management Agency would not be obligated to address those impacts, if it is at the expense of other beneficial users (e.g., cutting back groundwater extractions by agricultural users). The groundwater sustainability agency would only be obligated to address impacts to the GDE caused by changing groundwater conditions resulting from pumping or groundwater management under the jurisdiction of the groundwater sustainability agency that cause undesirable results. o In WLPMA, there needs to be a revised evaluation as to any hydrologic connection between the shallow aquifer system and any potential GDEs identified in the NC Dataset.
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.3-Undesirable Results	3.3.7-Defining Management-Area-Wide Undesirable Results	Undesirable Results [Checklist Items 30 to 46 (23 CCR §354.26)] • Section 3.3.7 Defining Undesirable Results (p. 3-16) o For ELPMA, addressing chronic lowering of groundwater levels and depletion of groundwater storage is assumed to be protective of interconnected surface water. And, the ELPMA will be determined to be experiencing undesirable results if, in any single monitoring event, groundwater levels in 5 of the 15 key wells are below their respective minimum thresholds. Given that the future depletions of interconnected surface water (and loss of the Arroyo Simi-Las Posas GDE) is only related to lowering of groundwater levels in the Shallow Alluvial Aquifer, this definition does not make sense. The two key wells in the Shallow Alluvial Aquifer should be assessed separately to determine whether there could be future undesirable results.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.4-Minimum Thresholds	3.4.2-East Las Posas Management Area	Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)] • Section 3.4 (p.3-17) The avoidance of undesirable results should include the aspirational goal of maintain groundwater levels in the ELPMA Shallow Alluvial Aquifer to prevent future depletions of interconnected surface water and loss of the Arroyo Simi-Las Posas GDE. • Section 3.4.2.6 ELPMA Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-24 to 3-25)] The GSP defines the minimum thresholds to address chronic lowering of groundwater levels and depletion of groundwater storage are to be protective of the Arroyo Simi-Las Posas GDE. Two wells to monitor representative groundwater conditions were selected in the Shallow Alluvial Aquifer are 02N20W09Q08 and 02N20W12MMW1. The proposed minimum thresholds are 170 ft MSL and 300 ft MSL for 02N20W09Q08 and 02N20W12MMW1, respectively. Both of these significantly below the historical lows of 271 and 358 ft MSL and the current condition (represented by Fall 2015) of 271 and 369 ft MSL for 02N20W09Q08 and 02N20W12MMW1, respectively. We disagree that the We find these proposed minimum thresholds to be entirely inappropriate. Based on literature studies, groundwater depths within the range considered necessary for juvenile establishment of willows and cottonwoods, typical focal phreatophytic species for riparian ecosystems, are less than 10 feet and for mature vegetation growth are less than 20 feet (Stillwater Sciences, 2016). Site-specific knowledge of groundwater use by the riparian vegetation is not known at this time. Although the literature studies suggest 20 ft bgs as a reasonable minimum threshold value for the GDE, it is uncertain what is the actual site conditions in the Arroyo Simi – Las Posas GDE. The recommended key well, 02N20W12MMW1, which is located outside of the GDE, has average depth to groundwater of 21 ft bgs at the well, with a range of 18 to 27 ft bgs. This well has a long-term representative time period (1996-present). The proposed minimum threshold of 170 ft MSL would represent a depth to groundwater that is 200 feet lower than the average water level; this would not be supportive of any riparian vegetation. We recommend a minimum threshold protective of the GDE at the historical groundwater elevation of 358.2 ft MSL. On the western losing reach of the GDE where key well 02N20W09Q08 is located, there has been a significant decrease in the vegetative health of the GDE since 2013. Water levels in key well 02N20W09Q08 average 38 ft bgs, with a range of 35 to 40 ft bgs (time period 2014 to present). Given that this well has only been monitoring groundwater levels since 2014, it is unclear what a realistic minimum threshold should be. Also, as the well is not actually within the GDE and ground surface elevations in this area are quite variable; accurately determining depths to groundwater within the GDE is necessary first step before recommending realistically protective minimum thresholds. This should be done by the 5-year plan update. In addition, there is an observed decline in ecosystem health in the western losing reach where key well 02N20W09Q08 is located, that is visible in the remote sensing vegetation metrics, NDVI and NDMI (Figure 14, Appendix I). However, as shown in Figure 10 (Appendix I), there is a large range in the depth to groundwater in this losing reach. It is recommended that field-based work be conducted to accurately determine depths to groundwater within the GDE and thus support a site-specific minimum threshold for the GDE. Following the precautionary principle, it is recommended that the minimum threshold for key well 02N20W12MMW1 be set at its minimum historical level (358.2 ft MSL). The recommendation recognizes there is uncertainty regarding these analyses herein regarding equivalent GDE depths and correlations with declining ecosystem health that can be addressed with additional field-based assessment and then revised in the next 5-year plan update.
Ruthie	Redmond	The Nature Conservancy	Appendices	I-The Nature Conservancy GDE Tech Memo	N/A	...In addition, there is an observed decline in ecosystem health in the western losing reach where key well 02N20W09Q08 is located, that is visible in the remote sensing vegetation metrics, NDVI and NDMI (Figure 14, Appendix I). However, as shown in Figure 10 (Appendix I), there is a large range in the depth to groundwater in this losing reach. It is recommended that field-based work be conducted to accurately determine depths to groundwater within the GDE and thus support a site-specific minimum threshold for the GDE.
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.5-Measurable Objectives	3.5.1 -West Las Posas Management Area	Measurable Objectives -Checklist Item 26 – (23 CCR §354.30) • Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-26 to 3-27) Current groundwater levels, as raised and sustained by wastewater plant and dewatering discharges, have been relatively constant since the 1980s and have provided for establishment and maintenance of the GDE. Under the current assumption that baseline conditions are representative of GDE conditions and thus currently represent sustainable conditions, our recommendation is therefore to set the measurable objective at the baseline average groundwater elevation. For the key wells 02N20W12MMW1 and 02N20W09Q08, it is recommended that the measurable objectives be set to 370 and 272 ft MSL, respectively. No interim milestones are necessary given that current conditions are meeting the measurable objectives. It is recognized that maintaining such levels is depended upon continued wastewater plant and dewatering discharges, though not regulated by the GSA. However, proposed projects in the GSP can ensure these sustainability criteria are met for the GDE beneficial use and continued recharge of Shallow Aquifer and Fox Canyon Aquifer.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	4 - Monitoring Networks	4.2-Description of Existing Monitoring Network	4.2.2-Surface Conditions Monitoring	Monitoring Network [Checklist Items 47, 48 and 49 (23 CCR §354.34)] • 4.2.2 Surface Conditions Monitoring (p.4-4) The statement "Additionally, evapotranspiration from riparian vegetation lining Arroyo Simi–Las Posas impacts surface conditions by using surface water in the Arroyo" attributes the evapotranspiration (ET) from riparian vegetation as solely being from surface water. This assumption that all ET is from surface water is not verified. The CMWD numerical model specifically attributes the ET from groundwater. In reality, it is likely a combination of surface water, soil pore water, and groundwater. This is an area for further study as there are the ET of the non-native Arundo in the riparian ecosystem is potential water savings that is evaluated in Project No. 2 (see Section 5.3).
Ruthie	Redmond	The Nature Conservancy	4 - Monitoring Networks	4.3-Monitoring Network Relationship to Sustainability Indicators	4.3.6-Depletions of Interconnected Surface Water	Monitoring Network [Checklist Items 47, 48 and 49 (23 CCR §354.34)] • Section 4.3.6 Depletions of Interconnected Surface Water (p.4-10) We recommend inclusion remote sensing vegetative indices as a low cost approach to monitor baseline conditions of GDEs. The Nature Conservancy's free online tool, GDE Pulse, allows GSAs a way to assess changes in GDE health using remote sensing data sets; specifically, the Normalized Difference Vegetation Index (NDVI), which is a satellite-derived index that represents the greenness of vegetation and Normalized Difference Moisture Index (NDMI), which is a satellite-derived index that represents water content in vegetation.
Ruthie	Redmond	The Nature Conservancy	4 - Monitoring Networks	4.6-Potential Monitoring Network Improvements	4.6.5-Shallow Groundwater Monitoring near Surface Water Bodies and GDEs	Monitoring Network [Checklist Items 47, 48 and 49 (23 CCR §354.34)] • Section 4.6.5 Shallow Groundwater Monitoring near Surface Water Bodies and GDEs (p.4-15) We recommend continued monitoring of the existing set of shallow aquifer monitoring wells in the vicinity of the GDE to continue a record of groundwater conditions and to assess whether changes occur in the future. (Figures 6-9, Appendix I): 02N19W09E01S, 02N19W0K01S, 02N19W08H02S, 02N19W07G01S, 02N19W07K04S, 02N20W12MMW1 (key well), 02N20W12MMW2, 02N20W12MMW3, 02N20W09Q08S (key well), 02N20W17J06S, 02N20W10K02S. Wells 02N19W0K01S, 02N20W12MMW1 (key well), 02N20W12MMW2, and 02N20W12MMW3 were not identified as monitored wells in Tables 4-3 to 4-5. Also, 02N19W08H02S was incorrectly listed in Table 4-3 as monitoring the LAS. These should be included. In particular, 02N20W12MMW1 is a specified key well. One limitation of this initial evaluation is that the estimation of groundwater levels in the GDE are approximated based on wells outside the GDE, using single point land surface GDE reference points. As a result, this analysis is a simplification of the groundwater depth representation for the Arroyo Simi - Las Posas GDE. In reality, the ground surface elevation varies as the GDE traverses upslope from the stream channel to the floodplain terraces and also longitudinally up or downstream. Refinement of the depth to groundwater mapping in the GDE would more clearly determine the impacts of decreasing groundwater levels on the riparian habitat. In particular, monitoring of groundwater levels in the GDE will characterize the degree to which the vegetation is reliant on groundwater. Mapping of the ground surface elevation in the GDE near the monitoring wells is a necessary task.
Ruthie	Redmond	The Nature Conservancy	5 - Project Management Actions	5.3-Project No. 2 – Arroyo Simi–Las Posas Arundo Removal	N/A	Projects and Management Actions to Achieve Sustainability Goal [Checklist Items 50 and 51 (23 CCR §354.44)] • Sections 5.3 and 5.4 Projects No. 2 & 3 – (p. 5-4 – 5-10) Because treated water inflows are critical to maintaining extractions rates for agriculture and other beneficial users including the Arroyo Simi-Las Posas GDE the FCGMA approved two projects to be evaluated in the GSP. These are Project No 2., Arroyo Simi-Las Posas Arundo Removal, and Project No. 3, Arroyo Simi-Las Posas Water Acquisition. These projects are focused on maintaining the inflows into the basin. According to Section 354.44 of the SGMA regulations projects are to achieve the sustainability goals for the basin. It goes on to say projects must include a "description of the measurable objective this is expected to benefit from the project". Therefore, the ELPMA GSP must include a goal(s) and measurable objective(s) tied to the purpose of projects 2 & 3. Initially this created a quandary for the GMA because it is important to maintain the inflows from the treated water discharges, but it is not within the GMA's authority to ensure they continue. The SGMA addresses this by allowing aspirational goal where the agency creates an objective that may exceed its operational flexibility but failure to achieve the objective is not grounds for a finding of inadequacy (see Sec. 354.30(g). It is extremely important to include the environmental beneficial user in the establishment of the sustainability criteria. The proposed ELPMA projects are multi-benefit projects, and grant funding for such projects are predicated on the establishment of that position. Because both projects have co-benefits to both groundwater supply and the restoration of native habitat, the projects have access to multiple sources of funding. Without such clarity in the GSP, there is no justification for conservation funding. The Nature Conservancy is partnering with another NGO that has already started the IRWM grant process in anticipation of the arundo removal project. We also want to jointly work to find funds for purchasing the Simi outfall water.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	5 - Project Management Actions	5.4-Project No. 3 – Arroyo Simi– Las Posas Water Acquis ition	N/A	Projects and Management Actions to Achieve Sustainability Goal [Checklist Items 50 and 51 (23 CCR §354.44)] • Sections 5.3 and 5.4 Projects No. 2 & 3 – (p. 5-4 – 5-10) Because treated water inflows are critical to maintaining extractions rates for agriculture and other beneficial users including the Arroyo Simi-Las Posas GDE the FCGMA approved two projects to be evaluated in the GSP. These are Project No 2., Arroyo Simi-Las Posas Arundo Removal, and Project No. 3, Arroyo Simi-Las Posas Water Acquisition. These projects are focused on maintaining the inflows into the basin. According to Section 354.44 of the SGMA regulations projects are to achieve the sustainability goals for the basin. It goes on to say projects must include a "description of the measurable objective this is expected to benefit from the project". Therefore, the ELPMA GSP must include a goal(s) and measurable objective(s) tied to the purpose of projects 2 & 3. Initially this created a quandary for the GMA because it is important to maintain the inflows from the treated water discharges, but it is not within the GMA's authority to ensure they continue. The SGMA addresses this by allowing aspirational goal where the agency creates an objective that may exceed its operational flexibility but failure to achieve the objective is not grounds for a finding of inadequacy (see Sec. 354.30(g). It is extremely important to include the environmental beneficial user in the establishment of the sustainability criteria. The proposed ELPMA projects are multi-benefit projects, and grant funding for such projects are predicated on the establishment of that position. Because both projects have co-benefits to both groundwater supply and the restoration of native habitat, the projects have access to multiple sources of funding. Without such clarity in the GSP, there is no justification for conservation funding. The Nature Conservancy is partnering with another NGO that has already started the IRWM grant process in anticipation of the arundo removal project. We also want to jointly work to find funds for purchasing the Simi outfall water.
Susan	Rungren	City of Ventura/ Ventura	Tables	2-5-Las Posas Valley Basin Water Purveyors	N/A	Table 2-5 needs to be corrected. Saticoy Country Club needs to be changed to City of San Buenaventura (Ventura). The City of Ventura is the water purveyor for the Saticoy Water System, and the water is supplied by groundwater from the Subbasin. This System supplies water to individual residences and to The Saticoy Club (formerly, the Saticoy Country Club). (Draft GSP, p. 2-85)
Alma	Quezada	Las Posas Users Group (LPUG)	1 - Administrative Information	1.8-Notification and Communicati on	1.8.2-Summary of Beneficial Uses and Users	See attached letter.
Lori	Craviotto	Grace Farms and Orchards	1 - Administrative Information	1.3-Description of Plan Area	1.3.1-Description	There are only a few mutual water companies listed. There are many more not listed. Perhaps it would be better to simply say that there are many mutual water companies or refer to the water companies that were served in the lawsuit in order to list them all.

Comments on GSP for East Las Posas

My name is Lori Craviotto and I am an avocado and citrus grower in the East Las Posas basin area. I farm a little over 200 acres with my family. I am also acting treasurer for Fuller Falls Mutual Water Company.

My undergraduate degree is in Biology, I taught high school science as a young woman before becoming a doctor of chiropractic, owning my own clinic and practicing for over 20 years. The last 12 years I have been involved with my family's 200 plus acre avocado and citrus farm (Grace Farms and Orchards). I have been working as overall farm manager for about the last 8 or 9 years. During this time I have also worked with a nonprofit as a board member and also as the director of the board. The nonprofit dealt with community development in Haiti. My background has given me a love for science and some understanding of the issues involved in developing sustainable solutions.

First, let me say, I do appreciate all the effort that has gone into creating the Groundwater Sustainability Plan for the Las Posas Basin. It is a huge undertaking and I think that much of the work has been thankless so let me start my comments by saying thank you. The work has been impressive and the presentations informative. I appreciate the openness of DUDEK to incorporate the suggestions that have come up during the presentations into the GSP. I have learned a lot about our water situation in East Las Posas basin during this process. While the process may be grueling it is actually a really good thing that people care. So often we all feel helpless to affect change in our governments and it has been wonderful to see people involved in this process. So again, thank you for reading our comments and listening to us and taking our thoughts into consideration.

1)
The most important comment that I want to make is that I have come to believe that the GSP should consider the **loss of agricultural**

acreage (particularly avocado and fruit orchards) an undesirable outcome in the GSP. Orchards in Ventura County provide food, fire protection, animal habitat and jobs while counteracting global warming. In fact, there is no better counteracting force on global warming than trees. Taking carbon out of the air and putting it into the soil and organic matter is what trees do. We need good quality water to protect avocado and citrus orchards in Ventura County. We also need those trees and orchards to support cooler microclimates and watershed areas. I have seen what happens to microclimate firsthand during my trips to Haiti. When an area loses it's tress, it is up to 15 degrees hotter and there is erosion.

While last year many farmers lost their crops due to the fires, heat and freeze the irrigated orchards provided another benefit. Irrigated orchards provided green belts that kept many people, homes and animals safe from wildfires that were raging out of control last year and saving countless acre-feet in water by effectively stopping the fires in their tracks. Isn't growing trees that produce food a better use of our water than using it for wildfire control if it can have the same effect?

Losing agriculture in Ventura, especially our orchards, due to inadequate or poor quality water would have such a devastating negative impact that agriculture needs to be protected through the GSP. Losing trees specifically should be considered a "stand alone" negative outcome as opposed to simply a negative economic impact. Over time, the pressure of ever growing populations and other economic factors will come into play making water expensive and harder to come by. This can only lead to urban development replacing orchards unless the we protect against the loss of our precious orchards in the GSP. Now is the time to put language into the GSP to help keep our part of the world a better place. It's only a short trip to LA to see what happens when agriculture becomes less economically viable then development.

As far as water allocations, ratcheting down agricultural water significantly over time by decreasing agricultural well extractions **will cause** the undesirable affect of losing avocado and citrus orchards. It is just a matter of time. We need water to grow the trees that protect the environment. For reference, the irrigation allocations set by Fox

Canyon GMA under Emergency Ordinance E are pretty “right on” in terms of what we actually need to farm productively and profitably. I understand that many of the farmers are only using 70% of their allocation and I notice that even within our small Mutual Water Company there are farmers using less water than is required to have profitable groves. I also notice that our farm and some of the other more profitable farms in our area regularly bump up against or go over the water allocations in Emergency Ordinance E. Having quality water and enough of it is the biggest part of what produces a vibrant and profitable avocado and citrus farm. Ratcheting down won’t work because our trees don’t need less water over time, we would have to either cut them down or watch them die. The farmers who need to make a living farming would sell. Only the very wealthy people can farm an unprofitable farm. We are being allocated the correct amount right now for avocado and citrus farming.

To conclude this point, let’s protect our orchards by including the loss of orchards in our East Las Posas area an undesirable outcome. Orchards and forests all over California should be protected just because it may well be the only timely thing we can do to help stop global warming. There is plenty of literature about how important protecting trees is in the fight for climate control. Could we perhaps start something really good movement with our GSP? It seems that we are ahead of many other GSPs in California. By making the loss of orchards a negative outcome in the GSP and making it a priority to give orchards access to the water they need our GSP would be helping our local environment, as well as, doing our part against global warming.

2)
From the GSP (1-12) it is my understanding that Ventura County has been given permission to create it GSPs for parts of the Los Posas Valley basin that are not within the boundaries of the Fox Canyon GMA yet may fall within an aquifer system managed by FCGMA. While this may be legally correct it does not make good common sense. The GSP should be one document for each of the individual aquifer systems. I agree with splitting East Las Posas and Grimes, West Las Posas etc. into separate areas as the water isn’t necessarily moving between them however, any unincorporated

areas within those aquifer systems need to be incorporated into the GSP. Otherwise, I don't understand how the GSP can create a management plan that works without Ventura county agreeing unequivocally not to take any additional water out of those systems in the future or agreeing to take a set amount equivalent to the amount it is taking now less any agreed upon pumping cuts required by the GSP.

3)
On page 1-3, under 1.2.3 there are only seven mutual water companies and districts listed as being within FCGMA. I imagine that you are aware that this error needs to be corrected as it is not true. There are many more mutual water companies.

4)
I am concerned about the Simi Valley recharge discussed as part of Project 3 coming into the Las Posas aquifer as my understanding is that it has high sodium concentrations of 175-200mg/L. I believe the sodium in our water is 0-25 mg/L of sodium now. What increased sodium in the water does in practical terms to farmers is decrease production and to create a situation where farmers need to apply water for longer periods of time to flush sodium past the root zone of there trees. The amount of extra watering time per tree that we are talking about is about 8 hours per week according to a friend of mine who farms both on our ranch (in East Las Posas area) and in San Diego County (where salt concentrations are high). This is clearly undesirable if the idea is to conserve water because it will increase the water requirements. Apparently, the salt plume is already heading towards our farm and this is not a good thing at all. I think the mention of the critical need for desalination of that water is a must if it is to be included as a project. Otherwise, it is my opinion that it can only be considered as "degrading our water quality." I am all in favor of it as a project as long as it is desalinated.

5)
I am also concerned about the CMWD ASR project which the GSP addresses. I believe that the GSP might be reasonably expected to make a recommendation that the project's storage of 50,000 AF in the Fox Canyon Aquifer may not be 100% available since it is impossible to know at this point where all the water outlets in the

basin are. It seems reasonable to infer that there are underground outlets and unreasonable and counterintuitive to assume that all water stored is 100% available all the time. I believe that it is incumbent upon the GSP to address this issue as opposed to making the assumption that “water-in” necessarily equals water-out. Along the same lines, it seems that where the water in Las Posas basin enters (or comes from) is not known. Knowing where the water is coming from would be worth investigating and might shed some light on where it might be able to go and vice-versa.

6)
As far as climate change as addressed on page 1-17, isn’t it possible that decreased precipitation, in our area, is actually a less likely consequence of global warming due to the fact that warming currents off our coasts have tended in the past to bring more precipitation?   I would like to take a wait and see approach when figuring the decreased rainfall factor into the GSP’s climate change calculations or at least be very conservative and use the 2% vs. the 5%.   The next decade may make it clear if we are seeing more or less precipitation in our area.

Again, thank you for reading and considering my comments as part of the GSP process. Please feel free to call me if you have any questions and/or you may mail/email any response to: 530 Los Angeles Ave. #115-330, Moorpark, CA. 93021 or lori.farmandarins@gmail.com

Sincerely,
Lori Craviotto
Grace Farms and Orchards
805 252-7599

September 20, 2019

Jeffery Pratt, P.E., Executive Officer
Fox Canyon Groundwater Management Agency
800 S. Victoria Avenue
Ventura, CA 93009

Dear Mr. Pratt,

Subject: DRAFT Groundwater Sustainability Plan for the Las Posas Valley Basin

The Las Posas Users Group (LPUG) appreciates the opportunity to review the *Draft Groundwater Sustainability Plan for Las Posas Valley Basin* prepared by Dudek on behalf of the Fox Canyon Groundwater Management Agency (FCGMA) and dated July 2019.

LPUG formed prior to the Sustainable Groundwater Management Act (SGMA) as a voluntary stakeholder group to promote the interests of beneficial users of groundwater in the Las Posas Valley Groundwater basin. LPUG's role as an advisory group to the FCGMA was later formalized through an FCGMA Charter in April 2016 with the goal of developing a groundwater pumping allocation system for inclusion into the Groundwater Sustainability Plan (GSP).

LPUG conducted public meetings and sent notifications to landowners in the Las Posas Valley Basin resulting in a collaborative effort between the FCGMA and various groundwater users in drafting an allocation system to encourage sustainable, long-term management of our basin's groundwater resources.

The most recent iteration of the allocation system was summarized in a white paper dated June 16, 2017 and presented to the FCGMA Board of Directors on June 23, 2017. At that meeting, FCGMA staff was directed to work with LPUG and the Las Posas Valley Water Rights Coalition (LPVWRC) to resolve pending issues with the proposed allocation system.

FCGMA staff failed to convene both groups for meaningful discussion and concurrence on those unsettled issues. Instead, the FCGMA continued work on their draft GSP and in November 2017 released the *Preliminary Draft GSP for the Las Posas Valley Basin*. That preliminary draft stated a "comprehensive water allocation system for groundwater users in the LPVB is currently under development by the FCGMA, with ongoing contributions from stakeholder groups." However, the FCGMA *did not* maintain open communication with LPUG to refine the allocation system and declined invitations to participate in LPUG meetings to foster a stakeholder-led collaborative forum for GSP feedback.

FCGMA continued revising their draft GSP with minimal stakeholder feedback to produce the most recent Draft GSP for the Las Posas Valley Basin dated July 2019. The current version of the draft GSP does not include an allocation system and Section 1.8.2 incorrectly states that LPUG "withdrew its support for the proposed system it had developed."

LPUG has never submitted formal documentation to the FCGMA indicating withdrawal of support for their allocation system. In fact, LPUG continues to support their proposed allocation system and recognizes the divergence on issues already discussed among the LPVWRC and LPUG.

The statement indicating LPUG withdrew their support should be removed from the Draft GSP to have an accurate representation of the facts.

To include such an egregious statement can only serve as an impetus for the FCGMA to dismiss the synergistic effort put forth by LPUG and various groundwater users to develop an appropriate and collaborative allocation system and instead create an independent allocation system devoid of stakeholder input.

LPUG looks forward to seeing a revised GSP with this misleading statement removed.

Respectfully,

Andrew Waters, III
LPUG Chairperson

Esper Petersen
LPUG Vice-Chairperson

The Nature Conservancy
Protecting nature. Preserving life.

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September 20, 2019

Jeff Pratt, Executive Officer
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, California 93009-1610

Submitted via website: http://fcgma.org/groundwater-sustainability-plan

Re: Las Posas Valley Groundwater Basin Groundwater Sustainability Plan

Dear Mr. Pratt,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the Las Posas Valley Basin Groundwater Sustainability Plan being prepared under the Sustainable Groundwater Management Act (SGMA).

TNC as a Stakeholder Representative for the Environment

TNC is a global, nonprofit organization dedicated to conserving the lands and waters on which all life depends. We seek to achieve our mission through science-based planning and implementation of conservation strategies. For decades, we have dedicated resources to establishing diverse partnerships and developing foundational science products for achieving positive outcomes for people and nature in California. TNC was part of a stakeholder group formed by the Water Foundation in early 2014 to develop recommendations for groundwater reform and actively worked to shape and pass SGMA.

Our reason for engaging is simple: California's freshwater biodiversity is highly imperiled. We have lost more than 90 percent of our native wetland and river habitats, leading to precipitous declines in native plants and the populations of animals that call these places home. These natural resources are intricately connected to California's economy providing direct benefits through industries such as fisheries, timber and hunting, as well as indirect benefits such as clean water supplies. SGMA must be successful for us to achieve a sustainable future, in which people and nature can thrive within Las Posas Valley Basin region and California.

We believe that the success of SGMA depends on bringing the best available science to the table, engaging all stakeholders in robust dialog, providing strong incentives for beneficial outcomes and rigorous enforcement by the State of California.

Given our mission, we are particularly concerned about the inclusion of nature, as required, in GSPs. The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Addressing Nature's Water Needs in GSPs

SGMA requires that all beneficial uses and users, including environmental users of groundwater, be considered in the development and implementation of GSPs (Water Code § 10723.2).

The GSP Regulations include specific requirements to identify and consider groundwater dependent ecosystems [23 CCR §354.16(g)] when determining whether groundwater conditions are having potential effects on beneficial uses and users. GSAs must also assess whether sustainable management criteria may cause adverse impacts to beneficial uses, which include environmental uses, such as plants and animals. The Nature Conservancy has identified each part of the GSP where consideration of beneficial uses and users are required. That list is available here: https://groundwaterresourcehub.org/importance-of-gdes/provisions-related-to-groundwater-dependent-ecosystems-in-the-groundwater-s. Please ensure that environmental beneficial users are addressed accordingly throughout the GSP. Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decision, and using data collected through monitoring to revise decisions in the future. Over time, GSPs should improve as data gaps are reduced and uncertainties addressed.

To help ensure that GSPs adequately address nature as required under SGMA, The Nature Conservancy has prepared a checklist (**Attachment A**) for GSAs and their consultants to use. The Nature Conservancy believes the following elements are foundational for 2020 GSP submittals. For detailed guidance on how to address the checklist items, please also see our publication, *GDEs under SGMA: Guidance for Preparing GSPs*[1].

1. Environmental Representation

SGMA requires that groundwater sustainability agencies (GSAs) consider the interests of all beneficial uses and users of groundwater. To meet this requirement, we recommend actively engaging environmental stakeholders by including environmental representation on the GSA board, technical advisory group, and/or working groups. This could include local staff from state and federal resource agencies, nonprofit organizations and other environmental interests. By engaging these stakeholders, GSAs will benefit from access to additional data and resources, as well as a more robust and inclusive GSP.

We appreciate the inclusion of an environmental representative on the Technical Advisory Group. In particular, we greatly appreciate the efforts by Fox Canyon GMA to work on an approach to the consideration of GDEs in the GSPs, including the creation of an Ad Hoc GDE Subcommittee and subsequent development of a TNC-led analysis of GDEs that was included in the draft GSP for Las Posas Valley Groundwater Basin.

2. Identification of Groundwater Dependent Ecosystems (GDEs)

SGMA requires that groundwater dependent ecosystems (GDEs) and interconnected surface waters (ISWs) be identified in the GSP. We recommend using the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) provided online[2] by the Department of Water Resources (DWR) as a starting point for the GDE map. The NC Dataset

[1]GDEs under SGMA: Guidance for Preparing GSPs is available at: https://groundwaterresourcehub.org/public/uploads/pdfs/GWR_Hub_GDE_Guidance_Doc_2-1-18.pdf

[2] The Department of Water Resources' Natural Communities Commonly Associated with Groundwater dataset is available at: *https://gis.water.ca.gov/app/NCDatasetViewer/*

was developed through a collaboration between DWR, the Department of Fish and Wildlife and TNC.

3. Potential Effects on Environmental Beneficial Users

SGMA requires that potential effects on GDEs and environmental surface water users be described when defining undesirable results. In addition to identifying GDEs in the basin, The Nature Conservancy recommends identifying beneficial users of surface water, which include environmental users. This is a critical step, as it is impossible to define "significant and unreasonable adverse impacts" without knowing *what* is being impacted. For your convenience, we've provided a list of freshwater species within the boundary of the Las Posas Valley Basin in **Attachment C**. Our hope is that this information will help your GSA better evaluate the impacts of groundwater management on environmental beneficial users of surface water. We recommend that after identifying which freshwater species exist in your basin, especially federal and state listed species, that you contact staff at the Department of Fish and Wildlife (DFW), United States Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Services (NMFS) to obtain their input on the groundwater and surface water needs of the organisms on the GSA's freshwater species list. We also refer you to the Critical Species Lookbook[3] prepared by The Nature Conservancy and partner organizations for additional background information on the water needs and groundwater reliance of critical species. Because effects to plants and animals are difficult and sometimes impossible to reverse, we recommend erring on the side of caution to preserve sufficient groundwater conditions to sustain GDEs and ISWs.

4. Biological and Hydrological Monitoring

If sufficient hydrological and biological data in and around GDEs is not available in time for the 2020/2022 plan, data gaps should be identified along with actions to reconcile the gaps in the monitoring network.

Conclusion

The Nature Conservancy has thoroughly reviewed the Las Posas Valley Basin Draft GSP. We appreciate the work that has gone into the preparation of various elements of this plan. We consider it to be **inadequate** with respect to addressing environmental beneficial uses and meeting the ecosystem objectives of SGMA as summarized below:

- The riparian ecosystem around the Arroyo Simi-Las Posas should be considered a GDE. It should not be characterized as a *potential* GDE. [See Identification, Mapping and Description of GDEs (p.12)]
- GDEs are "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (23 CCR §351 (m)). By definition, the water source does not play a part in the *identification* of GDEs and thus the focus on "native flow" as defining a GDE is a fundamental flaw. [See Identification, Mapping and Description of GDEs (p.12)]
- GDEs are a beneficial use of groundwater and the criteria are intended to prevent significant and undesirable impacts to beneficial uses of groundwater under current and future conditions. *Given potential future conditions,* the Arroyo Simi-Las Posas GDE should be considered in the sustainability goal and sustainability criteria should be defined for interconnected surface water. [See Undesirable Results (p.14)]

[3] *The Critical Species LookBook is available at:* https://groundwaterresourcehub.org/sgma-tools/the-critical-species-lookbook/.

- We recommend inclusion of the "aspirational goal" (SGMA §354.30(g)[4])when setting sustainability criteria for interconnected surface waters and the associated Arroyo Simi-Las Posas GDE. [See Undesirable Results (p.14-15)]
- It is important to include the environmental beneficial user in the establishment of the sustainability criteria as the proposed Projects No 1 and No. 2 are multi-benefit use projects, and conservation grant funding for such projects are predicated on the establishment of that position [See Projects and Management Actions to Achieve Sustainability Goal (p.19)]

We have provided more specific comments to further improve the GSP's identification and consideration of environmental uses, and in particular, GDEs, in **Attachment B,** as referenced to the numbered items in **Attachment A. Attachment C** provides a list of the freshwater species located in the Las Posas Valley Basin. **Attachment D** describes six best practices that GSAs and their consultants can apply when using local groundwater data to confirm a connection to groundwater for DWR's Natural Communities Commonly Associated with Groundwater Dataset[2]. **Attachment E** provides an overview of a new, free online tool that allows GSAs to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data.

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

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[4] *"An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan."*

Attachment A

Environmental User Checklist

The Nature Conservancy is neither dispensing legal advice nor warranting any outcome that could result from the use of this checklist. Following this checklist does not guarantee approval of a GSP or compliance with SGMA, both of which will be determined by DWR and the State Water Resources Control Board.

GSP Plan Element*		GDE Inclusion in GSPs: Identification and Consideration Elements	Check Box
Admin Info	**2.1.5 Notice & Communication** *23 CCR §354.10*	**Description of the types of environmental beneficial uses of groundwater that exist within GDEs and a description of how environmental stakeholders were engaged throughout the development of the GSP.**	1
Planning Framework	**2.1.2 to 2.1.4 Description of Plan Area** *23 CCR §354.8*	**Description of jurisdictional boundaries, existing land use designations, water use management and monitoring programs; general plans and other land use plans relevant to GDEs and their relationship to the GSP.**	2
		Description of instream flow requirements, threatened and endangered species habitat, critical habitat, and protected areas.	3
		Summary of process for permitting new or replacement wells for the basin, and how the process incorporates any protection of GDEs	4
Basin Setting	**2.2.1 Hydrogeologic Conceptual Model** *23 CCR §354.14*	**Basin Bottom Boundary:** Is the bottom of the basin defined as at least as deep as the deepest groundwater extractions?	5
		Principal aquifers and aquitards: Are shallow aquifers adequately described, so that interconnections with surface water and vertical groundwater gradients with other aquifers can be characterized?	6
		Basin cross sections: Do cross-sections illustrate the relationships between GDEs, surface waters and principal aquifers?	7
	2.2.2 Current & Historical Groundwater Conditions *23 CCR §354.16*	**Interconnected surface waters:**	8
		Interconnected surface water maps for the basin with gaining and losing reaches defined (included as a figure in GSP & submitted as a shapefile on SGMA portal).	9
		Estimates of current and historical surface water depletions for interconnected surface waters quantified and described by reach, season, and water year type.	10
		Basin GDE map included (as figure in text & submitted as a shapefile on SGMA Portal).	11

		If NC Dataset *was* used:	Basin GDE map denotes which polygons were kept, removed, and added from NC Dataset (Worksheet 1, can be attached in GSP section 6.0).	12
			The basin's GDE shapefile, which is submitted via the SGMA Portal, includes two new fields in its attribute table denoting: 1) which polygons were kept/removed/added, and 2) the change reason (e.g., why polygons were removed).	13
			GDEs polygons are consolidated into larger units and named for easier identification throughout GSP.	14
		If NC Dataset *was not* used:	Description of why NC dataset was not used, and how an alternative dataset and/or mapping approach used is best available information.	15
		Description of GDEs included:		16
		Historical and current groundwater conditions and variability are described in each GDE unit.		17
		Historical and current ecological conditions and variability are described in each GDE unit.		18
		Each GDE unit has been characterized as having high, moderate, or low ecological value.		19
		Inventory of species, habitats, and protected lands for each GDE unit with ecological importance (Worksheet 2, can be attached in GSP section 6.0).		20
	2.2.3 Water Budget *23 CCR §354.18*	Groundwater inputs and outputs (e.g., evapotranspiration) of native vegetation and managed wetlands are included in the basin's historical and current water budget.		21
		Potential impacts to groundwater conditions due to land use changes, climate change, and population growth to GDEs and aquatic ecosystems are considered in the projected water budget.		22
Sustainable Management Criteria	**3.1 Sustainability Goal** *23 CCR §354.24*	**Environmental stakeholders/representatives were consulted.**		23
		Sustainability goal mentions GDEs or species and habitats that are of particular concern or interest.		24
		Sustainability goal mentions whether the intention is to address pre-SGMA impacts, maintain or improve conditions within GDEs or species and habitats that are of particular concern or interest.		25
	3.2 Measurable Objectives *23 CCR §354.30*	**Description of how GDEs were considered and whether the measurable objectives and interim milestones will help achieve the sustainability goal as it pertains to the environment.**		26
	3.3 Minimum Thresholds *23 CCR §354.28*	**Description of how GDEs and environmental uses of surface water were considered when setting minimum thresholds for relevant sustainability indicators:**		27
		Will adverse impacts to GDEs and/or aquatic ecosystems dependent on interconnected surface waters (beneficial user of surface water) be avoided with the selected minimum thresholds?		28
		Are there any differences between the selected minimum threshold and state, federal, or local standards relevant to the species or habitats residing in GDEs or aquatic ecosystems dependent on interconnected surface waters?		29
	3.4 Undesirable Results *23 CCR §354.26*	**For GDEs, hydrological data are compiled and synthesized for each GDE unit:**		30
		If hydrological data *are available* within/nearby the GDE	Hydrological datasets are plotted and provided for each GDE unit (Worksheet 3, can be attached in GSP Section 6.0).	31
			Baseline period in the hydrologic data is defined.	32

			GDE unit is classified as having high, moderate, or low susceptibility to changes in groundwater.	33
			Cause-and-effect relationships between groundwater changes and GDEs are explored.	34
		If hydrological data *are not available* within/nearby the GDE	Data gaps/insufficiencies are described.	35
			Plans to reconcile data gaps in the monitoring network are stated.	36
		For GDEs, biological data are compiled and synthesized for each GDE unit:		37
		Biological datasets are plotted and provided for each GDE unit, and when possible provide baseline conditions for assessment of trends and variability.		38
		Data gaps/insufficiencies are described.		39
		Plans to reconcile data gaps in the monitoring network are stated.		40
		Description of potential effects on GDEs, land uses and property interests:		41
		Cause-and-effect relationships between GDE and groundwater conditions are described.		42
		Impacts to GDEs that are considered to be "significant and unreasonable" are described.		43
		Known hydrological thresholds or triggers (e.g., instream flow criteria, groundwater depths, water quality parameters) for significant impacts to relevant species or ecological communities are reported.		44
		Land uses include and consider recreational uses (e.g., fishing/hunting, hiking, boating).		45
		Property interests include and consider privately and publicly protected conservation lands and opens spaces, including wildlife refuges, parks, and natural preserves.		46
Sustainable Management Criteria	**3.5 Monitoring Network** *23 CCR §354.34*	Description of whether hydrological data are spatially and temporally sufficient to monitor groundwater conditions for each GDE unit.		47
		Description of how hydrological data gaps and insufficiencies will be reconciled in the monitoring network.		48
		Description of how impacts to GDEs and environmental surface water users, as detected by biological responses, will be monitored and which GDE monitoring methods will be used in conjunction with hydrologic data to evaluate cause-and-effect relationships with groundwater conditions.		49
Projects & Mgmt Actions	**4.0. Projects & Mgmt Actions to Achieve Sustainability Goal** *23 CCR §354.44*	Description of how GDEs will benefit from relevant project or management actions.		50
		Description of how projects and management actions will be evaluated to assess whether adverse impacts to the GDE will be mitigated or prevented.		51

* In reference to DWR's GSP annotated outline guidance document, available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/GD_GSP_Outline_Final_2016-12-23.pdf

Attachment B

TNC Evaluation of the
Las Posas Valley Basin Groundwater Sustainability Plan, Public Review Draft

A complete draft of the Las Posas Valley Basin Groundwater Sustainability Plan (GSP) was provided for public review on July 24, 2019. This attachment summarizes our comments on the complete public draft GSP, which includes the main GSP file and several separate appendix files. Comments are provided in the order of the checklist items included as Attachment A.

<u>Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)]</u>

- Section 1.8.2, pp. 1-32
  We find the characterization of the Arroyo Simi–Las Posas GDE as a losing stream to mischaracterize the groundwater-surface water interconnection and thus it inappropriately concludes that the riparian plants are "using percolating surface water rather than groundwater." The Arroyo Simi–Las Posas should be characterized as a complex system of losing-gaining-losing reaches across the LPVB; groundwater is shallow and the riparian ecosystem likely uses a combination of unsaturated soil pore water and groundwater to supply its water needs.

  The GSA has included representation of environmental users on their TAG, in a special meeting on GDEs and in GSP email and meeting notifications. We also recommend that the GSP specifically list the natural resource agencies, NOAA Fisheries, US Fish and Wildlife Service, CA Department of Fish and Wildlife, as stakeholders since they are important parties representing the public trust. In addition, both the CA DFW and the US FWS agencies have attended the special TAG GDE meeting.

- Table 1-9 (p.1-46)
  Please revise the Land Use Category from "Vacant" to "Open Space". As noted in Section 1.3.2.3 - Historical, Current, and Projected Land Use and Section 1.6.1 – General Plans, this is a substantial acreage that is valued highly in Ventura County as open space, with ordinances such as the 1998 Save Open Space and Agricultural Resources ordinance. We need to do a better job of delineating open space and native habitat from the "vacant" category, as this devalues the environment and its water need. The Executive Summary (p. ES-3) correctly describes the land use as open space.

<u>Hydrogeologic Conceptual Model [Checklist Items 6, and 7 (23 CCR §354.14)]</u>

- Section 2.2
  - Section 2.2 should be revised to incorporate the latest knowledge provided by the ELPMA groundwater model (Intera, 2018). The characterization provided

both in the analysis (e.g., Section 5.0 Groundwater Occurrence and Movement) and by the numerical model provide a much fuller understanding of the hydrogeological conceptual model.

  - The Hydrogeologic Conceptual Model should describes the shallow groundwater that is interconnected with surface waters and GDEs. There is a brief mention of a "shallow aquifer system" in the WLPMA in Section 2.2, Hydrogeologic Conceptual Model. There is no discussion of it in Section 2.2.1, Geology; the description of the Recent Alluvium mentions only the "aquifer beneath the floodplain of Arroyo Simi–Las Posas." In Section 2.2.4, Principal Aquifers and Aquitards, in the description of the Shallow Alluvial Aquifer, which was specifically stated as being in the ELPMA, there is a statement that doesn't belong: "The alluvium is also present in the WLPMA in Beardsley Wash and Ferro Ditch (Figure 2-2)." Presumably, this is an attempt to discuss the "shallow aquifer system" in the WLPMA. Figure 2-4 shows the "Shallow Alluvial Aquifer" extending from the Wright Road fault to Bradley Road. In contrast, the UWCD model only includes aquifers of the UAS extending to about ½ mile east of the Wright Road fault (UWCD, 2018). As summarized in Table 2-10a, the pumping data (average of 1,397 AF/yr) for the shallow aquifer system and the water budget numbers from the UWCD numerical model indicate this is a water producing aquifer. These different statements lead to a significant amount of confusion by the reader. This shallow aquifer system should be much better characterized in Section 2.2.4.

    In particular, our concern for clarity is in regards the potential for this shallow aquifer to support any potential GDEs, such as the riparian ecosystem identified in the Beardsley Wash. Earlier discussions during TAG meetings had indicated that there was **not** a shallow aquifer unit in WLPMA. Thus the riparian habitat along the Beardsley Wash were assumed to be supported during dry summer periods by agricultural runoff, and/or residential development outdoor water use and excluded from further consideration (see Appendix I). This needs to be reconsidered.

  - Section 2.2.4, p.2-10: Statement regarding "Currently, there are few wells that produce water from the Shallow Alluvial Aquifer, which is likely a result of the marginal-quality water and low well yields compared to the FCA" is misleading. The CMWD numerical model report (Figure 7-11, Intera, 2018), shows at least 30 production wells in the Shallow Alluvial Aquifer. Figure 1-7 shows a significantly different set of wells. Section 2.4, Water Budget, indicates an average pumping rate in the Shallow Alluvial Aquifer of 383 AF/yr, with a range from 203 to 972 AF/yr over the historical period.

- 2.3.1.2.1 Shallow Alluvial Aquifer: Vertical Gradients (p.2-20)
  - This section only refers to the one nested well pair in the Shallow Alluvial Aquifer. That one data point indicates a small upward gradient and thus presents a very confusing picture of the flow from the Shallow Alluvial Aquifer

to the Upper San Pedro since it is very well established that there is a downward vertical gradient through the Shallow Alluvial Aquifer through the San Pedro and also down to the Fox Canyon.

<u>Interconnected Surface Waters (ISW) [Checklist Items 8, 9, and 10 – (23 CCR §354.16); Identification of ISWs is a required element of Current and Historical Groundwater Conditions (23 CCR §354.16).]</u>

- Executive Summary, Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K

  Arroyo Simi–Las Posas is a complex series of losing, gaining and losing reaches that is connected to the Shallow Alluvial Aquifer. Interconnected surface waters have been spatially identified, including a brief overview of the gaining/losing reaches of the Arroyo Simi–Las Posas based on source water data, streamflow gages, and a field study of the gain/losing reaches with an estimated recharge rate from Arroyo Simi–Las Posas to Shallow Groundwater. This study was performed in September 2011, during an average water year and reveals that the arroyo is a complex series of losing, gaining and losing reaches. In fact, the groundwater levels are sufficiently high and water surfaces back to the arroyo in the middle stretch of the arroyo. Figure 2-16 maps out the losing and gaining reaches and presents a clear understanding of the interconnected system in ELPMA. We strongly disagree with misleading language throughout the GSP stating that the arroyo is a losing stream and that the surface water and groundwater are disconnected.

  These include:

  - Executive Summary, ES.2, Summary of Basin Setting and Conditions (p.ES-6) "Increased surface water flow and infiltration along Arroyo Simi–Las Posas also resulted in the establishment of riparian vegetation, along the banks of the arroyo. This riparian vegetation, which is dominated by non-native Arundo (Arundo donax), has been identified as a potential groundwater-dependent ecosystem. Within the boundaries of the ELPMA, Arroyo Simi–Las Posas is generally a losing stream, meaning that the groundwater table is below the stream bed, and water from Arroyo Simi–Las Posas percolates into the underlying sediments to recharge the groundwater. This leads to the conclusion that the riparian habitat along Arroyo Simi–Las Posas may rely on soil moisture from percolating surface water, rather than groundwater. As surface flows and recharge decrease in Arroyo Simi–Las Posas, groundwater elevations and soil moisture content in the vicinity of the potential groundwater-dependent ecosystem are anticipated to decline. These declines may impact the health of the riparian vegetation."

    This language is misleading as it portrays a disconnected groundwater-surface water ecosystem. The Arroyo Simi–Las Posas is a mix of gaining and losing reaches and *is* connected to the Shallow Alluvial Aquifer. Only at the Las Posas Valley Basin boundary, where the Arroyo Las Posas has gone dry since 2012, is there a disconnection between the surface water and groundwater.

Ecosystems often rely both on groundwater and surface water to meet their water needs (see Best Management Practice #3 in Attachment C of this letter). A strictly binary approach, designating all GDEs as either 100 percent reliant on groundwater or 100 percent reliant on surface water supplies is therefore inconsistent with the available science. The above "conclusion" is conjecture and statement should revised.

- Executive Summary, ES.3, Overview Of Sustainability Criteria
  (p.ES-9) "Depletion of interconnected surface water is not occurring within the LPVB, where Arroyo Simi–Las Posas is a losing stream, with groundwater elevations that have been below the bottom of the stream channel for decades." This is not an accurate statement, as Arroyo Simi–Las Posas is a mix of losing and gaining reaches and the groundwater elevations have been stable and high enough to intersect the stream channel for the past few decades. We do agree that depletions of interconnected surface water are not occurring for the majority of the GDE, except along the LPVB boundary with Pleasant Valley as noted above.

<u>Identification, Mapping and Description of GDEs [Checklist Items 11 to 20 (23 CCR §354.16)]</u>

- Executive Summary and Section 2.3.7
  GDEs have been identified and mapped during the GSP development process using an earlier version of the statewide database of GDE indicators (iGDE v0.3.1; TNC, 2017) and TNC's GDE Guidance document (Rohde et al., 2018). This evaluation is described in Appendix I, with a brief summary in Section 2.3.7. In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the GDEs and potential GDEs.

  The Arroyo Simi–Las Posas *should* be considered a GDE. It should *not* be characterized as a *potential* GDE. Non-native flows from the Simi Valley and Moorpark waste water treatment plants and the Simi Valley groundwater dewatering wells have both provided perennial flows in the Arroyo Simi-Las Posas and filled the Shallow Alluvial Aquifer such that under current conditions, the Arroyo Simi-Las Posas and Shallow Alluvial Aquifer is an interconnected system. There are sufficient data and studies (CMWD 2012, 2013) that demonstrate the connectivity of GDE and the surface water itself. It must be emphasized that the recognition of the non-native source waters does **not** negate this groundwater-surface water connectivity. GDEs are "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (23 CCR §351 (m)). By definition, the water source does not play a part in the *identification* of GDEs. The focus on "native flow" as defining a GDE is a fundamental flaw. The source of water entering an aquifer has never been a factor in defining groundwater. In fact, about 93% of the inflows into the ELPMA are from non-native sources (see Table 2-7) yet the GSP considers all of it groundwater.

There are many misleading statements that attempt to discount the groundwater-surface water connection and the Arroyo Simi–Las Posas GDE by overemphasizing the water source. We request that such statements be revised or removed. These include:

- Executive Summary – see above listed language
- However, the riparian vegetation in the Arroyo Simi–Las Posas composing these potential GDEs was established and is maintained by discharges from wastewater plants and Simi Valley dewatering discharges to Arroyo Simi. (Section 2.3.7, p.2-36)
- The gaining reach is caused by surface water that is resurfacing rather than by discharge of native groundwater (CMWD 2012, 2013). (Section 2.3.7, p.2-36 - 2-37)
- Until a connection between groundwater elevations under native flow conditions and the potential GDE is established, the Arroyo Simi–Las Posas potential GDE cannot be conclusively determined to be a GDE. (Section 2.3.7, p.2-38)

Again, the source of the groundwater, native or otherwise, does not alter the fact that it is groundwater and therefore should be considered as such when evaluating whether it supports a potential GDE.

- Section 2.3.7
  The confusing information about the shallow aquifer in WLPMA, which was not presented in the 2017 Preliminary Draft GSP, need to be assessed as to whether there is a hydrologic connection to any potential GDEs, such as the riparian ecosystem identified in the Beardsley Wash. Earlier discussions during TAG meetings had indicated that there was not a shallow aquifer unit in WLPMA. Thus the riparian habitat along the Beardsley Wash were assumed to be supported during dry summer periods by agricultural runoff, and/or residential development outdoor water use and excluded from further consideration (see Appendix I). This needs to be reconsidered and described in Section 2.3.7.

<u>Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)]</u>

- Section 2.4
  The water budget includes the Shallow Alluvial Aquifer in the ELPMA and the shallow aquifer in the WLPMA. In the ELPMA, the Arroyo Simi-Las Posas is a net recharge to the Shallow Alluvial Aquifer and the Arroyo Simi-Las Posas riparian vegetation evapotranspiration (ET) is a discharge from the Shallow Alluvial Aquifer. The riparian ET is estimated as Arundo. Section 2.4.2.2, Riparian Evapotranspiration Losses incorrectly describes the use of the consumptive water use of 24 AF/ac; the second paragraph correctly describes the calculation method of the ETo and crop coefficient. Table 2-7 lists riparian ET rates that are not consistent with the rates in the Technical Memorandum: Summary of Additional Refinements to the Groundwater Model of East and South Las Posas Sub-Basins (Intera, 2018).

Sustainability Goal [Checklist Items 23 to 25 (23 CCR §354.24)]

- Section 3.1 Sustainability Goal (p. 3-2)]
  Fox Canyon Groundwater Management Agency (FCGMA) Board of Directors (Board) adopted planning goals in 2015 that "Promote water levels that mitigate or minimize undesirable results (including pumping trough depressions, **surface water connectivity** [emphasis added], and chronic lowering of water levels)."

  The GDEs should be considered in the sustainability goal. GDEs are a beneficial use of groundwater and the criteria are intended to prevent significant and undesirable impacts to beneficial uses of groundwater under current and future conditions.

Undesirable Results [Checklist Items 30 to 46 (23 CCR §354.26)]

- Section 3.3.6 Depletions of Interconnected Surface Water (p. 3-14 - 3-15)
  - The undesirable result associated with depletion of interconnected surface water in the LPVB is unequivocally stated to be the loss of GDE habitat. We applaud that recognition. We do not agree with the misleading language continues to be used to dismiss the groundwater-surface water connection. Please see comments above with respect to Interconnected Surface Waters and Identification, Mapping and Description of GDEs. This nonsensical concept of resurfacing surface water not being groundwater is used to conclude that there will not be significant and unreasonable effects on beneficial uses of surface water such as GDEs.

    We do agree that *current* groundwater conditions in the LPVB do not impact the volume of flow in Arroyo Simi–Las Posas and groundwater production from the ELPMA will not result in depletion of interconnected surface water with significant and unreasonable adverse effects on beneficial uses of surface water.

    However, in the future, an anticipated cause of groundwater conditions that would lead to depletions of interconnected surface water and impacts to the Arroyo Simi-Las Posas GDE is decreased discharge from the Simi Valley and Moorpark wastewater discharges and Simi Valley dewatering wells. These discharges are a very important source of inflow to the ELPMA providing nearly 40% of the total annual recharge, and would also lead to decreased surface water flows, disconnection of the surface water and groundwater, and lowering of chronic lowering of groundwater levels in the Shallow Alluvial Aquifer and Fox Canyon Aquifer, and interbasin interflow from the Las Posas Valley Basin to the Pleasant Valley Basin.

    Such a change, however, is unrelated to groundwater production from the Shallow Alluvial Aquifer, and is outside of the jurisdictional powers of the FCGMA to prevent. However, given the SGMA goal of management of groundwater that will promote water levels that mitigate or minimize any potential future undesirable results of depletions of interconnected surface water and the associated Arroyo Simi–Las Posas potential GDE, The Nature Conservancy proposes inclusion of this aspirational goal (Section 354.30(g), Measurable Objectives) with recognition of the dependence on the continuation of these external water sources.

Recognition that external constraints (i.e., potential future loss of out-of-basin source waters) can result impacts to interconnected surface waters and GDEs was discussed with the California Department of Water Resources and State Water Resources Control Board (June 8, 2017 meeting). In particular, DWR was noted that SGMA §354.30(g) states: "An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." It was recognized that striving for an "aspirational goal" would be appropriate in this circumstance. We recommend inclusion of the "aspirational goal" when setting sustainability criteria for interconnected surface waters and the associated Arroyo Simi-Las Posas GDE.

Therefore, the sustainability goal would recognize that under circumstances where external constraints result in impacts to the GDE, the Fox Canyon Groundwater Management Agency would not be obligated to address those impacts, if it is at the expense of other beneficial users (e.g., cutting back groundwater extractions by agricultural users). The groundwater sustainability agency would only be obligated to address impacts to the GDE caused by changing groundwater conditions resulting from pumping or groundwater management under the jurisdiction of the groundwater sustainability agency that cause undesirable results.

- In WLPMA, there needs to be a revised evaluation as to any hydrologic connection between the shallow aquifer system and any potential GDEs identified in the NC Dataset.

- Section 3.3.7 Defining Undesirable Results (p. 3-16)
  - For ELPMA, addressing chronic lowering of groundwater levels and depletion of groundwater storage is assumed to be protective of interconnected surface water. And, the ELPMA will be determined to be experiencing undesirable results if, in any single monitoring event, groundwater levels in 5 of the 15 key wells are below their respective minimum thresholds. Given that the future depletions of interconnected surface water (and loss of the Arroyo Simi-Las Posas GDE) is only related to lowering of groundwater levels in the Shallow Alluvial Aquifer, this definition does not make sense. The two key wells in the Shallow Alluvial Aquifer should be assessed separately to determine whether there could be future undesirable results.

<u>Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)]</u>

- Section 3.4 (p.3-17)
  The avoidance of undesirable results should include the aspirational goal of maintain groundwater levels in the ELPMA Shallow Alluvial Aquifer to prevent future depletions of interconnected surface water and loss of the Arroyo Simi-Las Posas GDE.
- Section 3.4.2.6 ELPMA Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-24 to 3-25)]
  The GSP defines the minimum thresholds to address chronic lowering of groundwater levels and depletion of groundwater storage are to be protective of the Arroyo Simi-Las Posas GDE. Two wells to monitor representative groundwater conditions were selected in the Shallow Alluvial Aquifer are 02N20W09Q08 and 02N20W12MMW1. The proposed minimum thresholds are 170 ft MSL and 300 ft MSL for 02N20W09Q08 and 02N20W12MMW1, respectively. Both of these significantly below the historical lows of 271 and 358 ft MSL and the current condition (represented by Fall 2015) of 271 and 369 ft MSL for 02N20W09Q08 and 02N20W12MMW1, respectively. We disagree that the We find these proposed minimum thresholds to be entirely inappropriate.

  Based on literature studies, groundwater depths within the range considered necessary for juvenile establishment of willows and cottonwoods, typical focal phreatophytic species for riparian ecosystems, are less than 10 feet and for mature vegetation growth are less than 20 feet (Stillwater Sciences, 2016). Site-specific knowledge of groundwater use by the riparian vegetation is not known at this time. Although the literature studies suggest 20 ft bgs as a reasonable minimum threshold value for the GDE, it is uncertain what is the actual site conditions in the Arroyo Simi – Las Posas GDE. The recommended key well, 02N20W12MMW1, which is located outside of the GDE, has average depth to groundwater of 21 ft bgs at the well, with a range of 18 to 27 ft bgs. This well has a long-term representative time period (1996-present). The proposed minimum threshold of 170 ft MSL would represent a depth to groundwater that is 200 feet lower than the average water level; this would not be supportive of any riparian vegetation. We recommend a minimum threshold protective of the GDE at the historical groundwater elevation of 358.2 ft MSL.

  On the western losing reach of the GDE where key well 02N20W09Q08 is located, there has been a significant decrease in the vegetative health of the GDE since 2013. Water levels in key well 02N20W09Q08 average 38 ft bgs, with a range of 35 to 40 ft bgs (time period 2014 to present). Given that this well has only been monitoring groundwater levels since 2014, it is unclear what a realistic minimum threshold should be. Also, as the well is not actually within the GDE and ground surface elevations in this area are quite variable; accurately determining depths to groundwater within the GDE is necessary first step before recommending realistically protective minimum thresholds. This should be done by the 5-year plan update.

  In addition, there is an observed decline in ecosystem health in the western losing reach where key well 02N20W09Q08 is located, that is visible in the remote sensing vegetation metrics, NDVI and NDMI (Figure 14, Appendix I). However, as shown in

Figure 10 (Appendix I), there is a large range in the depth to groundwater in this losing reach. It is recommended that field-based work be conducted to accurately determine depths to groundwater within the GDE and thus support a site-specific minimum threshold for the GDE.

Following the precautionary principle, it is recommended that the minimum threshold for key well 02N20W12MMW1 be set at its minimum historical level (358.2 ft MSL). The recommendation recognizes there is uncertainty regarding these analyses herein regarding equivalent GDE depths and correlations with declining ecosystem health that can be addressed with additional field-based assessment and then revised in the next 5-year plan update.

<u>Measurable Objectives -Checklist Item 26 – (23 CCR §354.30)</u>

- Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-26 to 3-27)

  Current groundwater levels, as raised and sustained by wastewater plant and dewatering discharges, have been relatively constant since the 1980s and have provided for establishment and maintenance of the GDE. Under the current assumption that baseline conditions are representative of GDE conditions and thus currently represent sustainable conditions, our recommendation is therefore to set the measurable objective at the baseline average groundwater elevation. For the key wells 02N20W12MMW1 and 02N20W09Q08, it is recommended that the measurable objectives be set to 370 and 272 ft MSL, respectively.

  No interim milestones are necessary given that current conditions are meeting the measurable objectives.

  It is recognized that maintaining such levels is depended upon continued wastewater plant and dewatering discharges, though not regulated by the GSA. However, proposed projects in the GSP can ensure these sustainability criteria are met for the GDE beneficial use and continued recharge of Shallow Aquifer and Fox Canyon Aquifer.

<u>Monitoring Network [Checklist Items 47, 48 and 49 (23 CCR §354.34)]</u>

- 4.2.2 Surface Conditions Monitoring (p.4-4)
  The statement "Additionally, evapotranspiration from riparian vegetation lining Arroyo Simi–Las Posas impacts surface conditions by using surface water in the Arroyo" attributes the evapotranspiration (ET) from riparian vegetation as solely being from surface water. This assumption that all ET is from surface water is not verified. The CMWD numerical model specifically attributes the ET from groundwater. In reality, it is likely a combination of surface water, soil pore water, and groundwater. This is an area for further study as there are the ET of the non-native

Arundo in the riparian ecosystem is potential water savings that is evaluated in Project No. 2 (see Section 5.3).

- Section 4.3.6 Depletions of Interconnected Surface Water (p.4-10)
  We recommend inclusion remote sensing vegetative indices as a low cost approach to monitor baseline conditions of GDEs. The Nature Conservancy's free online tool, GDE Pulse, allows GSAs a way to assess changes in GDE health using remote sensing data sets; specifically, the Normalized Difference Vegetation Index (NDVI), which is a satellite-derived index that represents the greenness of vegetation and Normalized Difference Moisture Index (NDMI), which is a satellite-derived index that represents water content in vegetation.

- Section 4.6.5 Shallow Groundwater Monitoring near Surface Water Bodies and GDEs (p.4-15)
  We recommend continued monitoring of the existing set of shallow aquifer monitoring wells in the vicinity of the GDE to continue a record of groundwater conditions and to assess whether changes occur in the future. (Figures 6-9, Appendix I): 02N19W09E01S, 02N19W0K01S, 02N19W08H02S, 02N19W07G01S, 02N19W07K04S, 02N20W12MMW1 (key well), 02N20W12MMW2, 02N20W12MMW3, 02N20W09Q08S (key well), 02N20W17J06S, 02N20W10K02S. Wells 02N19W0K01S, 02N20W12MMW1 (key well), 02N20W12MMW2, and 02N20W12MMW3 were not identified as monitored wells in Tables 4-3 to 4-5. Also, 02N19W08H02S was incorrectly listed in Table 4-3 as monitoring the LAS. These should be included. In particular, 02N20W12MMW1 is a specified key well.

  One limitation of this initial evaluation is that the estimation of groundwater levels in the GDE are approximated based on wells outside the GDE, using single point land surface GDE reference points. As a result, this analysis is a simplification of the groundwater depth representation for the Arroyo Simi - Las Posas GDE. In reality, the ground surface elevation varies as the GDE traverses upslope from the stream channel to the floodplain terraces and also longitudinally up or downstream. Refinement of the depth to groundwater mapping in the GDE would more clearly determine the impacts of decreasing groundwater levels on the riparian habitat. In particular, monitoring of groundwater levels in the GDE will characterize the degree to which the vegetation is reliant on groundwater. Mapping of the ground surface elevation in the GDE near the monitoring wells is a necessary task.

Projects and Management Actions to Achieve Sustainability Goal [Checklist Items 50 and 51 (23 CCR §354.44)]

- Sections 5.3 and 5.4 Projects No. 2 & 3 – (p. 5-4 – 5-10)

  Because treated water inflows are critical to maintaining extractions rates for agriculture and other beneficial users including the Arroyo Simi-Las Posas GDE the FCGMA approved two projects to be evaluated in the GSP. These are Project No 2., Arroyo Simi-Las Posas Arundo Removal, and Project No. 3, Arroyo Simi-Las Posas

Water Acquisition. These projects are focused on maintaining the inflows into the basin.

According to Section 354.44 of the SGMA regulations projects are to achieve the sustainability goals for the basin. It goes on to say projects must include a "description of the measurable objective this is expected to benefit from the project". Therefore, the ELPMA GSP must include a goal(s) and measurable objective(s) tied to the purpose of projects 2 & 3. Initially this created a quandary for the GMA because it is important to maintain the inflows from the treated water discharges, but it is not within the GMA's authority to ensure they continue. The SGMA addresses this by allowing aspirational goal where the agency creates an objective that may exceed its operational flexibility but failure to achieve the objective is not grounds for a finding of inadequacy (see Sec. 354.30(g).

It is extremely important to include the environmental beneficial user in the establishment of the sustainability criteria. The proposed ELPMA projects are multi-benefit projects, and grant funding for such projects are predicated on the establishment of that position. Because both projects have co-benefits to both groundwater supply and the restoration of native habitat, the projects have access to multiple sources of funding. Without such clarity in the GSP, there is no justification for conservation funding. The Nature Conservancy is partnering with another NGO that has already started the IRWM grant process in anticipation of the arundo removal project. We also want to jointly work to find funds for purchasing the Simi outfall water.

Attachment C

Freshwater Species Located in the Las Posas Valley Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Las Posas Valley Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the GSA's boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[5]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[6] as well as on The Nature Conservancy's science website[7].

Scientific Name	Common Name	Legally Protected Species		
		Federal	State	Other
BIRDS				
Aix sponsa	Wood Duck			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas cyanoptera	Cinnamon Teal			
Anas platyrhynchos	Mallard			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya collaris	Ring-necked Duck			
Bucephala albeola	Bufflehead			
Butorides virescens	Green Heron			
Calidris minutilla	Least Sandpiper			
Egretta thula	Snowy Egret			
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Oxyura jamaicensis	Ruddy Duck			
Phalacrocorax auritus	Double-crested Cormorant			
Plegadis chihi	White-faced Ibis		Watch list	
Podilymbus podiceps	Pied-billed Grebe			

[5] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710
[6] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS
[7] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
CRUSTACEANS				
Cyprididae fam.	Cyprididae fam.			
Hyalella spp.	Hyalella spp.			
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Pseudacris cadaverina	California Treefrog			ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTEBRATES				
Ablabesmyia spp.	Ablabesmyia spp.			
Aeshnidae fam.	Aeshnidae fam.			
Apedilum spp.	Apedilum spp.			
Baetidae fam.	Baetidae fam.			
Baetis adonis	A Mayfly			
Baetis spp.	Baetis spp.			
Brechmorhoga mendax	Pale-faced Clubskimmer			
Callibaetis spp.	Callibaetis spp.			
Centroptilum spp.	Centroptilum spp.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Cladotanytarsus spp.	Cladotanytarsus spp.			
Coenagrionidae fam.	Coenagrionidae fam.			
Corixidae fam.	Corixidae fam.			
Cricotopus spp.	Cricotopus spp.			
Cricotopus trifascia				Not on any status lists
Cryptochironomus spp.	Cryptochironomus spp.			
Dicrotendipes spp.	Dicrotendipes spp.			
Endochironomus spp.	Endochironomus spp.			
Ephydridae fam.	Ephydridae fam.			

Eukiefferiella claripennis				Not on any status lists
Eukiefferiella spp.	Eukiefferiella spp.			
Fallceon quilleri	A Mayfly			
Fallceon spp.	Fallceon spp.			
Hydrobius spp.	Hydrobius spp.			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Labrundinia spp.	Labrundinia spp.			
Limnophyes spp.	Limnophyes spp.			
Micropsectra spp.	Micropsectra spp.			
Parachironomus spp.	Parachironomus spp.			
Pentaneura spp.	Pentaneura spp.			
Petrophila spp.	Petrophila spp.			
Polypedilum spp.	Polypedilum spp.			
Procladius spp.	Procladius spp.			
Pseudochironomus spp.	Pseudochironomus spp.			
Pseudosmittia spp.	Pseudosmittia spp.			
Psychodidae fam.	Psychodidae fam.			
Simulium argus				Not on any status lists
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Tanytarsus spp.	Tanytarsus spp.			
Tricorythodes explicatus	A Mayfly			
Tricorythodes spp.	Tricorythodes spp.			
Tropisternus spp.	Tropisternus spp.			
MOLLUSKS				
Ferrissia spp.	Ferrissia spp.			
Lymnaeidae fam.	Lymnaeidae fam.			
Physa spp.	Physa spp.			
Pyrgulopsis stearnsiana	Yaqui Springsnail			
PLANTS				
Eleocharis macrostachya	Creeping Spikerush			
Lemna minuta	Least Duckweed			
Mimulus cardinalis	Scarlet Monkeyflower			
Phacelia distans	NA			
Populus trichocarpa	NA			Not on any status lists

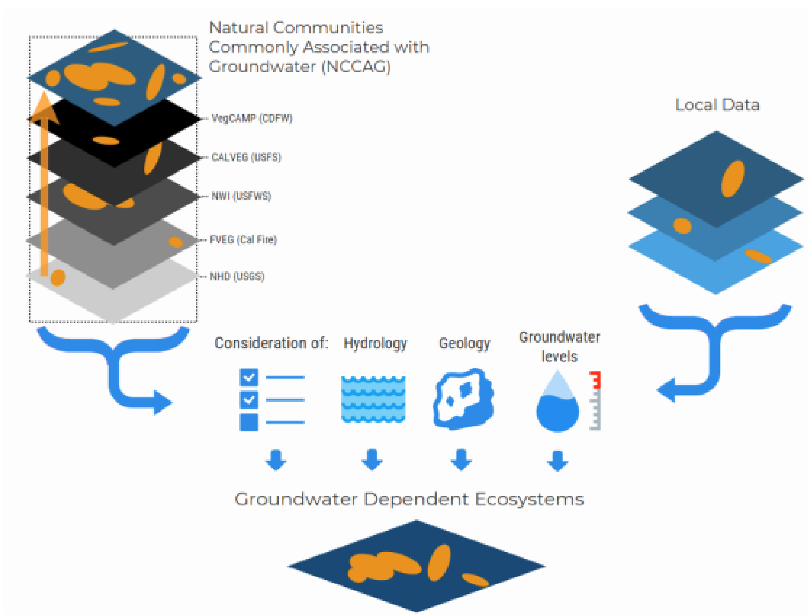
Attachment D

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[8] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[9]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.



[8] *NC Dataset Online Viewer:* *https://gis.water.ca.gov/app/NCDatasetViewer/*

[9] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[10]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[11] on the Groundwater Resource Hub[12], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

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[10] *For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf*

[11] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/

[12] *The Groundwater Resource Hub: www.GroundwaterResourceHub.org*

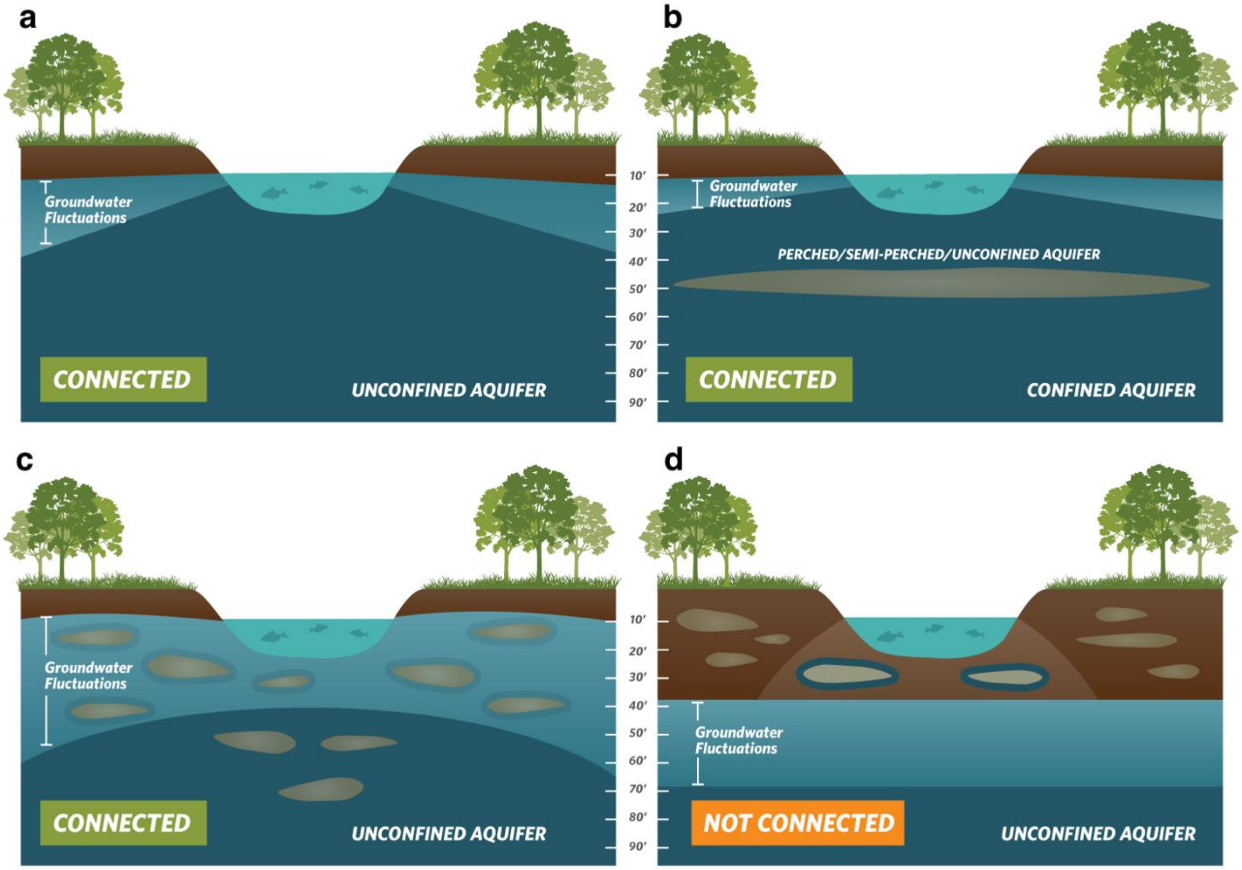

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[13] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[14] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[15] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[16]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

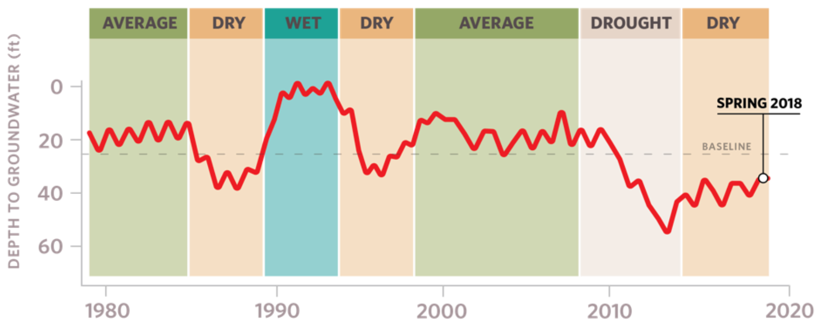

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

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[13] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[14] *Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]*

[15] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[16] *SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer*

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[17], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

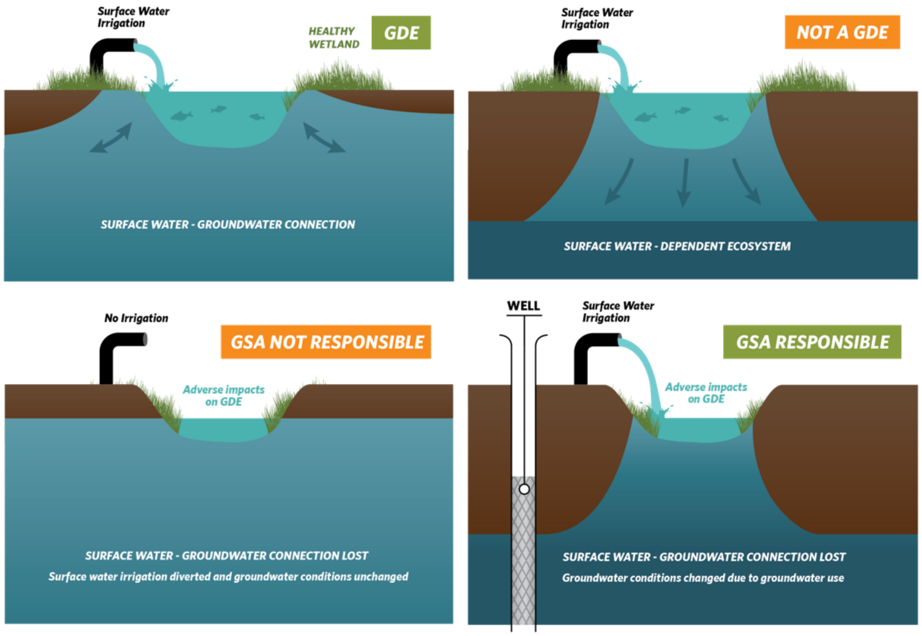


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[17] *For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/*

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

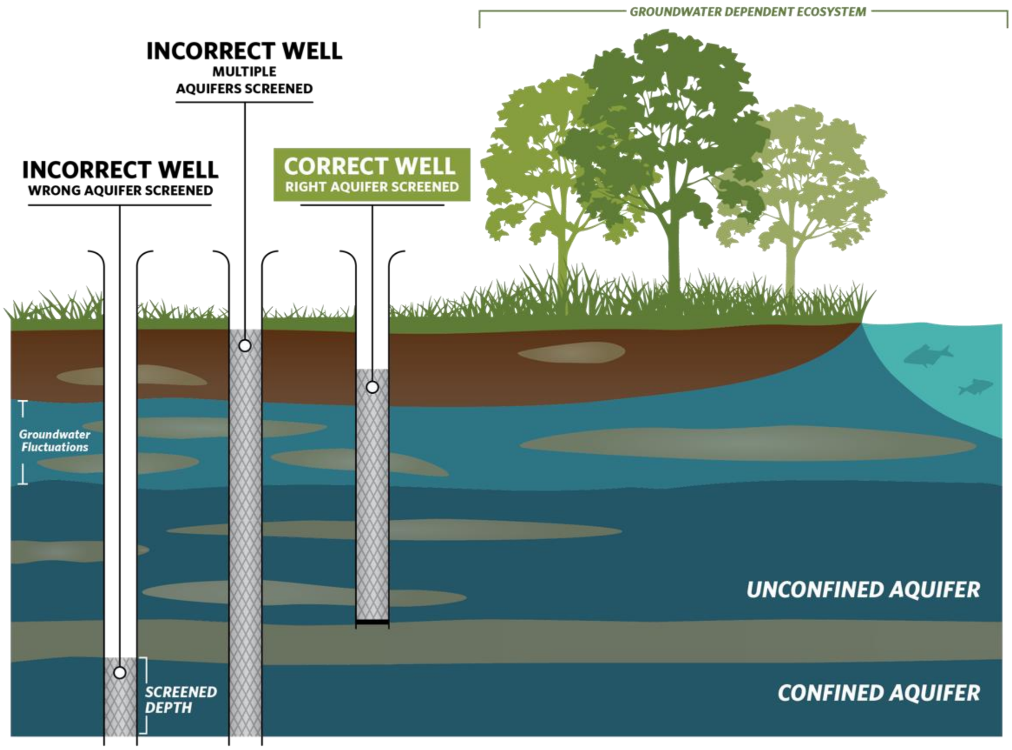


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[18] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

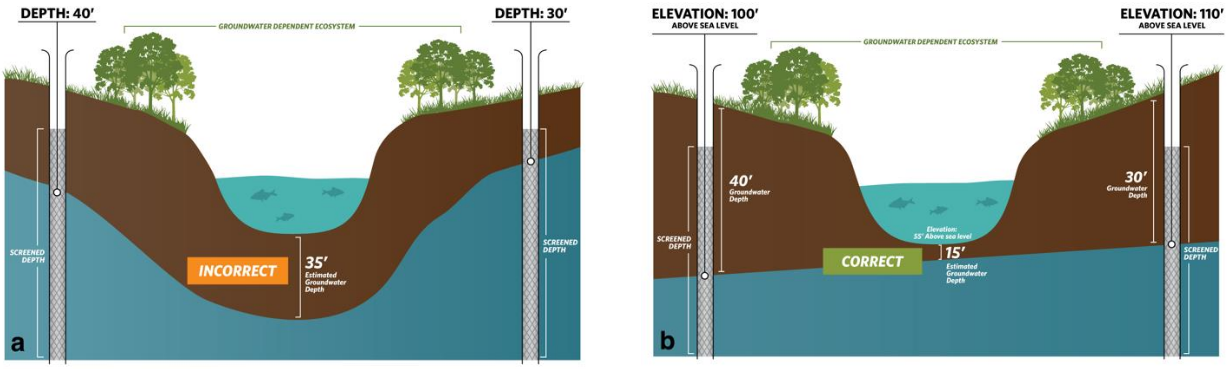


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

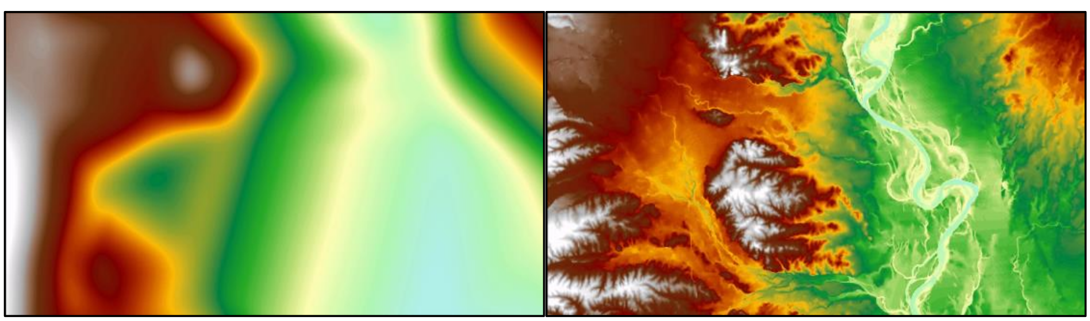


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[18] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

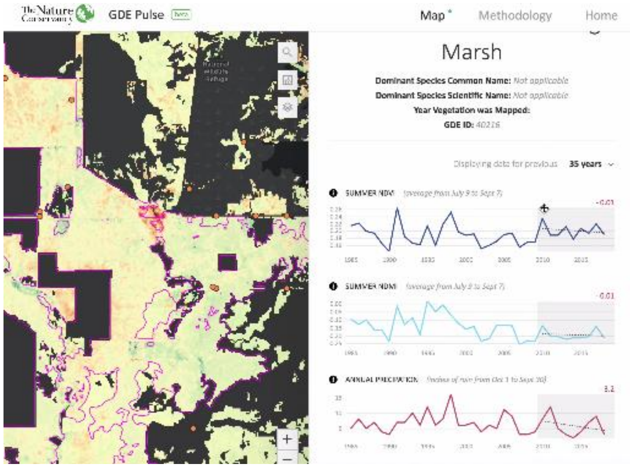
Attachment E

GDE Pulse

A new, free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data.

The Nature Conservancy
Protecting nature. Preserving life.

Visit https://gde.codefornature.org/



Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset[19]. The following datasets are included:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset[20]. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

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[19] The Natural Communities Commonly Associated with Groundwater Dataset is hosted on the California Department of Water Resources' website: https://gis.water.ca.gov/app/NCDatasetViewer/#

[20] The PRISM dataset is hosted on Oregon State University's website: http://www.prism.oregonstate.edu/

LA LOMA RANCH MUTUAL WATER COMPANY

September 23, 2019

Fox Canyon Groundwater Management Agency
Board of Directors
800 S. Victoria Avenue
Ventura, CA 93009

Dear Board of Directors,

Subject: DRAFT Groundwater Sustainability Plan for the Las Posas Valley Basin

La Loma Ranch Mutual Water Company (LLRM) is a small water purveyor in the Las Posas Valley established in 1978. LLRM is located at the northerly intersection of Price Road and La Loma Avenue in Somis, California. Since its formation, LLRM has relied exclusively on groundwater as their sole source of water.

Section 1.8.2 of the Draft GSP dated July 2019 erroneously states "*all of the purveyors in the LPV, including all municipal well operators, are in whole or part supplied water by CMWD*."

LLRM has never, either in part or in whole, been supplied by CMWD. LLRM has no plans now, or in the future to receive water from CMWD.

The Ventura County Watershed Protection District Inventory of Public and Private Water Purveyors (VCWPD 2006) shows LLRM as belonging to the Calleguas Municipal Water District (CMWD) wholesale area, however, there is no water infrastructure in place for CMWD to deliver water to LLRM. CMWD's closest turnout is located two miles away, at the intersection of Highway 118 and Price Road in Somis, California (Attachment 1).

CMWD can attest to the fact they do not supply water to all water purveyors in the Las Posas Valley as the Draft GSP states. Making such a blanket statement speaks to a lack of proper due diligence in identifying the beneficial users of groundwater in the basin, users that would be more heavily impacted if water restrictions were implemented because of their exclusive reliance on groundwater.

The statement cited above should be modified to reflect accurate information. Additionally, the draft GSP should clearly identify water purveyors that use groundwater as their only source of water.

Respectfully,

Alma Quezada, PG
General Manager

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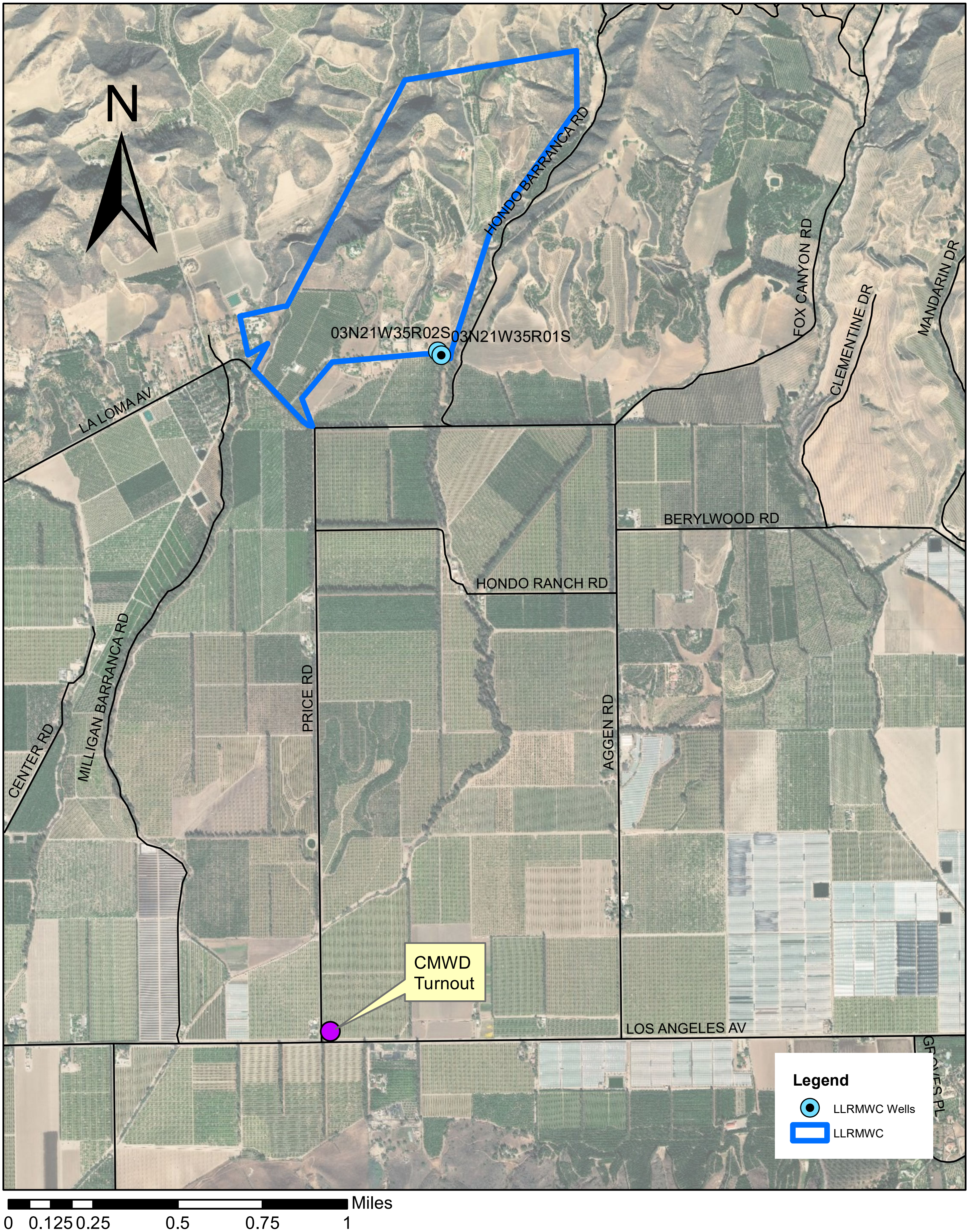
Somis, CA 93066
alma@lalomawater.com

Attachment 1: LLRM Water Company and CMWD Turnout



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September 23, 2019

VIA ELECTRONIC MAIL

Eugene F. West
Chair
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, California 93009-1610

Re: Comments on Draft Groundwater Sustainability Plan for the Las Posas Groundwater Basin

Dear Chair West:

The Las Posas Valley Water Rights Coalition and its members, the Las Posas Farming Group and its members, Zone Mutual Water Company, Del Norte Water Company, and Berylwood Heights Mutual Water Company (collectively, "Commenters") submit the following comments on the Draft Groundwater Sustainability Plan for the Las Posas Groundwater Basin (the "Draft GSP").

One primary concern with the Draft GSP is that its adoption at this time is premature and imprudent. The GSP is not due until 2022 and the basin is now being adjudicated. The adjudication will address many subjects including the division of groundwater pumping rights among basin users. We respectfully urge the Fox Canyon Groundwater Management Agency ("FCGMA") to postpone adoption of the GSP for at least a portion of the more than two years until the GSP is due to allow the adjudication to proceed. The FCGMA could then integrate the results of the adjudication, hopefully derived from a negotiated stipulation, into the GSP thereby furthering a proper harmonization of the GSP with the adjudication. To do otherwise and adopt a GSP for the Las Posas Groundwater Basin ("Basin") years ahead of schedule will force an unnecessary conflict between the groundwater management prescribed by the GSP and the legal issues being litigated in the adjudication, Consequently, premature adoption of the GSP will likely cause inefficiencies and further conflict that might otherwise be avoided, and hopefully settled.

Commenters also believe, for the reasons stated more fully in the accompanying technical comments prepared by Aquilogic, Steven Bachman, and Exponent, that the Draft GSP fails to meet the basic technical and scientific standards needed for groundwater management of the

Basin. Accordingly, if the FCGMA were to adopt the Draft GSP without thorough and comprehensive revisions, that approval would constitute an arbitrary and capricious action by FCGMA. The technical comments demonstrate that the FCGMA lacks sufficient evidence to support its technical conclusions and future management actions (including but not limited to allocation and any pumping restrictions) based on the analysis in the Draft GSP.

Specifically:

- The FCGMA has used poorly calibrated models as the basis for the Draft GSP, even when those models do not comport with the measured physical data (e.g., groundwater elevations) for the Basin. Models should not define reality; reality should define models.

- In the West Las Posas Basin ("WLP"), the model is not able to simulate historical conditions accurately, which is the basic function of a groundwater model. Given the size of these errors, that model cannot credibly be used in the Draft GSP. Without the analysis of the WLP, the Draft GSP as a whole cannot be sustained.

- Many of the conclusions (especially the Draft GSP's estimate of the sustainable yield of the Basin) are based on modeling of future conditions. The assumptions built into those model runs are based either on incorrect assumptions (e.g., that in wet years, pumping from the Basin will be the same as in dry years) and/or on speculation (that almost 5,000 afy of water from the Simi Valley will not be available in the future). In either case, there is not substantial evidence for the assumptions that led to the estimate of sustainable yield and so that estimate – which is the heart of the Draft GSP – is fatally flawed.

Commenters note that there is not a single mention in the Draft GSP of the water rights that are held by various parties to the groundwater in the Basin. Overlying water rights are property rights protected by California law (including, but not limited to the California Constitution) and also by the Sustainable Groundwater Management Act. Water Code §§10720.5, 10726.4(a)(2), 10726.8(b). That statute requires that the Draft GSP protect overlying water rights; the Draft GSP is deficient because it does not acknowledge that obligation or explain how the Draft GSP will protect those rights in the future. Indeed, to the extent that the Draft GSP understates the sustainable yield of the Basin and/or calls for reductions in pumping, the Draft GSP interferes with vested property rights and so is contrary to law. Again, because these water right issues are presently being adjudicated, it is reasonable for the FCGMA to postpone adoption of the GSP to allow resolution of these legal issues, which can then be integrated into the Draft GSP before adoption ahead of the 2022 due date.

Commenters continue to be willing to work with the FCGMA to develop a sustainable groundwater management program that ensures the long-term sustainability of the Basin and that fully protects water rights. The Draft GSP, however, is the wrong way to achieve those goals. I am honored to be able to inform the FCGMA that O'Melveny and Myers, LLP, on behalf of the Las Posas Farming Group and its members, and Price Postel & Parma LLP, on behalf of several large mutual water companies, join Downey Brand LLP and Goldenring & Prosser, A Professional Law Corporation, on behalf of the Las Posas Valley Water Rights Coalition and its members in these comments.

Very truly yours,

DOWNEY BRAND LLP

David R.E. Aladjem

cc: Peter Goldenring
Russell McGlothlin
Craig Parton

September 23, 2019

Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009-1610

Subject: Comments on the DRAFT (SUBJECT TO CHANGE) Groundwater Sustainability Plan for the Las Posas Valley Basin, July 2019

Dear Board of Directors:

The undersigned technical experts have reviewed the Draft Groundwater Sustainability Plan for the Las Posas Valley Basin ("Draft GSP"), dated July 2019. Based on our review of the Draft GSP and as described more fully below, it is our professional opinion that the Draft GSP is not suitable in its current state to develop sustainable management criteria (SMC), minimum thresholds (MTs), or measurable objectives (MOs), or to support management action development in the Las Posas Valley Basin (LPVB) in accordance with the Sustainable Groundwater Management Act (SGMA). In general, we found the Draft GSP to be deficient, unclear, and difficult to understand in numerous areas.

We disagree with the suggestion within the Draft GSP that the document and the analyses it contains are suitable in their current state to serve as the basis for important groundwater management decisions, which could then be refined over the next five years as the models and analysis are improved. It is not appropriate for that purpose. Rather, it is our opinion that the Draft GSP is not currently suitable as the basis for even interim management decisions but needs refinement and improvements first. Further, and as detailed herein, available information indicates that pumping reductions and other stringent management measures are unwarranted for the LPVB at this time.

Accordingly, the following 10 overarching comments capture our chief concerns:

1. The process used in the Draft GSP for developing a management plan with the aid of groundwater models rather than relying on measured data is backward, because it relies on model scenarios rather than measured data to establish the sustainability criteria. As a result, the MTs, MOs, estimates of sustainable yield and SMC are unreliable.
2. Critical parameters needed to calculate important quantities, such as the sustainable yield, have also been defined using a backward approach that relies primarily on models, rather than physical measurements.

3. In the West Las Posas sub-basin (WLP), the United Water Conservation District (United) groundwater model is not able to simulate historical groundwater conditions accurately; it cannot be relied upon in its current form.
4. The future model scenarios defined in both the WLP and the East Las Posas subbasin (ELP) are flawed and cannot be relied upon to evaluate management alternatives or develop estimates of sustainable yield.
5. The Draft GSP is unclear with respect to how saline intrusion was considered in establishing MTs, MOs, and the sustainable yield of the WLP.
6. Some of the chosen “key wells” used in the Draft GSP have been assigned to a specific aquifer, but in fact may be screened in multiple aquifers, which will result in erroneous model predictions.
7. The Draft GSP does not provide a rationale for assuming decreased water flows from Simi Valley in the future, rendering sustainable yield estimates for the ELP questionable.
8. Multiple inconsistencies in the Draft GSP have been identified relating to the values for the sustainable yield of WLP and ELP and pumping within these basins. Moreover, the sustainable yield calculation for WLP cannot be independently reproduced by our team of technical experts without more transparency regarding the methodologies or formulae employed by the FCGMA.
9. The Draft GSP asserts, without support, that “in-lieu” water deliveries have had a significant impact on groundwater levels and the volume of water in storage.
10. The Draft GSP does not establish that the chosen 1985-2015 base period, which is used to estimate sustainable yield and other important quantities, is representative of the long-term climate in the LPVB.

This letter provides an overview of the Draft GSP to provide context for these comments, summarizes our view of the available data and information, and discusses the implications of that information for groundwater basin management. The key supporting information for each major comment is provided in this letter, and additional detail for each major comment is provided in an appendix corresponding to that comment. The appendices include our analyses of technical details as well as specific comments on statements or findings of the Draft GSP.

The LPVB is not classified by the California Department of Water Resources (DWR) as a basin subject to conditions of critical overdraft; therefore, the GSP for the LPVB is not due until January 2022. In our opinion, the Draft GSP (and the technical analyses that serve as the bases for the Draft GSP) should be refined and improved significantly over the next two years in order to allow the development of a more technically sound and properly documented GSP upon which to base far-reaching groundwater management decisions. This conclusion is consistent with the Water Balance Report that we, and the expert consultant for the Calleguas Municipal Water

District, submitted to the Santa Barbara County Superior Court this past May. We stand ready to work collaboratively with the FCGMA to refine the technical analyses upon which the Draft GSP is based so that the LPVB can be managed based on the best available science. At present, however, due to the flaws and deficiencies identified in this letter, the Draft GSP is not suitable for use in implementing SGMA.

Overview of Draft GSP

The LPVB consists of two sub-basins: WLP and ELP (the Epworth Gravels Management Area is included inside the ELP). In the past, the South Las Posas sub-basin (SLP) was defined separate from ELP, but in the Draft GSP (and in these comments) the term “ELP” is used to refer to both the ELP and SLP.

The Draft GSP uses two numerical groundwater models as the basis for evaluating conditions and management actions within each basin. Models for the two basins were developed separately. Calleguas Municipal Water District developed a MODFLOW model for the ELP (referred to hereafter as the Calleguas model), and United Water Conservation District developed a MODFLOW model that includes the Oxnard Basin, Pleasant Valley Basin, and WLP (referred to hereafter as the United model). The models are distinct—*i.e.*, they are not continuous across the boundary between the WLP and ELP, and they include differing assumptions in the ELP and WLP. The procedures for evaluating sustainable yield, establishing MTs and MOs, and assessing management actions also differ between the two basins.

Both models were calibrated using historical conditions—*i.e.*, 1970-2015 for ELP and 1985-2015 for WLP. Model parameters were adjusted to improve the models’ abilities to reproduce historical conditions. Models were also used to simulate theoretical future conditions, and simplified assumptions were made in the future model simulations. For example, groundwater extraction (pumping) was held constant at 2015-2017 average rates in both the WLP and ELP future-condition evaluations. As described in greater detail in the comments below, MTs and MOs were established to avoid undesirable effects identified in the WLP and ELP. The primary undesirable effects identified in the Draft GSP include the chronic lowering of groundwater levels (WLP), chronic lowering of groundwater levels and conversion from confined to unconfined conditions (ELP), loss of storage in portions of the basin (ELP), saline intrusion into the Oxnard Plain (WLP), and subsidence (WLP). Sustainable yield estimates appear to have been calculated, at least in part, using model-derived water balance data. The Calleguas and United models make inconsistent assumptions. For example, the water balance in the Calleguas model for the ELP (Table 2-7) shows an average outflow of 125 AFY from the ELP to the WLP, but this assumption is not matched by the United model for the WLP to show a similar quantity of inflows to the WLP from the ELP.

There is No Problem

The Draft GSP relies, in large part, on reductions in groundwater production to achieve sustainability in each management area (i.e., WLP, ELP, and Epworth Gravels). However, the empirical data and United groundwater model simulations indicate that such reductions may not be needed. Simply put: the Draft GSP presents a solution to a problem that may not exist, or that is easily solvable through minimal projects! Imposing any reductions in groundwater production would have negative socio-economic impacts and would require hard decisions on behalf of water users. If it was later determined that such reductions were unnecessary, then those impacts would have been imposed for nothing, with potentially far-reaching consequences.

In Section 3.0 of the Draft GSP, hydrographs are presented for key wells in each management area (Figures 3-8a through 3-11). These hydrographs show historical groundwater levels, albeit for a limited period for many wells, and future groundwater levels under various scenarios.

In WLP, even under the baseline scenario (i.e., continued groundwater pumping at recent rates), groundwater levels at most key wells stay between the selected MOs and MTs or just below the MTs (and above the MO for one well). The Draft GSP recognizes that there is uncertainty in the suggested sustainable yield and SMC, MOs and MTs and indicates that values selected for these criteria will be refined and adjusted over the next five years. Given this uncertainty, and the future groundwater levels in WLP under various model scenarios, imposing any reductions in WLP may be unnecessary and is premature.

In ELP, in general, only under the baseline scenario do groundwater levels fall below the MT, and only after 2040. For most wells, the implementation of the limited number of projects detailed in the Draft GSP results in groundwater levels that remain above MTs, and in many cases at or above the MOs. Given this, and the uncertainty in sustainable yield, MTs and MOs described within the GSP, the focus in ELP should be on project implementation rather than reductions in groundwater production. Therefore, imposing any reductions in ELP may be unnecessary and is premature.

As noted, the Draft GSP for LPVB does not have to be submitted to DWR until January 2022. As noted, the values of sustainable yield, MOs, and MTs could be better defined over the next two years. In addition, the projects could be better defined and, in some cases, implemented during the next two years.

Further Information is Required for Proper Evaluation of the GSP

Despite repeated requests, model files for future scenarios were either not available for review (ELP) or, if available, it was not clear that the model files were current (WLP). Further, a key model file (the head observation file) was apparently not included among the MODFLOW files released by United in early 2019. Consequently, calibration of the United model was assessed on a preliminary basis using proxy well data supplied with the model in spreadsheet format. The Draft GSP also did not describe the climate adjustments that were made for the model simulations of future conditions, and the calculations used to estimate sustainable yield were not adequately described and could not be reproduced. Additional time is required to properly address serious concerns about the GSP that are discussed below.

Because SGMA contemplates that the groundwater sustainability agency (here, FCGMA) will use the best available information to manage the groundwater basin and that the GSA will involve stakeholders in that process, we respectfully request that the missing information be provided to us within the next two weeks for our review and analysis. We further respectfully request that we be allowed to supplement these comments by November 15 based on the additional information.

Overarching Comments on the Draft GSP

Overarching comments on the GSP are provided below, followed by appendices that provide additional analysis and line-by-line comments.

1) **The process used in the Draft GSP for developing a management plan with the aid of groundwater models rather than relying on measured data is backward, because it relies on model scenarios rather than measured data to establish the sustainability criteria. As a result, the MTs, MOs, estimates of SMC are unreliable.**

   The FCGMA should have relied primarily on measured data, including hydrographs and pumping records, to establish MTs and MOs and to evaluate sustainable yield. Instead, the Draft GSP relies on numerical models and other poorly defined criteria to establish MTs and MOs, to evaluate undesirable impacts, and to estimate the sustainable yield of the WLP and ELP. By relying primarily on model results to develop MTs, MOs, sustainable yield, and other important quantities, the Draft GSP fails to adequately consider the measured hydrographs and groundwater conditions.

   All groundwater models are approximations of an aquifer system and are implicitly uncertain, especially in highly complex basins like the LPVB. For this reason, measured data should be used to develop an understanding of groundwater behavior in a basin, and groundwater models should be used only when they comport with the groundwater behavior established using observations. In the case of the Draft GSP, numerical groundwater models are being used to supersede measured data.

   As detailed throughout these comments, measured data lead to different conclusions than those expressed in the Draft GSP. For example, in the eastern portion of the WLP, an undesirable result cited in the Draft GSP is chronic lowering of groundwater elevations. However, historical hydrographs indicate that groundwater elevations have been both rising and falling over time. Historical hydrographs do not indicate consistent declines over time – *i.e.*, measured hydrographs in the WLP do not indicate chronic lowering. For example, see Figure 1-1, Appendix 1.

   In fact, the MTs and MOs in the WLP (and ELP) are not based on actual undesirable results from the historical record, but rather are based on a mix of information including historical lows (which caused no apparent undesirable results), model output for theoretical future scenarios, and (for the WLP) considerations of saline intrusion at the coast[1]. In general, the methodology for setting MTs and MOs is unclear, appears subjective, and fails to give

[1] (*See also* Comment 3, which demonstrates that the model for the WLP is poorly calibrated and should not be relied upon in its current state; Comment 4, which demonstrates that the model scenarios for theoretical future conditions are flawed; and Comment 5, which discusses the treatment of saline intrusion in the Draft GSP.)

appropriate weight to measured groundwater data and the real-world effects of those groundwater levels.

In summary, the primary source of information regarding historical groundwater conditions and undesirable effects in the LPVB should be measured data from wells within the LPVB. Reliance instead on poorly calibrated groundwater models will result in inaccurate and misleading conclusions.

For additional detail, see Appendix 1.

2) Critical parameters needed to calculate important quantities, such as the sustainable yield, have also been defined using a backward approach that relies primarily on models, rather than physical measurements.

In the draft GSP, model-estimated parameters such as storativity and specific yield values are used to determine quantities of water contained in aquifer systems and to compute changes in the quantity of water stored over time. Hence, they may be used, in part, to estimate important values, such as the sustainable yield of an aquifer.

The well-established method to develop a conceptual and then numerical groundwater model of a basin's hydrogeology begins by considering the physical properties and dimensions of the aquifer. A model is then built around the real/measured parameters to simulate actual conditions. In this GSP, for the primary aquifers in the LPVB (including the Fox Canyon Aquifer), the groundwater models that underpin the Draft GSP appear to have been built first, and then the physical properties, specifically storativity and specific yield, were adjusted until the model "calibrated." The result is a set of models that do not accurately represent the actual conditions in the aquifers of the WLP and ELP, and that should not be relied upon for the development of a GSP.

In the previous (2017) Preliminary Draft GSP, a range of storage coefficients, both hypothetical and constrained with measurements, were used to estimate a range of average annual changes in groundwater storage within ELP and WLP (see Table 2-3, 2017 Draft GSP, and reproduced in Appendix 2). In the 2017 Preliminary Draft GSP, estimated annual changes in storage differed by hundreds to thousands of acre feet per year across the range of storage coefficients, which are also tabulated separately in Appendix 2 of this document. These data from the 2017 Preliminary Draft GSP illustrate the importance of using physical measurements to properly constrain storage coefficients; specifying potentially inaccurate, model-based storage coefficients may lead to large errors with respect to estimating changes in groundwater storage and other important quantities, such as sustainable yields.

The storativity and specific yield measurements and estimates are listed in Table A of Appendix 2, along with their source documents.

3) **In the West Las Posas sub-basin (WLP), the United groundwater model is not able to simulate historical groundwater conditions accurately; and therefore, it cannot be relied upon in its current form.**

Numerical groundwater models are used in the Draft GSP to develop sustainable yield estimates, evaluate management conditions, and develop MTs and MOs. Thus, it is critical that the groundwater models be able to accurately simulate conditions in the LPVB. However, modeled and measured groundwater surface elevations in the WLP differ substantially (by as much as 100 feet), and the model fails to reproduce the magnitude and trend of measured groundwater surface elevations within the "key" wells used to set MTs and MOs. In some wells, the difference between modeled and measured water levels is greater than the difference between the MT and the MO management thresholds (*See* Figure 3-3 in Appendix 3). Thus, the numerical groundwater model and its results should not be used to evaluate groundwater conditions or management options, including the setting of MTs and MOs, in the WLP sub-basin.

The United model simulates historical groundwater conditions in several primary groundwater basins (including the Oxnard Basin, Pleasant Valley Basin, and the WLP sub-basin) over the time period of 1985-2015. Our preliminary assessment of calibration for the United model suggests it is generally reasonably well calibrated in the Oxnard and Pleasant Valley Basins, but that the model is <u>not</u> suitable in its current state for describing hydrogeological conditions or processes in the WLP. Our assessment is preliminary because, as detailed above, key model files were not available for review for the United model. Thus, our analysis of the model calibration is based upon available data and may be refined if model files are made available.

Given the inability of the United model to accurately simulate historical conditions in the WLP, there can be no confidence that it can be used to simulate future conditions or evaluate alternative management scenarios. *See also* Comment 4.

See Appendix 3 for figures and analysis describing our preliminary evaluation of the numerical groundwater model calibration for the WLP.

4) **The future model scenarios defined in both the WLP and the ELP are flawed and cannot be relied upon to evaluate management alternatives or develop estimates of sustainable yield.**

The Draft GSP uses numerical groundwater model scenarios for a theoretical future condition to evaluate MTs, MOs, sustainable yield, and future management actions. In these future scenarios, precipitation between the years 2020 and 2069 is based on observed precipitation between 1930 and 1979 and adjusted for predicted changes in climate as specified by the DWR, and a fixed pumping rate is imposed. Specifically, the average pumping for 2015-

2017 is used to simulate pumping for all future years, including the full range of both dry and wet years observed in a 50-year historical period. However, this approach is fundamentally flawed, as it does not capture relationships between extraction and climate. Measured data confirm that there is substantially less pumping in wet years than in dry years (*see* Figure 4-1, Appendix 4). Since precipitation and pumping are primary variables that control groundwater levels, the models will fail to adequately predict future conditions. The use of invariant groundwater extraction rates coupled with natural, varying hydrogeologic conditions introduces serious errors into the future model scenarios.

In addition, the climate adjustments that were made within the model are not described in the Draft GSP, and future model runs have not been made available for review.

See Appendix 4 for more details and further comments.

5) The Draft GSP is unclear with respect to how saline intrusion was considered in establishing MTs, MOs, and the sustainable yield of the WLP.

Given the distance of the WLP basin from the coast (approximately 9 miles), it is highly unlikely that management actions in the WLP would have a proximate or meaningful effect on saline intrusion at the coast during the implementation period contemplated by the Draft GSP. Instead, the most efficient way to address saline intrusion at the coast is to focus management actions and projects on areas near the coast.

In some places the Draft GSP indicates that saline intrusion was considered in the development of MTs and MOs for the WLP, while in other places the Draft GSP indicates that saline intrusion was not considered as part of the analysis. For example, the statement "Groundwater levels that contribute to seawater intrusion in the Oxnard subbasin have only occurred within the WLPMA" (p. 3-17) is inconsistent with the statement "Additionally, groundwater levels in [WLPMA] do not exert a measurable influence on groundwater levels in the Oxnard Plain subbasin" (p. 3-18). Appendix 5 includes examples of these inconsistencies, which render the Draft GSP inconsistent with respect to how saline intrusion was considered.

In the Fox Canyon Aquifer, simulated and measured groundwater elevations in the adjacent Oxnard Plain subbasin, which is closer to the ocean, are often lower than in the WLP (*see* Figures 4-5, 4-6, 4-19, 4-20 in United 2018[2]). These depressed groundwater levels within the Oxnard Plain and groundwater levels below mean seal level (MSL) proximate to the coast indicates that management of groundwater levels in the Oxnard Plain (notably next to the coast) will prove more effective for mitigating seawater intrusion than management within

[2] United Water Conservation District. *Ventura Regional Groundwater Flow Model and Updated Hydrogeological Conceptual Model: Oxnard Plain, Oxnard Forebay, Pleasant Valley, West Las Posas, and Mound Groundwater Basins*. Open file report 2018-02, July 2018.

the WLP. Indeed, unless there are management actions undertaken that successfully address groundwater levels below mean sea level (MSL) proximate to the coast, any management actions in the WLP are unlikely to have any impact on saline intrusion.

The Draft GSP does not adequately explain how the WLP pumping reduction scenarios were developed in relation to addressing saline intrusion in the Oxnard basin. In addition, the Draft GSP indicates that both "connate water" (i.e., ancient water dating to the time of sediment/rock deposition) and brines are present in the Oxnard subbasin (Draft GSP p. 3-10); Neither connate water nor brines are believed to be related to any WLP pumping or historical activities. Hence, activities within the WLP cannot be responsible for the presence of connate water or brines, and it appears that salinity near the coast may be due to multiple factors, not solely modern seawater intrusion.

Of note, no United groundwater model simulation could attribute the respective contribution of pumping in the various basins to saline intrusion. That is, the model simulations do not demonstrate that pumping in WLP, in isolation, actually contributes to saline intrusion. Rather, it is simply assumed that it has an impact. As such, it is unlikely that reductions in groundwater pumping in WLP to prevent saline intrusion are even necessary.

See Appendix 5 for details and further comments.

6) **Some of the chosen "key wells" used in the Draft GSP have been assigned to a specific aquifer, but in fact may be screened in multiple aquifers, which will result in erroneous model predictions.**

Analysis included in Appendix 6 suggests that many wells used in the GSP model calibration are completed in multiple aquifers and/or in different aquifers than stated in the Draft GSP. Specifically, five of the twenty-one key wells (4 in ELP, 1 in ELP-Epworth Gravels) that are proposed for monitoring of groundwater in a particular aquifer unit do not appear to reflect groundwater elevations accurately in the aquifer unit to which they are assigned.

Although MOs and MTs were assigned to certain key wells, it is not clear that groundwater elevations in these wells accurately reflect the assigned aquifer unit. Pumping allocations should not be made for individual wells until the aquifer provenance of both individual wells and key monitoring wells is positively established.

Moreover, the draft GSP relies on very few wells as "key" wells. It would be far better and more reliable to have multiple wells. Also, the in setting the MT's, the Draft GSP should recognize the time required for slow infiltration from rainfall to reach the shallow sub-aquifers and then to the much deeper Fox Canyon, especially in a drought cycles.

See Appendix 6 for more details and further comments.

7) **The Draft GSP does not provide a rationale for assuming decreased water flows from Simi Valley in the future, rendering sustainable yield estimates for the ELP questionable.**

Arroyo Simi and Arroyo Las Posas receive imported water from dewatering activities and discharges of treated wastewater in Simi Valley, which subsequently percolate into the ELP sub-basin and represent a substantial input of water to the ELP aquifer system. However, theoretical future model scenarios assume that flows from Simi Valley will decrease over time, even though no references are provided to indicate these theoretical flow reductions will occur. Sustainable yield estimates calculated using these assumptions are unreliable because there is no evidence – only speculation – suggesting that these flows will decrease. To our knowledge, the City of Simi Valley has not filed a petition with the State Water Resources Control Board to change its discharge, and we are unaware of other plans that would have a similar effect. For this reason, there is no apparent factual basis for the Draft GSP to assume that there will be a decrease in the flows from Simi Valley over time. A more logical approach to account for imported water inflow is to hold these inputs constant in future modeling runs and adjust them in future Draft GSP revisions if warranted.

See Appendix 7 for more details and further comments.

8) **Multiple inconsistencies in the Draft GSP have been identified relating to the values for the sustainable yield of WLP and ELP and pumping within these basins. Moreover, the sustainable yield calculation for WLP cannot be independently reproduced by our team of technical experts without more transparency regarding the methodologies or formulae employed by the FCGMA.**

As described more fully in Appendix 8, the sustainable yield calculations for the WLP (section 2.4.3.4, paragraph 2) are difficult to understand and cannot be reproduced. The Draft GSP does not include any rationale for the "formulae" used to calculate sustainable yield in the ELP and WLP. It is critically important that a scientist be able to understand and reproduce the critical calculations presented in the Draft GSP. Therefore, we respectfully request that the calculations underlying the sustainable yield estimates, together with an explanation of the calculation formulae, be provided for review by October 1, 2019, so that we may incorporate our evaluation of those formulae in the supplemental comments that we will file on or before November 15.

Further, the methodology used to calculate uncertainty for the sustainable yield estimates is flawed and inappropriate. For example, the uncertainty assigned to the sustainable yield estimate for the WLP is identical (expressed as a percent of the overall sustainable yield) to the uncertainty calculated for the sustainable yield in the Oxnard subbasin, despite the fact (*see* Comment 3) that the model calibration for the WLP is far more flawed than the model calibration for the Oxnard subbasin. When one model is more poorly calibrated than another, the level of uncertainty in the more poorly calibrated model is – almost by definition – greater than in the better calibrated model. Therefore, the draft GSP's use of identical estimates for the uncertainty of the two models is simply not correct. Finally, the value of uncertainty for the Oxnard Basin is calculated using future scenarios that are fundamentally flawed, as noted in Comment 4, above—hence, the value of uncertainty assigned to sustainable yield estimates in the WLP is fundamentally flawed.

Finally, inconsistent values are provided in the Draft GSP for pumping with the WLP and ELP for 2015.

Without substantial additional work and clarification, it is not possible to have confidence in the sustainable yield values included in the Draft GSP.

See Appendix 8 for details and further comments.

9) **The Draft GSP asserts, without support, that "in-lieu" water deliveries have had a significant impact on groundwater levels and the volume of water in storage.**

The Draft GSP asserts that "in-lieu" deliveries have had a significant and beneficial impact on both the ELP and WLP. There is a longstanding practice in groundwater management of using "in-lieu" deliveries of water to manage groundwater basins at the least possible cost. An "in-lieu" delivery of water occurs where a groundwater pumper switches to and accepts deliveries of surface water instead of ("in-lieu" of) pumping groundwater. The new surface water (often imported from outside the groundwater basin) substitutes for the groundwater that would have otherwise been pumped from the basin, and the unused groundwater is then "banked" in the groundwater basin. In many basins, such substitution is considered as "in-lieu" delivery. The key, of course, to such in-lieu deliveries is that the groundwater pumper ceases pumping when surface water is delivered; otherwise, the importation of surface water simply allows for greater use of water within the groundwater basin.

Within the Draft GSP, "in-lieu" water is described as imparting a positive influence on groundwater levels, yet there is no analysis to support this claim. In particular, the Draft GSP fails to establish whether and where pumping was curtailed as part of the in-lieu program. Without such information, there is no factual basis to claim credit for an in-lieu delivery program. Additional analysis is required to ascertain the impact of in-lieu water deliveries and the role of in-lieu water deliveries in the future. Also, the Draft GSP has no analysis of "leakage" of injected ASR water into the Grimes Canyon Aquifer or into adjacent groundwater subbasins, the quality of ASR water, or the impact of ASR extractions on adjacent pumpers.

See Appendix 9 for further comments.

10. **The Draft GSP does not establish that the chosen 1985-2015 base period, which is used to estimate sustainable yield and other important quantities, is representative of long-term climate in the LPVB.**

    It is important to define a hydrologically representative period when evaluating sustainable yield and other important quantities. A hydrologic period that is not representative of long-term conditions (e.g., if the time period is much dryer or wetter than long-term conditions) will lead to erroneous conclusions regarding groundwater conditions in the basin, which will in turn lead to flawed conclusions about long-term management options. The GSP acknowledges that "The hydrologic base period (calendar years 1985-2015, DWR's 31-year base period) may not necessarily be representative of long-term average or representative conditions" (Draft GSP, p. 2-53). The Draft GSP and the numerical models use this time period to calculate a water balance, sustainable yield estimates, and other quantities. However, the Draft GSP has not established that this time period is representative of a longer-term climate record in the basin. Without such analysis, it is unclear whether quantities presented in the Draft GSP such as the sustainable yield, are reasonable estimates.

    Because the Draft GSP does not provide an analysis of whether the 31-year time period is representative, we have not included an appendix corresponding to Comment 10.

11. **Additional comments on the Draft GSP are included in Appendix 11.**

    Line-by-line comments and questions covering a wider range of topics than those listed above are provided in appendix 11.

We appreciate the opportunity to share and express our concerns with the Draft GSP. If you have any questions, or require clarification on our objections, we would be happy to discuss these issues further. Our ultimate goal is to achieve a GSP that includes sustainable management criteria and supports management action development in the LPVB, in accordance with the core principles of SGMA. We look forward to continuing to work together to refine the technical analyses upon which the Draft GSP is based to achieve the best outcome for the LPVB.

Very truly yours,

Technical Experts:

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Appendices

Appendix 1. Additional comments and information relating to Comment 1: "The process used in the Draft GSP for developing a management plan with the aid of groundwater models rather than relying on measured data is backward, because it relies on model scenarios rather than measured data to establish the sustainability criteria. As a result, the MTs, MOs, estimates of sustainable yield and SMC are unreliable."

1) The MOs in WLP are arbitrary

- In the eastern portion of WLP, the Draft GSP states that "the measurable objective groundwater elevations were selected based on the groundwater level recovery observed in the wells --- between 1995 and 2008" (Draft GSP at p. 3-28). However, during 1995 and 2008, approximately 25,000 acre-feet of "in-lieu" water were delivered to the WLP (an average of approximately 1,800 acre-feet per year, Draft GSP Table 2-12 at p. 2-98). Thus, the MOs were set at the groundwater elevation midpoint during a time period that may have been influenced by delivery of in-lieu water (see also Comment 9). Because in-lieu deliveries in the WLP ended in 2008 and it is unknown if similar in-lieu water deliveries will occur in the future, the MOs are based on conditions that were artificial and may not occur again. In contrast, it would be more appropriate to establish MOs based on the historical record.
- In the western portion of WLP, the MO was set at an elevation at the peak of a wet-weather recovery. An MO that corresponds to a peak wet-weather recovery condition is inappropriate, as wet and dry cycles heavily influence the trends in groundwater elevations in this area. The MO can then only realistically be met during wet years, and will not be met over longer term, average conditions. It is inappropriate and unrealistic to set an MO based on a wet-weather condition.

2) The MTs established in WLP are arbitrary

- In the eastern portion of the WLP, "the minimum threshold is based on the average low historical groundwater elevations in the early 1990s" (Draft GSP at p. ES-10). However, undesirable results were not documented during these low groundwater elevations. Thus, it would be more appropriate to set the MTs at the lowest historical elevation in each well.
- In the western portion of the WLP, "the minimum thresholds are based on the lowest simulated groundwater elevation after 2040" (Draft GSP at p. ES-10, 3-17). As detailed in Comment 3, there are numerous concerns with the ability of the groundwater model for the WLP to simulate historical (observed) conditions; similarly, as detailed in Comment 4, there are also numerous problems with the groundwater model simulations of theoretical future conditions. For this reason, it is not appropriate to set MTs based on non-optimized model simulations when there are abundant measured groundwater elevations in the area.

3) **The numerical models on which some of the WLP MOs and MTs are based (which simulate seawater intrusion into the Oxnard basin) are poorly calibrated and are not able to simulate groundwater conditions adequately.**

- The model simulations used in setting sustainability criteria in WLP result in large average discharges of fresh water to the ocean in the Upper Aquifer (discharge to ocean from the Oxnard Plain subbasin), with a much smaller amount of seawater intrusion in the Lower Aquifer (saline intrusion into the Oxnard plain). Optimum model runs would balance the Upper and Lower aquifers so that there was no net seawater intrusion. Current favored model simulations result in thousands of acre-feet of net offshore discharge, reducing the yield of the onshore basins by a like amount. However, as noted in Comment 5 , saline intrusion will not affect the WLP directly, and management actions taken in the WLP will have a very limited effect on saline intrusion in the Oxnard subbasin.

4) **Appendix 1, Specific Line-by-Line Comments**

Page 2-58 (PDF page 160)

Document Statement: Entire page (2.4.5.1.2 Future Baseline with Projects Model Simulation)

Reviewer Comment: Much of this section is explained poorly, and it is difficult to follow the rationale for how the "Future Baseline with Projects" scenario was constructed. For example, specific quantities of water are discussed for fallowing, recycled water delivery, and the GREAT program, but it is difficult to understand how quantities were derived and applied in the model. Please clarify this section.

Page 2-68 (PDF page 170)

Document Statement: "The model scenarios developed for the ELPMA include the following: (list of future numerical model simulations)"

Reviewer Comment: Please provide justification for percentages used in future scenarios, e.g., why was a 10 or 15% reduction in average 2015-2017 pumping rate used to simulate reduced pumping? Were these reductions chosen for specific reasons, or were they somewhat arbitrary?

Further, it appears that the Future Baseline simulation does not include existing flows from Simi Valley. As detailed in Comment 7, no justification is provided for this decision.

Page 3-5 (PDF page 321)

Document statement: "Consequently, chronic lowering of groundwater levels in WLPMA has the potential to exacerbate seawater intrusion…"

Reviewer comment: The authors state that direct seawater intrusion is not a concern but assert that management activities in WLP may influence seawater intrusion in the Oxnard plain. However, the statement listed above is tentative and does not suggest the authors fully support that pumping in WLP will influence seawater intrusion into the Oxnard subbasin. Moreover, it is unclear if this statement means that historical groundwater levels have been "chronically lowered" or if this is a potential result derived from the future model scenarios. How is it concluded that water levels are chronically declining in WLP? To what analysis is this statement referring?

Page 3-6 (PDF page 322)

Document statement: "Limiting the long-term loss of storage to no more than 20% in these areas of the ELPMA was determined to be a reasonable approach by the FCGMA Board to avoid significant and unreasonable loss of supply."

Reviewer comment: The FCGMA defines an undesirable result in the ELPMA in the vicinity of the Moorpark anticline as a storage loss of 20% (of the "2015 groundwater storage"), based on the potential for the aquifer in this area to convert from confined to unconfined conditions. Is the 20% loss metric a guess, or is this based on scientific evidence/analysis?

Page 3-11 (PDF page 327)

Document statement: "The primary cause of groundwater conditions in the WLPMA that would lead to degradation of water quality from increased concentrations of TDS, nitrate, sulfate, and boron is resumption of previous land use practices."

Reviewer comment: Additional detail is needed. What land use practices occurred in the past that led to degraded water quality?

Page 3-15 (PDF page 331)

Document statement: "Wells that can be used to monitor representative groundwater conditions were selected in each management area (Table 3-1)."

Reviewer comment: What was the scientific basis for well selection?

Page 3-17 (PDF page 333)

Document statement: "The future climate simulated in the model recreated the observed climate from 1930-1979 with adjustments to precipitation and streamflow based on climate change factors provided by DWR."

Reviewer comments: Please provide the rationale for choosing 1930-1979 as the hydrologic period for future scenarios, and please describe the DWR factors for adjusting climate change and how they were applied.

Page 3-17 (PDF page 333)

Document statement: "For Well 02N21W16J03, in the western part of the WLPM, the minimum thresholds are based on the lowest simulated groundwater elevation after 2040 for the model scenario in which the 2015 to 2017 average production rate was continued throughout the 50-year model simulation, and projects were implemented."

Reviewer comment: Please describe how compounding uncertainty will affect the lowest simulated groundwater level, owing to a) potentially poor calibration of the UWCD model in the WLPMA, b) the use of variable, historic climate in the model, but a fixed rate of 2015-2017 pumping, c) DWR's recommended climate adjustment, and d) the choice of parameters used for projects (e.g., reduced pumping rates, ET reductions based on Arundo removal, etc). Was a sensitivity analysis performed to determine the impact of these assumptions on model predictions over future decades?

Page 3-18 (PDF page 334)

Section: "3.4.1.1 Chronic lowering of groundwater levels" [WLPMA]

Reviewer comment: In this section, the authors loosely describe how minimum thresholds were set, e.g., they indicate metrics used to presumably constrain minimum thresholds. However, as written, the choice of minimum thresholds cannot be independently reproduced. Please provide a quantitative description of how minimum thresholds were determined.

Page 3-21 (PDF page 337)

Section "3.4.2.1 Chronic lowering of groundwater levels" [ELPMA]

Reviewer Comment: *Ibid*. (see prior comment)

Page 3-28 (PDF page 344)

Section 3.5 "Measurable Objectives" [WLPMA and ELPMA]

Reviewer Comment: *Ibid.*, with respect to measurable objectives.

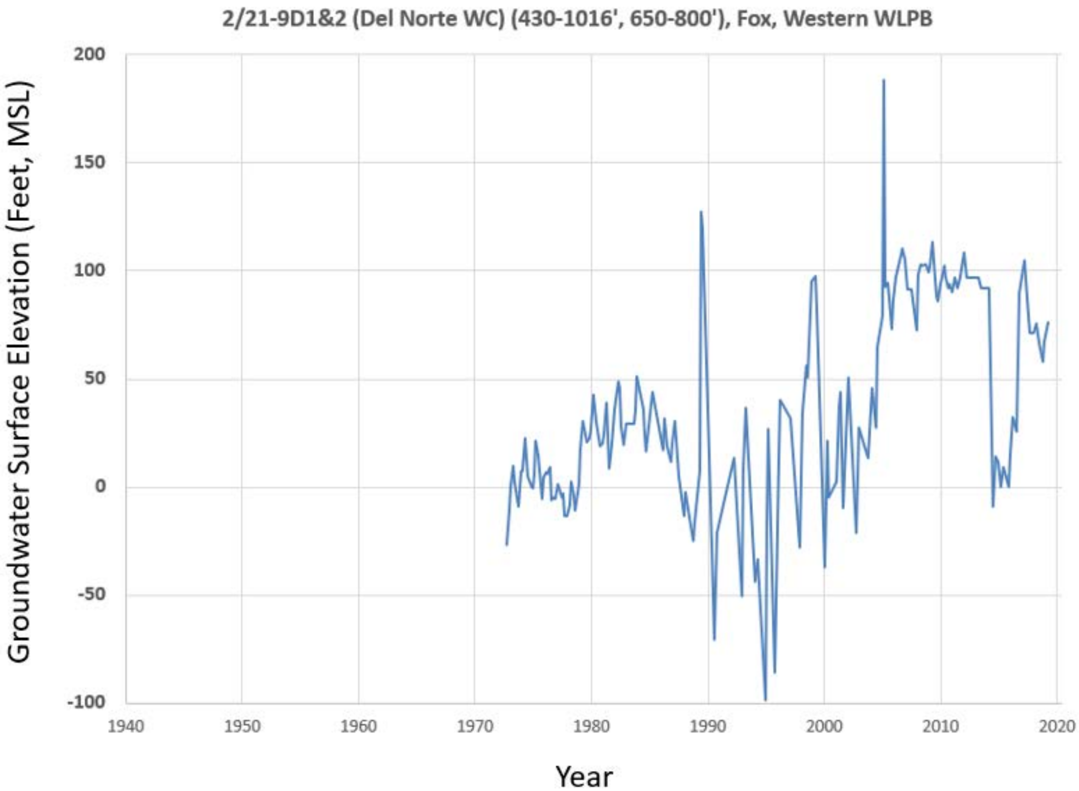

Figure 1-1. Hydrograph of groundwater surface elevations for well 2/21-9D1&2, screened in the Fox Canyon Aquifer, Western WLP basin. Hydrograph illustrates that water levels have been fluctuating, and generally increasing since 1970.

Appendix 2. **Additional comments and information relating to Comment 2: "Critical parameters needed to calculate important quantities, such as the sustainable yield, have also been defined using a backward approach that relies primarily on models, rather than physical measurements."**

Definitions:

Storativity (also known as the storage coefficient): The volume of water that a permeable unit will absorb or expel from storage per unit surface area per unit change in head. Used when calculating changes in storage within a confined aquifer.

Specific Yield: The ratio of the volume of water that drains from a saturated formation owing to the attraction of gravity to the total volume of the formation. Used when calculating changes in storage within an unconfined aquifer.

Measured values of storativity. Although data appear to be sparse, the 2017 Preliminary Draft GSP reported several measured values of storativity. In the November 2017 Preliminary Draft GSP[3], the change in storage per aquifer was estimated from measured hydrographs using year-over-year change in groundwater levels in the spring, applied over representative areas (generated via Thiessen polygons) and using representative aquifer storage coefficients (Section 2.3.2, page 2-26). For confined aquifers, the 2017 Preliminary Draft GSP reported that aquifer tests in the area showed storativity values ranging from 0.0005 to 0.007. The references for this information were given as CMWD 2017[4] and Hopkins 2016[5].

Hopkins 2016 was not available for review. CMWD 2017 was checked and the referenced information could not be found. However, in an earlier document for the FCGMA (DBS&A, 2017)[6], more detail was given on the storativity values as follows:

- Storativity values from aquifer tests in certain portions of the ELPMA range from 0.0007 to 0.007 (an earlier version of the CMWD report[7] was cited as the source of this

[3] Dudek. 2017. Preliminary Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin. Prepared for Fox Canyon Groundwater Management Agency. November.
[4] CMWD. 2017. Development of a Conceptual Model for the Las Posas Valley Basin – East and South Sub-Basins. Prepared for Calleguas Municipal Water District by CH2M. January 2017.
[5] Hopkins (Hopkins Groundwater Consultants). 2016. Aquifer Data for Wells in Ventura County.
[6] Fox Canyon Groundwater Management Agency Groundwater Balance Study Ventura County, California Prepared for Dudek by Daniel B Stephens, November 1,2017.
[7] CMWD. 2016a. Development of a Conceptual Model for the Las Posas Valley Basin – East and South Sub-Basins. Revised draft. Prepared by CH2M Hill Inc. Thousand Oaks, California: CH2M Hill Inc. August 2016.

information). Default values used in the storage analysis presented in DBS&A (2017) were assumed to be 0.003, representative of confined conditions.

- Measured storativity for the WLPMA was available from aquifer test data for a single well screened from 1,100 – 1,530 feet bgs, which had an estimated value of 5 x 10^{-4} (0.0005; Hopkins, 2016 was cited as the source of this information), which is representative of confined conditions.

Although available data appear to indicate storativity values ranging from 0.0005 to 0.007, a wider range of values have been used in (a) numerical groundwater models and (b) in evaluations of change in storage based on hydrographs and measured data. Note that numerical groundwater models are the primary basis for the analysis in the 2019 Draft GSP; evaluations of change in storage using measured data were made in the 2017 Preliminary Draft GSP but were not carried forward or presented in the 2019 Draft GSP.

Table A below lists storativity and specific yield values for various aquifer units as cited in both the latest 2019 Draft GSP and the 2017 Preliminary Draft GSP, and associated documents as referenced. The values in italics and highlighted yellow originate from the latest 2019 Draft GSP and are understood to be based on modelled values. No other justification for using these values has been provided.

Table A. Specific Yield and Storativity values used in calculations, and their sources

Shallow Alluvial Aquifer Specific Yield Values	
0.25	Table 4-2 of Intera, 2018a[8]: Groundwater Flow Model of the East and South Las Posas Sub-Basins - Preliminary Draft Report. Prepared for CMWD. January 17[9].
0.15	Table 2-3 of Dudek, 2017[10]: Preliminary Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin. Prepared for FCGMA. November.
0.1	
0.075	
Epworth Gravels Aquifer Specific Yield Values	
0.25	Table 4-2 of Intera, 2018a.
0.225	Figure 8-33 of Intera, 2018a.

[8] Intera, 2018a. Groundwater Flow Model of the East and South Las Posas Sub-Basins. Preliminary Draft Report prepared for Calleguas Municipal Water District, 17 January. Appendix C of Dudek (2019).

[9] CMWD. 2017. Development of a Conceptual Model for the Las Posas Valley Basin – East and South Sub-Basins. Prepared for Calleguas Municipal Water District by CH2M. January 2017.

[10] Dudek, 2017. Groundwater Sustainability Plan for the Las Posas Valley Basin, prepared for Fox Canyon Groundwater Management Agency. Preliminary Draft, November.

0.2	Page 2-10 of Dudek, 2019. 2019. Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin. Prepared for Fox Canyon Groundwater Management Agency. July 2019.[11].
0.15	Page 2-10 of Dudek, 2019 Table 2-3 of Dudek, 2017.
0.1	Table 2-3 of Dudek, 2017.
0.075	
Upper San Pedro Formation Storativity Values	
0.004	*Figures 8 and 9 of Intera, 2018b[12]: Summary of Revisions to the Groundwater Model of East and South Las Posas Sub-Basins Made Pursuant to FCGMA TAG and UWCD Comments Received to Date. 26 April.*
0.01	
0.02	
0.05	
0.1	
0.075	Table 2-3 of Dudek, 2017.
0.1	
0.15	
0.01	
0.002	*Table 4-6 of United Water Conservation District, 2018:[13] Ventura Regional Groundwater Flow Model and Updated Hydrogeologic Conceptual Model: Oxnard Plain, Oxnard Forebay, Pleasant Valley, West Las Posas, and Mound Basins, United Water Conservation District Open-File Report 2018-02, July.*
Fox Canyon Aquifer Storativity Values - East Las Posas Valley Basin	
0.1	*Figure 10 of Intera, 2018b.*
0.05	
0.004	
0.01	Page 2-30 of Dudek, 2017.
0.007	
0.003	
0.0005	
Fox Canyon Aquifer Storativity Values - West Las Posas Valley Basin	
0.002	*Table 4-6 of United Water Conservation District, 2018.*
0.01	Page 2-30 of Dudek, 2017.
0.007	
0.003	
0.0005	
Grimes Canyon Aquifer Specific Yield / Storativity Values	
0.1 - 0.2	Page 2-13 of Dudek, 2019.

[11] Dudek. 2019. Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin. Prepared for Fox Canyon Groundwater Management Agency. July 2019.

[12] Intera. 2018b. Summary of Revisions to the Groundwater Model of East and South Las Posas Sub-Basins Made Pursuant to FCGMA TAG and UWCD Comments Received to Date. 26 April.

[13] United Water Conservation District, 2018, Ventura Regional Groundwater Flow Model and Updated Hydrogeologic Conceptual Model: Oxnard Plain, Oxnard Forebay, Pleasant Valley, West Las Posas, and Mound Basins, United Water Conservation District Open-File Report 2018-02, July

0.004	*Figure 11 of Intera, 2018b.*
0.01	
0.02	
0.0005	Table 2-3 of Dudek, 2017.
0.003	
0.007	
0.002	*Table 4-6 of United Water Conservation District, 2018.*

Impact of changes in values of storage coefficients. In the 2017 Preliminary Draft GSP, four different values of storage coefficients were used to generate a range of change-in-storage estimates. For the FCA, the storage coefficients ranged between 0.0005 and 0.01, as shown in Table 2-3 from the 2017 Preliminary Draft GSP, which is reproduced below. As shown in this table, the value that is selected for the storage coefficient has a significant impact on the average annual change in storage; the differences between the largest cumulative change in storage and the smallest cumulative change in storage over the time period of (1985-2015) are greater than an order of magnitude.

Table 2-3
Summary of Storage Coefficients Used in Change in Storage Calculations

Basin/ Subbasin	Scenario	Aquifer Storage Coefficients					Average Annual Change in Storage (acre-feet)	Cumulative Change in Storage (acre-feet)
		Shallow Alluvial Aquifer	*Epworth Gravels Aquifer*	*Upper San Pedro Formation*	*FCA*	*Grimes Canyon Aquifer*		
WLPMA	Case 1	N/A	N/A	0.075	0.0005	0.0005	800	24,000
	Case 2	N/A	N/A	0.1	0.003	0.003	1,100	32,000
	Case 3	N/A	N/A	0.15	0.007	0.007	1,600	48,000
	Case 4	N/A	N/A	0.01	0.01	0.007	40	1,200
ELPMA	Case 1	0.075	0.075	0.075	0.0005	0.0005	-2,200	-67,000
	Case 2	0.1	0.1	0.1	0.003	0.003	-3,000	-90,000
	Case 3	0.15	0.15	0.15	0.007	0.007	-4,500	-134,000
	Case 4	0.1	0.1	0.01	0.01	0.007	-180	-5,300

Note: N/A = Not available/applicable.

The 2017 Preliminary Draft GSP includes estimates of change in storage over time that are based on measured hydrographs and a range of storage coefficients. Although this analysis is not included in the 2019 Draft GSP, the 2017 analysis indicates the importance of accurate estimates of storage coefficients.

In the 2019 Draft GSP, change in storage has been estimated using numerical groundwater flow models (Section 2.3.2, page 2-26). Storativity values are not presented in this section of the text; instead, reference is made to the CMWD and UWCD model reports that appear as appendices.

Earlier, on page 2-12 of the 2019 Draft GSP, it is stated that the average specific yield of the FCA is 15% to 20%, which would relate to the aquifer in an unconfined condition.

For the Calleguas model (Appendix C to the 2019 Draft GSP), Intera (2018)[14] Table 4-2 and Figure 8-34 show that they used a specific yield of 0.25 for the FCA across the whole of the ELPMA. However, there is a technical memo that post-dates the Intera (2018) report[15] and which appears to provide an update. Figure 10 on page 22 of this memo is a map showing different storativity values for the FCA. It appears that the model was modified to use storativity values of between 0.004 and 0.1 for the FCA.

Based on this information, we conclude that the measured values of storativity and specific yield served at best as a starting point for model adjustments of these values. Based on the data shown in Table A, it appears that a wide range of values were subsequently implemented within the model, and that many of these values are significantly different from the measured values included in the 2017 Preliminary Draft GSP.

[14] Intera. 2018a. Groundwater Flow Model of the East and South Las Posas Sub-Basins - Preliminary Draft Report. Prepared for Calleguas Municipal Water District. January 17.

[15] Intera. 2018b. Summary of Revisions to the Groundwater Model of East and South Las Posas Sub-Basins Made Pursuant to FCGMA TAG and UWCD Comments Received to Date. 26 April.

Appendix 3. Additional comments and information relating to Comment 3: "In the West Las Posas sub-basin (WLP), the United groundwater model is not able to simulate historical groundwater conditions accurately, and therefore cannot be relied upon in its current state."

United Model Calibration. Exponent performed a preliminary examination of the United model calibration. This calibration was limited, since the original batch of MODFLOW files was missing the head observation file, which is required to fully evaluate the model calibration. Instead, United supplied a list of wells, some of which may have been used in the calibration process, in spreadsheet format, with observed groundwater levels and screened interval information for specific wells. Simulated heads for these wells were then extracted from the model, using the screen interval specified in the spreadsheet. In other words, simulated heads were extracted from the MODFLOW model using data from a spreadsheet supplied by United (that may or may not be accurate), rather than the actual well-specific parameters (e.g., screened interval) specified by authors of the MODFLOW simulations, and which would have been included in the missing head observation file. Hence, this evaluation of calibration should be regarded as preliminary, and additional information should be provided to allow for a more comprehensive analysis.

Our preliminary evaluation of the United model suggests it is not suitable to support water balance calculations within the California DWR Bulletin 118-delineated WLP groundwater subbasin boundary (B118 Area).

The United model includes the Oxnard, Pleasant Valley, and WLP basins, and the model was calibrated using data from 1985-2015. The calibration quality of the United model appears reasonable for the Oxnard Basin, Pleasant Valley Basin, and some other areas encompassed by the model. However, the model calibration is ***demonstrably poorer*** within the WLP B118 Area.

To evaluate the goodness of fit between modeled and measured groundwater elevations, we computed the normalized root mean square error (nRMSE) or the United model (Oxnard, Pleasant Valley, and WLP) and Calleguas model (ELP). Higher values of the nRMSE generally indicate more poorly calibrated models. When we excluded wells with short or intermittent measurement records of less than 15 observations, the median nRMSE for the entire United model[16] (402 wells) was 0.15. In contrast, the nRMSE value was substantially worse for wells in WLP (median of 0.44, 25 wells).[17] See **Figure 3-1** for a graphical representation of calibration data for the United model. Figure 3-2 illustrates calibration data in the WLP and ELP (where the Calleguas model was used). We also computed the average nRMSE (rather than the median

[16] Only wells with greater than 15 data points (groundwater surface elevation measurements) and a specified screened interval were considered; the data set included 402 wells in the entire United model domain, 25 wells of which were in in the WLPMA. Well information was supplied by United in spreadsheet format.

[17] Here, the normalized root mean square error is the root mean squared error between observed and modeled groundwater elevations, divided by the range (maximum – minimum) of groundwater elevations.

nRMSE) for the entire domain within the calibrated United model (0.41), substantially lower than the average nRMSE for the B118 WLP area (1.875).

In many WLP wells, the model is not able to capture major features of the hydrographs (e.g., measured hydrographs show rising groundwater elevations over time, while model results show steady or declining elevations over time).

The poorer fit of the United model to hydrologic data within the WLP B118 area may reflect complex local geology, poorly understood model inputs (e.g., recharge, underflow), and/or an apparent focus on optimizing model calibration for the Oxnard and Pleasant Valley basins.

Within the Draft GSP, uncertainty estimates for the sustainable yield of WLP were derived from uncertainty estimates for the sustainable yield of the Oxnard Basin (DRAFT GSP, p. 2-66)—i.e., uncertainty values were computed for the portion of the basin (Oxnard subbasin) where model calibration is relatively good. Specifically, the uncertainty for the Oxnard subbasin was "established by calculating the mean errors between observed and simulated groundwater levels at the coastal wells and applying the relationship between simulated groundwater levels and seawater flux to determine what the flux would have been had the model exactly reproduced observed water levels" (Draft GSP at p. 2-66). The uncertainty derived in this way was characterized as a percent of the sustainable yield estimated for the Oxnard subbasin, and the Draft GSP then assumed that the uncertainty associated with the model-estimated sustainable yield in the WLP was the same (i.e., was the same per cent of the WLP sustainable yield estimate). This methodology of calculating the uncertainty associated with the sustainable yield in the WLP is flawed: Because model calibration is substantially worse in the WLP (i.e., the difference between modeled and measured groundwater levels is much greater in the WLP than in the Oxnard subbasin), uncertainty associated with sustainable yield estimates for the WLP is expected to be substantially higher than reported in the Draft GSP.

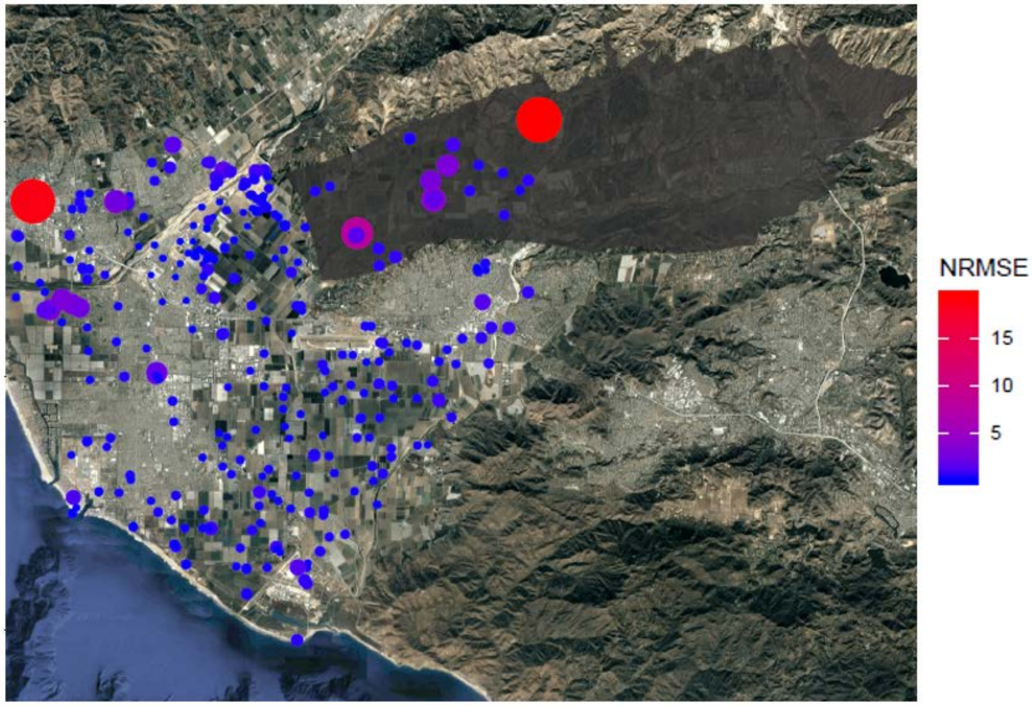

Figure 3-1. (above) nRMSE calculated to compare modeled and measured water surface elevations in individual wells in the entire United model physical domain (including Oxnard, Pleasant Valley, and WLP). The Las Posas Bulletin 118 area is shaded in dark grey. Higher nRMSE scores (poor calibration metrics) and fewer calibration wells are generally observed within the WLMA compared to other locations in the model, including Oxnard and Pleasant Valley.

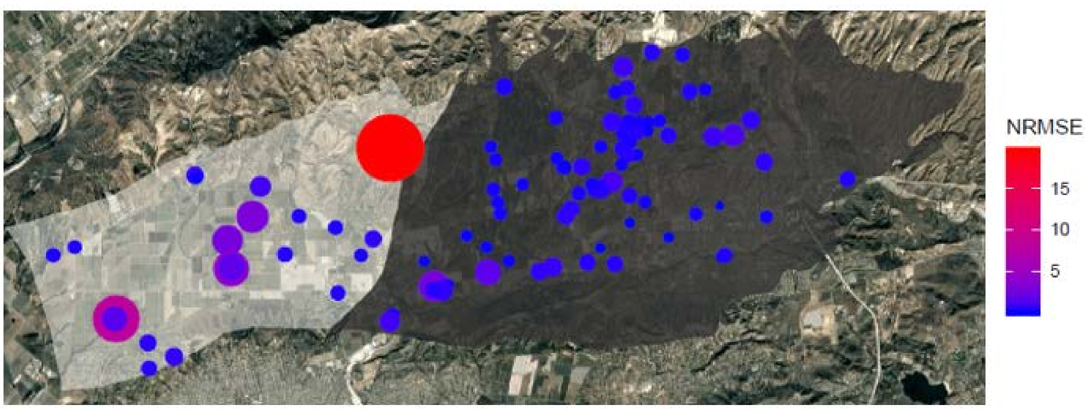

Figure 3-2. (above) nRMSE calculated to compare modeled and measured water surface elevations in individual wells in the WLP and ELP. The Somis Fault Zone approximately bisects the Bulletin 118 Area from the north to the south near the center of the LPVB. Higher nRMSE scores in the WLP (shaded light grey) indicate a poorer fit of calculated to observed well heads than in the ELP (shaded dark grey)

For some wells in WLP, modeled and measured water surface elevations vary by 100 feet or more (**Figure 3-3A**). Moreover, in several wells where MTs and MOs are established in the GSP, modeled and measured water surface elevations differ substantially. In some cases, the difference between modeled and measured water surface elevations is greater than the difference in elevation between the MT and the MO, which calls into question the model's ability to simulate future water levels and management scenarios (**Figure 3-3B**).

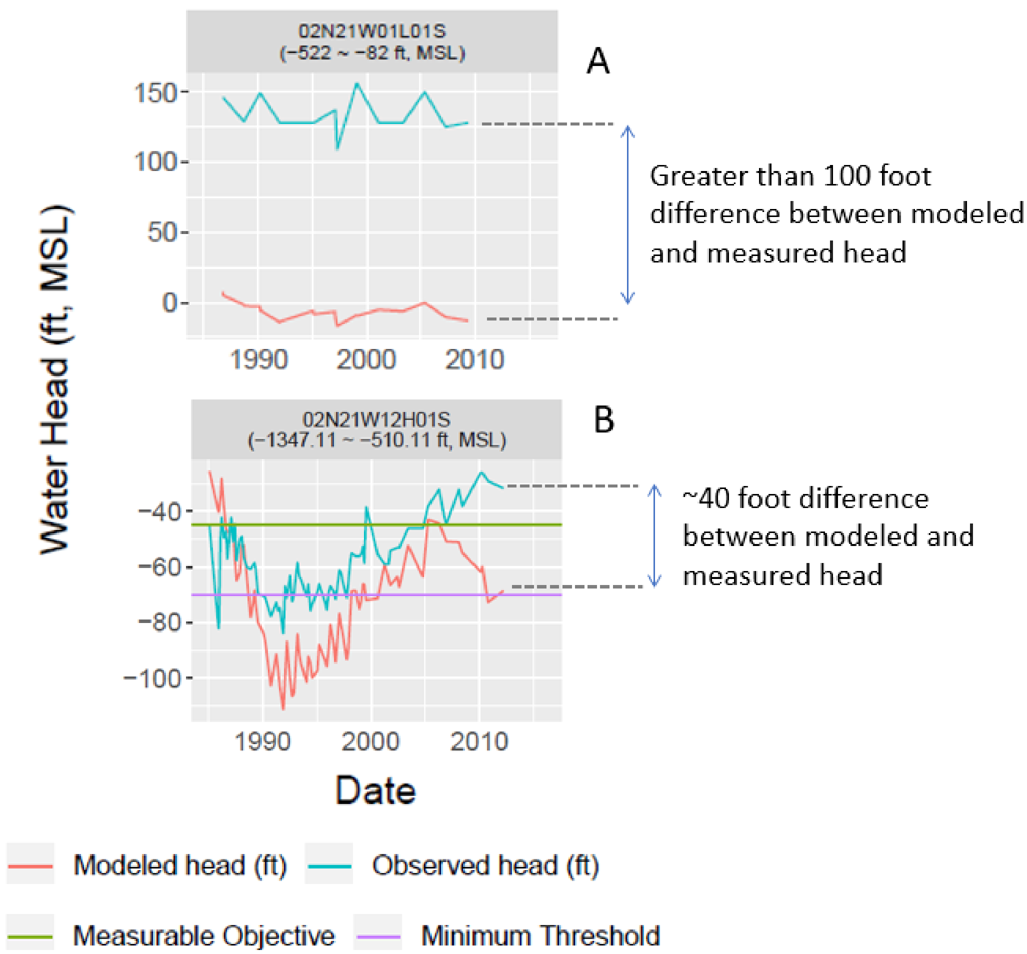

Figure 3-3. (A) Preliminary assessment of observed and modeled water levels (hydrograph) for well 02N21W01L01S, which differ by more than 100 feet. (B) Observed and modeled hydrograph for well 02N21W12H01S, with GSP-specified MO and MT values added. Observed well heads differ by approximately 40 feet from modeled value near the end of the calibration period, while the difference between the MT and the MO is 25 feet. This assessment is preliminary, as the head observation file was missing from the batch of MODFLOW files released by United.

In summary, substantial additional work is needed to evaluate and/or improve the model calibration for the WLP and characterize the uncertainty associated with model estimates of sustainable yield and other important parameters. This additional work should be completed before the model is used to estimate water balance values, including underflow between WLP and other basins, and assess the sustainable yield of the WLP. Available information indicates that the model does not capture trends and magnitude for historical conditions.

<u>Appendix 4.</u> Additional comments and information relating to Comment 4: "The future model scenarios defined in both the WLP and the ELP are flawed and cannot be relied upon to evaluate management alternatives or develop estimates of sustainable yield."

For the model scenarios that were used to evaluate theoretical future conditions and management options, pumping is set to the average of pumping during the drought period of 2015-2017, and pumping is held constant and does not vary in wet and dry years. The Draft GSP's assumption that pumping is constant is not realistic and will likely result in erroneous groundwater level estimates.

Observed data indicate that pumping tends to decrease in wet years and increase in dry years. **Figure 4-1** plots total annual pumping (WLP + ELP) and annual rainfall for the period of 1985-2015. **Figure 4-1** confirms that pumping is inversely correlated with rainfall – i.e., pumping is highest in dry years and lowest in wet years. Although the future model runs simulate a range of hydrologic conditions, t<u>he future model runs do not simulate the corresponding variability in extraction rates</u>.

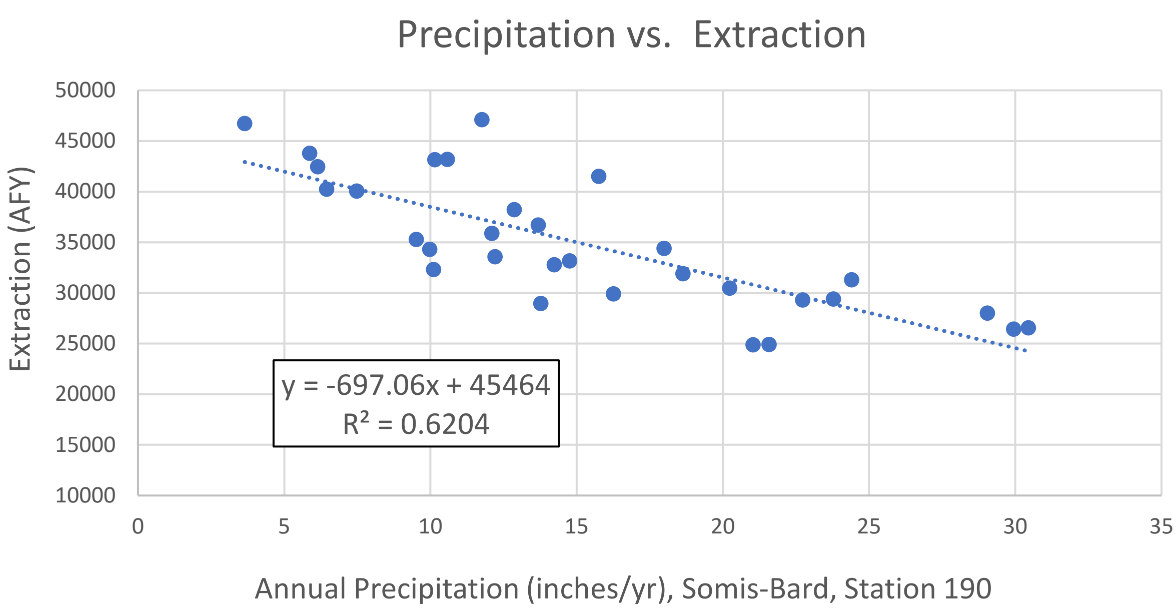

Figure 4-1. Observed annual precipitation at the Somis-Bard (station 190, Ventura County) and reported extraction (pumping) values for the period of 1985-2015. The amount of observed precipitation is inversely correlated with extraction (pumping) values for the LPVB as reported in the 2019 (July) Draft GSP.

1) Appendix 4, Specific Line-by-Line Comments

Page ES-7 (PDF Page 21)

Document Statement: "Two scenarios in the WLPMA continued the 2015-2017 average groundwater extraction rate throughout the 50-year model period."

Reviewer Comment: No rationale is provided for using the 2015-2017 average pumping rate. Moreover, since less pumping in the LPVB is known to occur in relatively wet years (see **Figure 4-1**), using a fixed pumping rate for all future years will inaccurately simulate water balance dynamics, rendering future modeling runs overly simplistic and unreliable.

Page ES-8 (PDF Page 22)

Document Statement: "…the 2015-2017 average groundwater rate was continued throughout the 50-year model period."

Reviewer Comment: A fixed 2015-2017 pumping rate cannot capture extraction dynamics in wet and dry years, thereby rendering future water level predictions highly uncertain.

Page ES-10 (PDF page 24)

Document Statement: "…the average 2015-2017 production rate was continued throughout the 50-year model simulation."

Reviewer Comment: As mentioned above, using the average 2015-2017 pumping rates insufficiently describes extraction under dynamic climactic conditions. Hence, using this extraction rate in modeling runs will erroneously describe future water levels with respect to MTs and MOs.

<u>Appendix 5</u>. Additional comments and information relating to Comment 5: "The Draft GSP is unclear with respect to how seawater intrusion was considered in establishing MTs, MOs, and the sustainable yield of the WLP."

1) The Disconnect with Saline Intrusion

The GSP suggests that groundwater production in WLP has an impact on saline intrusion at the coast. This assumption is flawed for the following reasons:

a. <u>Assumption that Inland Pumping has a Direct Impact on Saline Intrusion</u>

The degree of hydrologic connection between the WLP and the coast, and the degree of impact that pumping in WLP has on saline intrusion, have not been fully characterized and are open to interpretation. While there are variations in lithology within the various hydro-stratigraphic units (HSUs) in the WLP and Oxnard Subbasin, the GSP assumes that the communication (i.e., groundwater flow) between WLP and Oxnard Subbasin is essentially unimpeded and pumping inland has a direct effect on saline intrusion. This assumption is mostly based on the structure (i.e., layering sequence and hydraulic parameter discretization) of the United groundwater model, rather than empirical data. Within the United groundwater model, the structure allows unimpeded hydrologic continuity between WLP and Oxnard Subbasin, and between the various aquifer systems and the Pacific Ocean.

b. <u>Saline Intrusion is not Hydrologically Down-gradient of WLP</u>

Even if there is a hydrologic connection between pumping in WLP and saline intrusion, the saline intrusion is not hydrologically down-gradient of the WLP. The saline intrusion occurs between Port Hueneme and Point Mugu, down-gradient of the Pleasant Valley Subbasin. Saline intrusion north of Port Hueneme is minimal and is likely being mitigated by the natural and enhanced recharge at, and proximate to, the Santa Clara River, as well as the farther-offshore location of the aquifer-seawater interface. Given this, it is unlikely that reductions in groundwater pumping in WLP to prevent saline intrusion south of Port Hueneme are even necessary.

c. <u>Failure to Understand Saline Intrusion</u>

Throughout the GSPs for the Oxnard and Pleasant Valley subbasins (and for the WLP in the GSP for the LPVB), saline intrusion is identified as a significant and unreasonable undesirable result that will control sustainable groundwater management. The GSPs lay out an approach (mostly reductions in groundwater production) to address a problem (i.e., saline intrusion) which isn't well understood. The GSPs recognize that the saline intrusion results from: (1) seawater intrusion, (2) upwelling of brackish groundwater from deeper sediments, (3) release of connate water from fine-grained sediments, and (4) percolation of shallow, brackish groundwater (Izbicki et al, 1992[18]; 1996a[19]; 2005a[20]), However, amongst other things, the following are not well understood:

- Except for the Pacific Ocean, the magnitude, extent, and geochemical character of each respective source
- The exact locations and mechanisms (i.e., hydrogeologic flow paths) by which the sources contribute to saline intrusion in the Upper Aquifer System (UAS) and Lower Aquifer System (LAS)
- The rates, as velocity and volumetric flow, at which each source contributes to the overall saline intrusion
- The factors that exacerbate or could negate the contribution of each source to the overall saline intrusion
- The respective contributions from these sources to the overall saline intrusion

Understanding the nature of the sources, how they impact the aquifer systems, their contribution, and what factors exacerbate or could negate their contribution are critical factors that must be understood to develop a solution to the problem. Simply put - it is hard to develop a solution when you don't understand the problem!

d. Failure to Simulate Sources of Saline Impacts

Other than seawater intrusion, the other sources of saline impact, notably the upwelling of connate groundwater, are not simulated within the United groundwater model. Thus, it is impossible to quantify the respective contributions of seawater, shallow brackish, connate, and deeper groundwater that lead to degraded groundwater quality along the coast and what is solely described in the GSPs as "seawater intrusion". Given this, the assumption that inland pumping has caused the saline intrusion cannot be confirmed. For example, the degradation of water quality along the coast may be largely the result of pumping proximate to the coastline that has created lower groundwater levels in the

[18] Izbicki, J.A., 1992. Sources of chloride in groundwater of the Oxnard Plain, California, in Prince K.R. and Johnson, A.I., eds., Regional aquifer systems of the United States-Aquifers of the Far West: American Water Resources Association Monograph Series, no. 16, p. 5-

[19] Izbicki, J.A., 1996a, Source, Movement, and Age of Groundwater Water in a Coastal California Aquifer. U.S. Geological Survey Fact Sheet 126-96. July.

[20] Izbicki, J.A., Christensen, A.H., Newhouse, M.W., Aiken, G.R., 2005a. Inorganic Isotopic and organic composition of high chloride water from wells in a coastal southern California aquifer. Applied Geochemistry 20 (2005) p. 1496-1517.

aquifers, reversed vertical hydraulic gradients, and allowed upwelling of brackish, connate groundwater.

e. Failure to Focus on Where the Problem is Occurring

It is recognized that saline intrusion is focused at the coast and immediately inland from the coast, notably between Port Hueneme and Point Mugu. However, to address a localized, coastal problem, the GSPs for Oxnard, Pleasant Valley, and LPV Subbasins present a management action, reductions in groundwater pumping, applied to the entire Oxnard and Pleasant Valley Subbasins and WLP. The GSP for the Oxnard Subbasin should have identified and evaluated management actions (e.g., prohibition of pumping near the coast and delivery of in-lieu water) and projects (saline intrusion barriers) that focus on where the problem is occurring. With the implementation of actions/projects at the coast, reductions in groundwater production inland, notably in WLP, to prevent saline intrusion at the coast would not be needed (assuming such inland pumping even contributes to saline intrusion).

2) **Inconsistencies in the GSP Regarding Saline Intrusion.** It appears (but is unclear) that seawater intrusion may have been one of the primary metrics used to evaluate management scenarios for the WLP, even though the WLP is approximately 9 miles from the coast. The Draft GSP is inconsistent regarding discussion of seawater intrusion. Some statements suggest that seawater intrusion was not considered as an undesirable effect in the WLP, while other statements suggest that it was. For example:

Statements suggesting seawater intrusion is not considered in this GSP

- P. 3-10: "…seawater intrusion is unlikely to occur in the LPVB in the future. Because seawater intrusion has not occurred historically in the LPVB and is not likely to occur in the LPVB in the future, specific criteria for undesirable results related to seawater intrusion are not established in this GSP."
- P. 3-10: "Sources of water high in chloride in the Oxnard Subbasin include modern seawater as well as brines and connate water in fine-grained marine-deposited sediments. Therefore, this area is referred to as the 'saline water impact area,' rather than the 'seawater intrusion impact area,' to reflect all the potential sources of chloride to the aquifers in this area."
- P. 3-16: "A minimum threshold is not established for seawater intrusion because direct seawater intrusion has not occurred and is unlikely to occur in the future in the LPVB."

Statements suggesting seawater intrusion is considered in this GSP, possibly with respect to settings MTs and MOs.

- P. 3-13: "The minimum thresholds metric against which subsidence will be measured in the western WLPMA is groundwater levels that were selected to prevent to prevent [*sic*] net landward migration of the 2015 saline water impact front, and net seawater intrusion after 2040. These groundwater elevations are higher than previous historical low groundwater levels."

- P. 3-14: "Even though substantial interference with land surface uses is not anticipated, actions to reduce groundwater production to a rate that prevents future long-term declines in groundwater elevation and maintains groundwater levels at or above historic lows will mitigation future seawater intrusion as well as reducing the potential for additional subsidence…"
- P. 3-17: "The thresholds discussed below are the minimum groundwater elevations at individual wells that avoid undesirable results, which have been defined as follows … Groundwater levels in the WLPMA that prevent the Oxnard Subbasin from stopping net landward migration of the saline water impact front after 2040."

3) Appendix 5, Specific Line-by-Line Comments

Page ES-7 (PDF Page 21)

Document Statement: "The results of each of these scenarios indicated that continuing the 2015-2017 extraction rate would contribute to net seawater intrusion in the Oxnard Subbasin, which is hydrologically connected to the WLPMA."

Reviewer Comment: First, using a fixed 2015-2017 pumping rate for future modeling scenarios is inadequate for properly describing pumping dynamics in future wet and dry years, when pumping is expected to vary (see **Figure 4-1**). Second, the United model calibration is poor in the WLPMA, which casts doubt on its ability to accurately describe the influence of pumping in the WLPMA on seawater intrusion in the Oxnard Plain.

Page 2-59 (PDF page 161)

Document Statement: Section "Future Baseline with Projects Scenario Model Results"

Reviewer Comment: Please comment on how the calibration of the United model in the WLPMA (not in Oxnard) will influence uncertainty surrounding the seawater flux calculations.

Page 3-13 (PDF page 329)

Document Statement: "The minimum thresholds metric against which subsidence will be measured in the western WLPMA is groundwater levels that were selected to prevent net landward migration of the 2015 saline water impact front, and net seawater intrusion after 2040."

Reviewer Comment: This statement appears to use seawater intrusion in the Oxnard Plain (approximately 9 miles from the WLP) as a proxy for subsidence in the WLP. Given the distance between the WLP and the coast, there is no technical basis for assuming that subsidence in the WLP and seawater intrusion in the Oxnard Plan are related.

<u>Appendix 6.</u> Additional comments and information relating to Comment 6: "Some of the chosen "key wells" used in the Draft GSP have been assigned to a specific aquifer, but in fact may be screened in multiple aquifers, which will result in erroneous model predictions."

Chapter 2 of the July 2019 draft GSP (Dudek 2019[21]) describes the setting of the Las Posas Valley Basin (LPVB), and Section 2.3 describes groundwater conditions within the different aquifers in the West Las Posas Management Area (WLPMA) and East Las Posas Management Area (ELPMA). As stated on page 2-14, the "*discussion of groundwater elevation is limited to production and monitoring wells screened in a single aquifer*." Figures accompanying Section 2.3 identify these wells and have been used as the initial basis for drawing up lists of wells screened in single aquifers, as described below.

The 2017 Preliminary Draft GSP (Dudek, 2017[22]) included Table 4-1, which listed all the single-aquifer-screened wells. This table identified 129 wells, including six within the Shallow Alluvium, five in the Epworth Gravels, 18 in the Upper San Pedro Formation, 93 in the Fox Canyon Aquifer, and six in the Grimes Canyon Aquifer (the one remaining well was assigned to 'Oxnard' and is assumed to be outside the area of study). Although Table 4-1 of the 2017 Preliminary Draft GSP does not appear in the latest July 2019 GSP, it has been used as an additional source for identifying potential single-aquifer-screened wells, as described below.

Other available information sources were used to confirm screened-aquifer designations and to identify additional potential single-aquifer-screened wells not identified in the Draft GSP. These sources are referenced in the following sections.

In the following sections, "Draft GSP" refers to the latest version of the document (Dudek, 2019). The earlier draft version is cited as Dudek (2017). The well assignment and reference for wells discussed below are included in tables at the end of Appendix 6.

Shallow Alluvial Aquifer

Figures 2-16 and 2-17 of the Draft GSP, which show groundwater elevations for the Shallow Alluvial Aquifer in March and October 2015 respectively, identify a total of 10 wells screened in the shallow alluvial aquifer (three of them are identified as wastewater treatment plant (WWTP) wells; these do not have State Well Numbers (see Table 1 at the end of this document). Of these 10 wells, six are listed in Table 4-1 of Dudek (2017), all assigned to the Alluvium.

Figure 2-18 of the Draft GSP shows hydrographs for six of the above wells, plus an additional well which is noted to be screened in the Upper San Pedro Formation (USP).

[21] Dudek, 2019. Groundwater Sustainability Plan for the Las Posas Valley Basin, prepared for Fox Canyon Groundwater Management Agency. Draft (subject to change), July.

[22] Dudek, 2017. Groundwater Sustainability Plan for the Las Posas Valley Basin, prepared for Fox Canyon Groundwater Management Agency. Preliminary Draft, November.

Available information has been reviewed to corroborate whether the above-referenced wells are screened solely in the Shallow Alluvial Aquifer, and to identify additional similarly screened wells, if possible.

Figure 5-7 of Intera (2018a)[23], which is included as Appendix C to the Draft GSP, shows eight wells screened in the Shallow Alluvial Aquifer (see Table 1 at the end of this document). Three of these are the WWTP wells noted above. The remaining five correspond with the wells identified as screened in the Shallow Alluvial Aquifer in the Draft GSP as described above. Anomalies are presented in bold font and include:

1. **Well 02N19W08H02S is identified as completed in the alluvium in Intera 2018a (Appendix C of Draft GSP), but in Table 4-1 of Dudek (2017) and the 2019 Draft GSP figures, it is noted as screened in the Fox Canyon Aquifer (FCA)**.

2. **Well 02N20W12G02S is identified as completed in the Upper San Pedro aquifer in Intera 2018a (Appendix C of Draft GSP), but in the 2019 Draft GSP figures, it is noted as screened in the Shallow Alluvial Aquifer.**

Figure 5-8 of Intera (2018) has hydrographs for the eight wells in Appendix C of the Draft GSP.

CMWD (2017)[24], which was used as the basis for Intera's (2018) model, includes a set of cross-sections as Figure 9 and Appendix C. However, it does not depict any of the above wells indicated as being potentially screened in the Shallow Alluvial Aquifer.

Summary: Fifteen wells are identified in available documents as potentially being screened in the Shallow Alluvial Aquifer. Ten are included in the Draft GSP (11 if Appendix C is included). Two of the 11 wells are alternatively assigned to different aquifer units by different consultants.

Epworth Gravels Aquifer

Figures 2-19 and 2-20 of the Draft GSP, which show groundwater elevations for the Epworth Gravels Aquifer (EGA) in March and October 2015 respectively, show five wells screened in the EGA (see Table 2 at the end of this document). All five are listed in Table 4-1 of Dudek (2017) and identified as EGA-screened wells.

Figure 2-21 of the Draft GSP shows hydrographs for four of these wells, plus an additional two wells. Anomalies are presented in bold font and include:

1. **03N19W29E02S is listed twice in the legend; it is not known if this is an error.**

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[23] Intera, 2018a. Groundwater Flow Model of the East and South Las Posas Sub-Basins. Preliminary Draft Report prepared for Calleguas Municipal Water District, 17 January. Appendix C of Dudek (2019).

[24] CMWD. 2017. Development of a Conceptual Model for the Las Posas Valley Basin – East and South Sub-Basins. Prepared for Calleguas Municipal Water District by CH2M. January 2017.

2. **03N20W25H01S would plot outside the Epworth Gravels Management Area as shown in Figures 2-19 and 2-20 of the Draft GSP; it is not known if this is an error. In addition, this well is listed in Table 4-1 of Dudek (2017) as screened in the FCA.**

Other available information has been reviewed to corroborate whether the above-referenced wells are screened solely in the EGA, and to identify additional similarly screened wells, if possible.

Figure 5-7 of Intera (2018a) shows three wells screened in the EGA. Only one of them, 03N19W29F06S, is listed in Table 4-1 of Dudek (2017). The other two are included in Figure 2-21 (hydrographs) of the Draft GSP, as already referenced above.

Figure 5-9 of Intera (2018a) has hydrographs for these three wells.

CMWD (2017) includes a set of cross-sections as Figure 9 and Appendix C. Wells assigned to the USP from the sources described above and which appear on the cross-sections include the following (NOTE. Well labels on sections 9-9', 10-10', and 13-13' are illegible in the PDF and have not been interpreted). Anomalies are presented in bold font and include:

1. **03N19W29M03S - cross-sections 5-5' and 11-11' suggest this well is screened in both the EGA and USP.**
2. **03N19W30Q01S - cross-sections 6-6' and 11-11' suggest this well is screened in both the EGA and USP.**
3. **03N19W29F06S - cross-section 11-11' suggests this well is screened in both the EGA and USP.**

Summary: Available documentation indicates that seven wells are potentially being screened in the EGA (see Table 2 at the end of this document). Five of these wells have been used in the Draft GSP as representative of the Epworth Gravels Aquifer, but three of the five wells are screened both in the EGA and USP aquifers according to the CMWD 2017 cross-sections.

Upper San Pedro Formation

Figures 2-6 and 2-7 of the GSP, which show groundwater elevations for the Upper San Pedro Formation (USP) in March and October 2015 respectively, show 22 wells screened in the aquifer (see Table 3 at the end of this document). Of these 22 wells, 20 are listed in Table 4-1 of Dudek (2017), with 18 assigned to the Upper San Pedro Formation. However, two of the wells shown in Figures 2-6 and 2-7 of the GSP are identified in Table 4-1 of Dudek (2017) as screened in the Fox Canyon Aquifer (FCA). Anomalies are presented in bold font and include:

1. **02N21W01L01S**
2. **02N21W11A02S**

Figures 2-8 and 2-22 of the Draft GSP show hydrographs for selected USP wells, all of which appear in Figures 2-6 and 2-7 of the Draft GSP. They include the two wells listed in Table 4-1 of Dudek (2017) as being screened in the FCA, as identified above.

[**Note**: **Section 2.3.1.2.3 of the GSP has several apparent typographical errors in well names -it appears that 03N30W35R04S and 02N30W35R04S actually refer to 03N20W35R04S (screened in the USP), and 03N30W035R03S and 02N30W35R03S actually refer to 03N20W35R03S (screened in the FCA)**.]

Figures 2-6 and 2-7 of the Draft GSP show that the relatively few wells screened in the USP are concentrated in the WLPMA and the central part of the ELPMA. A large area in the center of the basin, including around the Somis fault, is not represented. Only limited contouring of the groundwater elevation data is shown on the figures, and only in the ELPMA. Particularly in the WLPMA, groundwater elevations are indicated to vary widely in wells which are close together. For example, as shown in Figure 2-6 of the GSP, in March 2015 a nested set of three monitoring wells screened in the USP showed the following groundwater elevations:

Well	**Screened interval (feet bgs)**	**Groundwater elevation (feet)**
02N21W11J06S	190 - 230	201.49
02N21W11J05S	340 - 380	172.69
02N21W11J04S	615 - 655	-8.6

At this location, the USP aquifer has been interpreted to be at least 465 feet thick, and the groundwater elevation at different levels varies by 210 feet, indicating that the USP aquifer cannot be represented by a single potentiometric surface map. As Section 2.3.1.1.1 of the Draft GSP acknowledges, *'the data suggest that there are multiple, distinct water-bearing zones within the USP'* (page 2-15).

Other available information has been reviewed to corroborate whether the above-referenced wells are screened solely in the USP, and to identify additional USP-screened wells, if possible.

Figure 5-10 of Intera (2018a) shows nine wells screened in the USP. Only one of them (03N20W35R04S) appears in Figures 2-6 and 2-7 of the Draft GSP (see Table 3). Figure 5-11 of Intera (2018a) has hydrographs for the nine wells.

CMWD (2017) includes a set of cross-sections as Figure 9 and Appendix C. Wells assigned to the USP as identified above, and which appear on the cross-sections, include the following (note that well labels on sections 9-9', 10-10', and 13-13' are illegible in the PDF and have not been interpreted). Anomalies are presented in bold font and include:

1. **02N19W06F01S - cross-sections 1-1 and 3-3' suggest this well is screened in both the USP and FCA.**
2. **02N19W05K01S - cross-section 5-5' suggests this well is screened in both the USP and FCA. This well is used in Appendix C of the GSP (Intera 2018a), but not in the Draft GSP figures.**

3. 03N19W30N03S - cross-section 1-1' corroborates the interpretation that this well is screened in the USP.
4. 02N19W05F02S - cross-section 5-5' corroborates the interpretation that this well is screened in the USP.
5. **02N20W02J01S - cross-section 7-7' suggests this well is screened in the USP, FCA and Grimes Canyon Aquifer (GCA).**
6. 03N19W28E02S - cross-section 11-11' corroborates the interpretation that this well is screened in the USP.

Summary: available documentation identifies 30 wells as potentially being screened in the USP (see Table 3 at the end of this document). Two of the 22 wells used in the Draft GSP were assigned to the FCA in early versions of the GSP. Two wells of the 22 used in the current GSP are assigned to both the USP and FCA according to the CH2M 2017 cross-sections. One of the nine wells in Appendix C of the Draft GSP is assigned to both the USP and FCA according to the CH2M 2017 cross sections.

Fox Canyon Aquifer

Figures 2-9 and 2-10 of the Draft GSP, which show groundwater elevations for the FCA in March and October 2015 respectively, show 96 wells screened in the aquifer. Of these 96 wells, 87 are listed in Table 4-1 of Dudek (2017), which includes an additional six wells which are not shown on the two figures. Together, Figures 2-9 and 2-10 of the Draft GSP and Table 4-1 of Dudek (2017) identify 102 wells potentially screened in the FCA (see Table 4 at the end of this document)

Figures 2-11, 2-12, 2-23, and 2-24 of the Draft GSP show hydrographs for selected FCA wells. Anomalies are presented in bold font and include **03N20W32F02S (Figure 2-12) and 03N19W29K04S (Figure 2-25),** which are not shown in Figures 2-9 and 2-10 of the GSP or in Table 4-1 of Dudek (2017).

[In Section 2.3.1.2.4 concerning the ELPMA, it is stated that "*[t]he highest groundwater elevations in the FCA were measured in Well 02N20W07K02S*." This well does not appear on Figures 2-9 or 2-10, or in any of the other sources discussed above. It appears to be a typographical error and should refer to well 20N19W07K02S.]

Other available information has been reviewed to corroborate whether the above-referenced wells are screened solely in the FCA, and to identify additional FCA-screened wells, if possible.

Figure 5-12 of Intera (2018a) shows 15 selected wells screened solely in the FCA. All but four of these are indicated in Figures 2-9 and 2-10 of the Draft GSP and/or Table 4-1 of Dudek (2017) as being screened in the FCA. The four additional wells are:

1. 02N20W08Q01S
2. 02N20W09Q05S
3. 02N20W17J01S
4. 03N19W32A01S

Figure 5-13 of Intera (2018) has hydrographs for all 15 wells.

Some of the wells assigned to the FCA by the sources identified above appear in the CMWD (2017) cross-sections. For each well, the screened interval on the cross-section (if shown) is noted in the following table [note: the well labels on sections 9-9', 10-10' and 13-13' are illegible in the pdf file and these sections have not been interpreted].

Well ID	**Screened interval from cross-section(s)**	**Cross-section(s)**
02N19W05M01S	FCA	5
02N19W07B02S	FCA	1, 3
02N20W01D01S	FCA	7
02N20W02N03S	FCA	8
02N20W03B01S	FCA & GCA	14
02N20W03H01S	FCA	14
02N20W04F01S	FCA	14
02N20W04F02S	FCA	14
02N20W05D01S	FCA	15
02N20W06R01S	FCA	17
03N19W19J01S	FCA	16
03N19W28N03S	FCA & GCA	4
03N19W29K04S	USP & FCA	4, 11
03N19W30E06S	FCA	1
03N19W30F01S	FCA	3, 11
03N19W31B01S	FCA & GCA	6, 12
03N20W26R03S	FCA & GCA	7, 12
03N20W32F02S	Upper San Pedro & FCA	12
03N20W32H02S	FCA	12
03N20W33L01S	FCA	12
03N20W34J01S	FCA	15
03N20W34L02S	FCA	15
03N20W35G01S	FCA	8, 15
03N20W35J01S	Upper San Pedro & FCA	7, 14
03N20W35R02S	(possibly FCA) and GCA	7
03N20W36A02S	FCA & GCA	2

The highlights in the table above indicate instances where a well designated as being screened solely in the FCA from the sources described above is indicated in the CMWD (2017) cross-sections as being screened in multiple aquifers.

The cross-sections show five additional wells that may be screened solely in the FCA, but which are not included in the sources discussed above. Anomalies are presented in bold font and include:

1. 02N20W06J01S
2. 03N19W18J01S
3. **03N19W19P02S (assigned to the GCA in Figures 2-13 and 2-14 of the GSP, but shown in Figure 5-14 of Intera (2018) as screened in both the FCA and GCA)**

4. 03N20W32G02S
5. 03N20W34J02S

In addition:

- In Section 2.3.1.2.4 of the Draft GSP, concerning the FCA in ELPMA, under subsection heading *'Central East Las Posas Management Area'* (page 2-25), well **03N20W35J01S** is cited in a discussion on historical groundwater elevation trends. **This well is indicated in CMWD (2017) cross-sections 7 and 14 as being screened in both the USP and FCA.**

- Under the heading *'Eastern East Las Posas Management Area'* (page 2-26) well **03N19W29K04S** is similarly cited. **This well is indicated in CMWD (2017) cross-sections 4 and 11 as being screened in both the USP and FCA.** In the same subsection, reference is also made to well **03N19W19P02S**. **This well is indicated as an FCA-screened well in CMWD (2017) cross-section 3, but it is identified in Figures 2-13 and 2-14 of the GSP, and in Table 4-1 of Dudek (2017), as a well that is screened in the Grimes Canyon Aquifer (GCA).**

- In the same sub-section, reference is made to well **03N19W31B01S**. **This well is indicated in CMWD (2017) cross-sections 6 and 12 as being screened in both the FCA and GCA.**

In summary, 113 wells are identified from available documentation as potentially being screened in the FCA (see Table 4 at the end of the document). Seven of the wells assigned in the FCA in the Draft GSP have been assigned to other aquifers (instead of or in addition to the FCA) by other documents.

Grimes Canyon Aquifer

Figures 2-13 and 2-14 of the Draft GSP, which show groundwater elevations for the Grimes Canyon Aquifer (GCA) in March and October 2015 respectively, show 10 wells screened in the aquifer (see Table 5). Of these 10 wells, six are listed in Table 4-1 of Dudek (2017). Anomalies are presented in bold font and include:

Section 2.3.1.2.5 of the GSP (page 2-26) states that "*[t]here are no wells screened solely within the Grimes Canyon Aquifer in the ELPMA*" and refers to Figures 2-13 and 2-14. However, Figures 2-13 and 2-14 indicate two GCA-screened wells within the ELPMA - 03N19W19P02S (which is also identified in Table 4-1 of Dudek (2017) as being screened in the GCA but, as noted above, CMWD (2017) cross-section 3 assigns it to the FCA) and 02N20W27B01S (which is not listed in Table 4-1 of Dudek (2017)).

Figure 2-15 of the Draft GSP shows hydrographs for selected GCA wells, one of which is **02N21W16J01S, which does not appear in Figures 2-13 and 2-14**. This well is also mentioned in Section 2.3.1.1.3 of the text (page 2-19**). Table 4-1 of Dudek (2017) identifies 02N21W16J01S as being screened in the Upper San Pedro Formation. The label**

02N21W16J01S on Figure 2-15 and in the text may be a typographical error for 02N21W15J01S.

Figures 2-13, 2-14 and 2-15 of the Draft GSP show only two wells screened within the GCA in the ELPMA, and both of these are located along the northern edge of the basin. In the WLPMA, eight GCA-screened wells are indicated, and these are concentrated in the west and south areas. In general, well coverage in the GCA appears to be poor and will hinder aquifer-specific interpretation.

Other available information has been reviewed to corroborate whether the above-referenced wells are screened solely in the GCA, and to identify additional GCA-screened wells, if possible.

Figure 5-14 of Intera (2018a) shows four wells screened solely in the GCA. Figure 8-5 of Intera (2018a) identifies all of these as production wells. None of these wells coincide with the 10 wells identified by the Draft GSP as being screened in the GCA (see above). Anomalies are presented in bold font and include: **Of the four wells, only 03N20W26R03S is listed in Table 4-1 of Dudek (2017)[25] - which identifies it as being screened in the Fox Canyon Aquifer (FCA).**

Figure 5-15a of Intera (2018) has hydrographs for the above 4 wells.

Figure 5-14 of Intera (2018) also shows three wells screened across both the FCA and GCA. Anomalies are presented in bold font and include:

1. **03N19W19P02S - Figures 2-13 and 2-14 of the GSP indicate this as a GCA well, but as described above in the FCA section, Section 2.3.1.2.4 of the GSP discusses it as a FCA-screened well, and CMWD (2017) cross-section 3 also depicts it as a FCA well (see also below).**
2. **03N19W28N03S - identified in the GSP and Table 4-1 of Dudek (2017) as an FCA-screened well, but it is shown in CMWD (2017) cross-section 4 as screened in both the FCA and GCA.**
3. 02N19W04K01S

Some of the wells assigned to the GCA by the sources identified above appear in the CMWD (2017) cross-sections. Wells assigned to the GCA as identified above, and which appear on the cross-sections, include the following (NOTE. well labels on sections 9-9', 10-10', and 13-13' are illegible in the PDF and have not been interpreted). Anomalies are presented in bold font and include:

1. 03N19W17Q01S - cross-sections 4 and 5 corroborate the interpretation that this well is screened in the GCA.
2. **03N19W19P02S - cross-section 3 suggests this well is screened solely in the FCA, not the GCA. (Note: there is a nearby well, 03N19W19K02S which is screened in the GCA.) The DWR driller's report for this well shows the screened interval to be 865-**

[25] Dudek, 2017. Groundwater Sustainability Plan (GSP) for the Las Posas Valley Basin, prepared for Fox Canyon Groundwater Management Agency (FCGMA). Preliminary Draft, November 2017.

1095 feet below ground surface (bgs) - which agrees with the cross-section. This well is identified in Table 4-1 of the 2017 Preliminary Draft GSP (Dudek, 2017) as being screened in the GCA.

3. **03N20W26R03S - cross-section 7 suggests this well is screened across both the FCA and the GCA.**

The CMWD (2017) cross-sections show four additional wells that may be screened solely in the GCA, but which are not included in the sources discussed above:

1. 03N19W19K02S
2. 03N19W20G01S
3. 03N19W27M02S
4. 03N20W24G01S

Summary: There are 18 wells identified from available documentation as potentially being screened in the GCA (see Table 5 at the end of the document). Of the ten wells assigned in the Draft GSP figures, two wells have been assigned to other aquifers. Of the four wells in Appendix C of the Draft GSP assigned to the GCA, one of the wells is assigned to the FCA in the Draft GSP Figures.

Key wells

Anomalies are presented in bold font and include: Section 3.3.7 of the GSP describes the 'key wells' that will be used to monitor representative groundwater levels across the basin. '*One well was selected in the Epworth Gravels Management Area, 14 wells were selected in the ELPMA, and 8 wells were selected in the WLPMA'* (page 3-15). **This suggests a total of 23 key wells. However, the summary Table 3-1 in the report lists only 21 wells. Later in the text, under the sub-heading *'West Las Posas Management Area'* (page 3-15), it says five wells (not eight) were selected in WLPMA, and under *'East Las Posas Management Area*' (page 3-16), it says 15 wells were selected (not 14). Using these numbers, the total is 5 (WLPMA) + 15 (ELPMA) + 1 (Epworth Gravels) = 21. This matches the number of wells shown in both Table 3-1 and Figures 3-1 and 3-2.**

The five wells in WLPMA are described in the text and in Table 3-1 of the Draft GSP as being screened in the LAS (Lower Aquifer System), which according to Section 2.2 (page 2-2) includes the EGA (which is not present in the WLPMA), USP, FCA and GCA. Figure 3-1 of the Draft GSP shows three of these wells as screened in the FCA, and two in "multiple aquifers."

'*Fifteen wells were selected as key wells in the ELPMA (Table 3-1). Of these, 2 are screened in the Shallow Alluvial Aquifer, 1 is screened in the Grimes Canyon Aquifer, and 12 are screened in the FCA'* (page 3-16). **The identity of the GCA-screened well is uncertain. The most likely candidate appears to be 03N20W35R02, which is identified by Table 3-1 as being screened in *'FCA/GCA*'; however, Table 3-2 says this well is screened in only the GCA - and Figure 3-1 identifies it as an FCA-screened well.**

Cross-checking between Table 3-1 and Figures 3-1 and 3-2 of the Draft GSP, the following observations can be made:

1. **02N20W01B02S is identified in Table 3-1 as an FCA-screened well, but in Figure 3-1 it is identified as being screened in multiple aquifers.**
2. 02N20W06R01S, 02N20W08F01S, 02N21W16J03S, 02N21W11J03S, and 02N21W12H01S are listed as screened in the LAS in Table 3-1. Of these, in Figure 3-1:
   a. 02N20W06R01S, 02N21W11J03S and 02N21W12H01S are indicated as screened in the FCA; and
   b. 02N20W08F01S and 02N21W16J03S are indicated as screened in multiple aquifers.
3. **As already noted above, 03N20W35R02S is indicated as screened in the FCA/GCA in Table 3-1, but in the FCA in Figure 3-1.**

Referring back to the preceding sections which attempted to identify wells screened in single aquifer, the following observations are made concerning the 'key wells':

1. **03N19W29F06S, the only key well in the EGA, is indicated by CMWD (2017) cross-section 11 as screened in both the EGA and USP.**
2. **03N19W28N03S is indicated in Table 3-1 as an FCA-screened well, but in CMWD (2017) cross-section 4 as screened in both the FCA and GCA.**
3. **03N19W31B01S is indicated in Table 3-1 as an FCA-screened well, but in CMWD (2017) cross-sections 6 and 12 as screened in both the FCA and GCA.**
4. **03N20W26R03S is indicated in Table 3-1 as an FCA-screened well, but in CMWD (2017) cross-sections 7 and 12 as screened in both the FCA and GCA.**
5. **03N20W35R02S - which, as described above, is indicated in different places in the GSP to be screened in the FCA, the GCA, and both the FCA and GCA, is indicated in CMWD (2017) cross-section 7 as being screened mainly in the GCA, but possibly in the lowest part of the FCA also.**

APPENDIX 6 TABLES

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
02N19W03A01S	x		Alluvium	x	x											
02N19W03A03S	x		Alluvium	x	x											
02N19W07A03S	x		Alluvium	x	x											
02N19W07G01S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1726609.29	282171.6	151	95	4	25	85
02N19W07K04S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1725740.58	281382.905	800	150	2	90	150
02N19W08G01S	x		Alluvium	x	x											
02N19W08H02S	Fox		Alluvium	x	Fox	ELPMA	FCGMA	Active	Municipal	1732092.75	282353.21	310	240	12	60	240
02N19W09E01S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1733751.12	283169.7	161.5	155	4	24	154
02N20W09Q08S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1704254.49	279658.76	167	90	4	35	85
02N20W10K02S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1709434.94	280926.98	185	156	4	86	156
02N20W12G02S	Alluvium		Upper San Pedro	x	x											
02N20W17J06S	Alluvium		x	x	Alluvium	ELPMA	WRD	Active	Monitoring	1700050.56	276240.49	201.5	142	2	62	142
MMW1	Alluvium		Alluvium	x	x											
MMW2	Alluvium		Alluvium	x	x											
MMW3	Alluvium		Alluvium	x	x											
Yellow highlight indicates well with alternative possible assigments.																

Table 1. Groundwater wells in Shallow Alluvium in East Las Posas Valley Basin

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
03N19W29F06S	Epworth		Epworth	Epworth & Upper San Pedro (11)	Epworth	ELPMA	FCGMA	Active	Agricultural	1730362.45	297979.28	0	505	14	222	505
03N19W29M02S	Epworth		x	x	Epworth	ELPMA	FCGMA Unreg	Abandoned	Agricultural	1728270.06	297804.11	450	450	0	0	0
03N19W29M03S	Epworth		x	Epworth & Upper San Pedro (5,11)	Epworth	ELPMA	FCGMA	Active	Agricultural	1728736.22	296988.52	600	600	16	300	600
03N19W30M02S	Epworth		x	x	Epworth	ELPMA	FCGMA	Active	Agricultural	1723510.9	296741.6	610	610	12	318	610
03N19W30Q01S	Epworth		x	Epworth & Upper San Pedro (6,11)	Epworth	ELPMA	FCGMA	Active	Agricultural	1726839.04	296333.03	567	460	14	280	480
03N19W29E02S	x	Epworth	Epworth	x	x											
03N20W25H01S	Fox	Epworth (Fig 2-21)	Epworth	x	Fox	ELPMA	FCGMA	Active	Agricultural	1721719.9	297977.03	700	700	0	0	0
Yellow highlight indicates well with alternative possible assigments.																

Table 2. Groundwater wells in the Epworth Gravels Aquifer in East Las Posas Basin

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
02N19W05F02S	USP		x	USP (5)	USP	ELPMA	FCGMA Unreg	Abandoned	Agricultural	1730246	288489	647	320	14	80	300
02N19W05K01S	x		USP	USP & Fox	x											
02N19W06F01S	USP		x	USP & Fox	USP	ELPMA	FCGMA	Active	Agricultural	1724470.845	287430.57	612	550	14	320	520
02N19W06N03S	x		USP	x	x											
02N19W07K03S	USP		x	x	USP	ELPMA	WRD	Active	Monitoring	1725740.581	281382.905	800	300	2	240	300
02N19W08G03S	x		USP	x	x											
02N20W01M01S	USP		x	x	USP	ELPMA	FCGMA	Active	Agricultural	1717440.15	286851.65	650	629	16	533	629
02N20W02J01S	USP		x	USP, Fox, Grimes (7)	USP	ELPMA	FCGMA	Active	Agricultural	1716901.18	286144.74	912	810	13	440	800
02N20W03K02S	x		USP	x	x											
02N20W12G02S	Alluvium		USP	x	x											
02N20W12J01S	x		USP	x	x											
02N21W01L01S	USP		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1686947.02	286564.02	1727	1030	16	590	1030
02N21W11A02S	USP		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1684609.023	284415.411	740	740	14	407	740
02N21W11J04S	USP		x	x	USP	WLPMA	MW-	Active	Monitoring	1684906.46	281647.83	1080	655	2	615	655
02N21W11J05S	USP		x	x	USP	WLPMA	MW-	Active	Monitoring	1684906.46	281647.83	1080	380	2	340	380
02N21W11J06S	USP		x	x	USP	WLPMA	MW-	Active	Monitoring	1684906.46	281647.83	1080	230	2	190	230
02N21W12F01S	USP		x	x	USP	WLPMA	FCGMA	Non-Compliant Abandoned	Agricultural	1687507.51	282678.92	560	560	12	374	400
02N21W15M03S	USP		x	x	USP	WLPMA	FCGMA	Active	Agricultural	1674929.16	276522.48	1315	1030	14	406	1030
02N21W15M05S	USP		x	x	USP	WLPMA	FCGMA	Active	Agricultural	1675061.13	276250.36	1000	900	14	550	900
02N21W16J01S	USP		x	x	USP	WLPMA	FCGMA / UW	Active	Agricultural	1673852.82	276876.52	400	400	12	182	295
02N21W16K01S	USP		x	x	x											
03N19W28E02S	USP		x	USP (11)	USP	ELPMA	FCGMA Unreg	Abandoned	Agricultural	1734548.884	297857.06	780	750	10	460	750
03N19W30N03S	USP		x	USP (1)	USP	ELPMA	FCGMA Unreg	Non-Compliant	Agricultural	1722959	295379	1220	1200	14	720	1200
03N19W32G01S	x		USP	x	x											
03N20W27G04S	USP		x	x	x											
03N20W27H01S	x		USP	x	x											
03N20W27H02S	USP		x	x	USP	ELPMA	FCGMA Unreg	Active	Domestic	1711907.99	298794.71	825	722	8	523	722
03N20W35R04S	USP		USP	x	USP	ELPMA	MW-USGS	Active	Monitoring	1716794.05	290859.34	1120	530	2	490	530
03N21W36Q01S	USP		x	x	USP	WLPMA	FCGMA	Active	Agricultural	1687780.42	289268.03	1700	1700	14	860	1700
03N21W36Q02S	USP		x	x	USP	WLPMA	FCGMA	Active	Agricultural	1688801.86	289118.71	1730	1724	16	804	1684

Yellow highlight indicates well with alternative possible assigments.

Table 3. Groundwater wells in the Upper San Pedro Aquifer

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
	Fox		x	Fox (5)	x											
02N19W07B02S	Fox		x	Fox (1,3)	Fox	ELPMA	FCGMA	Active	Agricultural	1725387.11	284610.96	646	590	14	457	577
02N19W07K02S	Fox		x	x	Fox	ELPMA	WRD	Active	Monitoring	1725740.581	281382.905	800	730	2.5	680	730
02N19W08H02S	Fox		Alluvium	x	Fox	ELPMA	FCGMA	Active	Municipal	1732092.75	282353.21	310	240	12	60	240
02N20W01A01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1721311.06	289449.87	740	730	16	500	720
02N20W01B03S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1720388	288619	845	718	16	510	708
02N20W01D01S	Fox		x	Fox (7)	Fox	ELPMA	FCGMA	Active	Agricultural	1717109	288801	847	840	8	620	840
02N20W01E02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1718145.83	288336.77	1050	1010	20	680	1000
02N20W01E03S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1717813.07	287743.43	1020	1010	14	620	1010
02N20W02D02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1712774.27	289192.74	1352	1238	6	878	1238
	Fox		x	Fox (8)	Fox	ELPMA	FCGMA	Active	Agricultural	1712397.47	286044.79	1248	1208	14	848	1208
02N20W03B01S	Fox		Fox	Fox & Grimes (14)	Fox	ELPMA	FCGMA	Active	Agricultural	1710078.98	288898.16	1500	1448	14	1016	1448
02N20W03H01S	Fox		x	Fox (14)	Fox	ELPMA	FCGMA	Active	Agricultural	1710420.57	287604.74	1456	1300	16	900	1260
02N20W03J01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1710643.12	286456.31	1060	1060	15	900	1060
02N20W03K03S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1710036.668	286219.477	1110	1062	16	882	1042
02N20W04B01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1704936.15	289837.1	1240	1010	16	710	990
02N20W04F01S	Fox		x	Fox (14)	Fox	ELPMA	FCGMA	Active	Agricultural	1702982.4	287820.16	1008	960	14	560	960
02N20W04F02S	Fox		Fox	Fox (14)	Fox	ELPMA	FCGMA	Active	Agricultural	1703511.3	287649.22	1014	1000	14	680	1000
02N20W05D01S	Fox		x	Fox (15)	Fox	WLPMA	FCGMA	Active	Agricultural	1696574.836	289402.531	1105	1080	12	720	1080
02N20W05J01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1700957.375		1136	1040	14	700	1040
02N20W06J01S	x		x	Fox (17)	x											
	Fox		x	x	x											
02N20W06R01S	Fox		x	Fox (17)	Fox	WLPMA	FCGMA	Active	Agricultural	1694885.62	285354.15	1535	1512	16	1090	1512
Yellow highlight indicates well with alternative possible assigments.																

Table 4. Groundwater wells in the Fox Canyon Aquifer

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
02N20W06R02S	Fox		x	x	x											
02N20W07L01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1692713.318	282148.14	1580	1567	12	1246	1567
02N20W07R02S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agriculture	1694856	280636.201	1375	1360	16	960	1360
02N20W08B01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Municipal	1698468.89	284118.27	1500	1440	16	800	1440
	x		Fox	x	x											
02N20W09F01S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Municipal	1703322.969		1290	1290	16	990	1290
	x		Fox	x	x											
	Fox		x	x	x											
	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1704435.68	279760.25	880	880	16	480	880
02N20W09R01S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Domestic	1705567.86	279797.78	785	785	16	456	724
02N20W10D02S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Domestic	1707420.64	284454.47	1097	1097	12	872	1032
02N20W10G01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1709288.15	283416.33	890	890	15	635	890
02N20W10J01S	Fox		x	x	Fox	ELPMA	FCGMA	Exempted	Monitoring	1711430.97	281940.19	566	566	14	500	540
	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1706905.367	280187.379	760	650	16	363	610
02N20W13F02S	Fox		x	x	x											
02N20W16B06S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1704077.53	277983	445	440	16	230	430
02N20W16D02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1701304.58	279233.48	1040	800	12	520	800
02N20W17E01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agriculture	1696076	277339	748	748	10	448	748
02N20W17J01S	x		Fox	x	x											
02N20W17J05S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1700153.214		680	483	8	300	480
02N20W18A01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1695012.05	279188.61	1240	1240	0	780	1192
02N21W01L01S	USP		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1686947.02	286564.02	1727	1030	16	590	1030
02N21W07L04S	Fox		x	x	x											
02N21W08G04S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1667787.23	282899.05	1070	1066	14	666	1066
02N21W08L02S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1665711.82	281712.189	1067	1041	14	641	1041

Yellow highlight indicates well with alternative possible assigments.

Table 4. Groundwater wells in the Fox Canyon Aquifer (continued)

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
02N21W08L03S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Municipal	1665890.646	281911.742	1132	1030	16	625	1030
02N21W09D02S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1669958.45	283649.36	1092	1000	16	650	800
02N21W10Q04S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1677817.979	280086.821	1660	1650	16	1290	1610
02N21W11A02S	USP		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1684609.023	284415.411	740	740	14	407	740
02N21W11A03S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1685065.197	284435.044	1800	1630	14	880	1630
02N21W11J03S	Fox		x	x	Fox	WLPMA	MW-USGS	Active	Monitoring	1684906.46	281647.83	1080	1080	2	1020	1080
02N21W12H01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1690073.18	282761.64	1850	1784	14	928	1765
02N21W13A01S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1690266.855	278232.661	1613	1600	16	1290	1590
02N21W16N03S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1669839.54	274920.38	1000	852	16	610	830
02N21W17F05S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1666368.96	277810.19	1105	1105	14	525	1105
02N21W18H10S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1663347.55	278209.08	1486	177	14	60	150
02N21W18H14S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1663481.87	278127.18	1320	1275	18	1105	1275
02N21W20A01S	Fox		x	x	Fox	WLPMA	FCGMA / UW	Active	Agricultural	1668075.394	273953.611	840	820	16	520	800
02N22W23B03S	Fox		x	x	x											
03N19W18J01S	x		x	Fox (5)	x											
03N19W19J01S	Fox		x	Fox (16)	Fox	ELPMA	FCGMA	Exempted	Agricultural	1728192.68	301508.646	1100	1074	12	858	1050
03N19W19P02S	Grimes	Fox (Section 2.3.1.2.4)	Fox & Grimes	Fox (3)	Grimes	ELPMA	FCGMA	Active	Industrial	1725279.48	301820.52	1100	1100	12	865	1095
	Fox		x	Fox &	Fox	ELPMA	FCGMA	Exempted	Municipal	1734649.18	295271.57	910	900	16	598	900
03N19W29K04S	x	Fox (Figure 2-25)	x	Upper San Pedro & Fox (4,11)	x											
03N19W30D01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1722484.89	300366.93	1005	940	12	630	940
03N19W30D02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1722527.56	300447.41	1300	1290	15	970	1250
03N19W30E06S	Fox		x	Fox (1)	Fox	ELPMA	FCGMA	Active	Agricultural	1722921.37	298172.29	1266	1204	14	924	1204
03N19W30F01S	Fox		x	Fox (3,11)	Fox	ELPMA	FCGMA	Active	Agricultural	1724331.64	297991.1	1260	1260	14	1020	1260
03N19W31B01S	Fox		x	Fox & Grimes	Fox	ELPMA	FCGMA	Active	Municipal	1725849.23	295201.26	1620	1440	16	880	1420
03N19W31C01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1724810	295048	1603	1440	20	880	1430
Yellow highlight indicates well with alternative possible assigments.																

Table 4. Groundwater wells in the Fox Canyon Aquifer (continued)

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
03N19W31C02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1724786	294230	1200	1060	20	745	1050
03N19W31D02S	Fox		x	x	Fox	ELPMA	FCGMA Unreg	Active	Municipal	1723770	294188	1403	1230	20	800	1220
03N19W31D03S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722400	293897	1380	1230	20	790	1220
03N19W31D04S	x		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1723946	295086	1654	1430	20	860	1420
03N19W31D05S	x		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722788.97	294669.18	1583	1295	20	750	1285
03N19W31D06S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722970.7	295091.3	1599	1520	20	940	1510
03N19W31E02S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722371	292584	1121	950	20	600	940
03N19W31E03S	x		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1723141	293223	1070	900	20	640	890
03N19W31H01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1726846.9	293887.9	1020	813	16	613	803
	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1723733	291924	959	865	20	530	855
	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722769	292024	1030	900	20	620	890
	Fox		x	x	Fox	ELPMA	FCGMA	Active	Municipal	1722310.472	290974.611	955	825	20	540	815
03N19W32A01S	x		Fox	x	x											
03N20W25H01S	Fox	Epworth (Fig 2-21)	Epworth	x	Fox	ELPMA	FCGMA	Active	Agricultural	1721719.9	297977.03	700	700	0	0	0
03N20W25R04S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1721369.05	295648.79	1520	1500	16	950	1500
03N20W26R03S	Fox		Grimes	Fox & Grimes	Fox	ELPMA	FCGMA	Active	Agricultural	1716046.79	295607.62	1200	1180	16	803	1180
03N20W27H03S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1711103.126	298644.721	1112	1110	14	900	1100
03N20W32F02S	x	Fox (Figure 2-12)	x	Upper San Pedro & Fox	x											
03N20W32G02S	x		x	Fox (12)	x											
03N20W32H02S	Fox		x	Fox (12)	Fox	WLPMA	FCGMA	Abandoned_HOLD	Agricultural	1700174.21	292852.63	1182	1090	14	762	1090
03N20W32H03S	Fox		x	x	Fox	WLPMA	FCGMA	Active	Agricultural	1700099.55	292946.12	1127	1120	12	900	1100
03N20W33B01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1705200.85	295038.95	1225	1165	12	844	1141
03N20W33B03S	x		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1705287.97	294772.49	1128	1120	12	800	1120
Yellow highlight indicates well with alternative possible assigments.																

Table 4. Groundwater wells in the Fox Canyon Aquifer (continued)

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
03N20W33B04S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1704294.51	295224.32	1303	1301	10	1058	1300
03N20W33L01S	Fox		x	Fox (12)	x											
03N20W34G01S	Fox		Fox	x	x											
03N20W34J01S	Fox		x	Fox (12)	Fox	ELPMA	FCGMA	Active	Agricultural	1711182.76	291915.78	1225	1120	12	750	1120
03N20W34J02S	x		x	Fox (15)	x											
03N20W34K01S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Agricultural	1710300.36	291700.01	1360	1360	16	756	1274
03N20W34L02S	Fox		x	Fox (12)	Fox	ELPMA	FCGMA	Active	Agricultural	1708058.488	291807.605	1150	1060	15	600	1060
03N20W35G01S	Fox		x	Fox (12)	Fox	ELPMA	FCGMA	Active	Agricultural	1714425.18	292796.61	1500	1464	16	1160	1440
03N20W35J01S	Fox		Fox	Upper San Pedro & Fox (7,14)	Fox	ELPMA	FCGMA	Active	Municipal	1716063.3	291566.81	1120	1120	16	700	1120
03N20W35R01S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Municipal	1716702.32	290888.58	980	980	16	670	980
03N20W35R02S	Fox		x	(possibly Fox) & Grimes (7)	Fox	ELPMA	MW-USGS	Active	Monitoring	1716794.05	290859.34	1120	1110	2	1050	1110
03N20W35R03S	Fox		Fox	x	Fox	ELPMA	MW-	Active	Monitoring	1716794.05	290859.34	1120	900	2	800	900
03N20W36A02S	Fox		x	Fox & Grimes (2)	Fox	ELPMA	FCGMA	Active	Agricultural	1721186.379	295171.738	1721	1420	16	860	1400
03N20W36A04S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1721372.335	295211.426	1290	1280	12	910	1270
03N20W36G01S	Fox		Fox	x	Fox	ELPMA	FCGMA	Active	Agricultural	1720302.24	292845.52	968	980	16	0	0
03N20W36P01S	Fox		x	x	Fox	ELPMA	FCGMA	Active	Agricultural	1718496.778	290894.815	910	890	8	630	890
03N21W35P02S	Fox		x	x	Fox	ELPMA	FCGMA / UW	Active	Agricultural	1681572.65	290198.35	1940	1760	14	790	1760
Yellow highlight indicates well with alternative possible assigments.																

Table 4. Groundwater wells in the Fox Canyon Aquifer (continued)

State Well Number (SWN)	2019 GSP Figures (Dudek, 2019)	Other GSP source (Dudek, 2019)	Intera (2018) (GSP Appendix C)	CH2M Hill (2017) cross-sections (section no. in brackets)	2017 GSP Table 4-1 (Dudek, 2017)	Management area	Agency	Status	Main Use	X	Y	Borehole depth (ft bgs)	Casing depth (ft bgs)	Casing diameter (in)	Top of Screen (ft bgs)	Bottom of screen (ft bgs)
02N20W17F01S	Grimes		x	x	Grimes	WLPMA	FCGMA	Active	Agricultural	1697196.9	277367.7	1126	1113	16	318	1113
02N21W08G01S	Grimes	Assigned to FCA based on eki	x	x	x											
02N21W15J01S	Grimes		x	x	x											
02N21W21H01S	Grimes		x	x	x											
02N21W22A01S	Grimes		x	x	Grimes	WLPMA	FCGMA	Active	Municipal	1679338.77	273277.8	1721	1400	16	780	1400
02N21W22G01S	Grimes		x	x	Grimes	WLPMA	FCGMA	Active	Municipal	1676939.64	272123.5	1350	903	16	603	903
02N21W23D01S	Grimes		x	x	Grimes	WLPMA	FCGMA Unreg	Active	Agricultural	1680413.979	273242.932	1289	1207	10	662	1202
02N21W28A02S	Grimes		x	x	Grimes	WLPMA	FCGMA	Active	Municipal	1673301.79	267870.39	1300	810	15	550	800
03N19W17Q01S	x		Grimes	Grimes (4,5)	x											
03N19W19K02S	x		x	Grimes (3,6)	x											
03N19W19P02S	Grimes	Fox (Section 2.3.1.2.4	Fox & Grimes	Fox (3)	Grimes	ELPMA	FCGMA	Active	Industrial	1725279.48	301820.52	1100	1100	12	865	1095
03N19W20G01S	x		x	Grimes (4)	x											
	x		x	Grimes	x											
03N20W23L01S	x		Grimes	x	x											
03N20W24G01S	x		x	Grimes (1)	x											
03N20W24J01S	x		Grimes	x	x											
03N20W26R03S	Fox		Grimes	Fox & Grimes (7)	Fox	ELPMA	FCGMA	Active	Agricultural	1716046.79	295607.62	1200	1180	16	803	1180
03N20W27B01S	Grimes		x	x	x											

Yellow highlight indicates well with alternative possible assigments.

Table 5. Groundwater wells in the Grimes Canyon Aquifer in Las Posas Valley Basin

<u>Appendix 7.</u> Additional comments relating to Comment 7: "The Draft GSP does not provide a rationale for assuming decreased water flows from Simi Valley in the future, rendering sustainable yield estimates for the ELP questionable."

Appendix 7, Specific Line-by-Line Comments

Page ES-6 (PDF Page 20)

Document Statement: "As surface flows and recharge decreases in Arroyo Simi-Las Posas…"

Reviewer Comment: How is it anticipated that Simi flows will decline? A citation needs to be added, to include an agency or person to whom this comment can be attributed.

Page ES-14 (PDF page 28)

Document Statement: "The Arroyo Simi-Las Posas water acquisition project would involve the purchase of recycled water and discharged groundwater from the City of Simi Valley…Simi Valley has indicated that 3,000 AFY of recycled water would be available from the Simi Valley Water Quality Control Plant…"

Reviewer Comment: Who is "Simi Valley"? There needs to be a citation here, complete with the proper name of the agency with whom this agreement would be made, and the name of a person at the agency who can be contacted.

Page 1-21 (PDF Page 51)

Document Statement: "Plans to increase the direct use of these discharges will impact the amount of recharge available in the future."

Reviewer Comment: There is no citation or reference linked with this statement. Who in "Simi Valley" made this claim? When did they make this claim, and who do they work for?

<u>Appendix 8</u>. Additional comments relating to Comment 8: "Multiple inconsistencies in the Draft GSP have been identified relating to the values for the sustainable yield of WLP and ELP and pumping within these basins. Moreover, the sustainable yield calculation for WLP cannot be independently reproduced by our team of technical experts without more transparency regarding the methodologies or formulae employed by the FCGMA."

1) **Reported Sustainable Yield Values and Calculations are not Consistent and Cannot be Fully Evaluated.**
   - The sustainable yield (SY) calculations in the GSP are complex, and it is not readily apparent how these calculations were performed, or why these specific formulas were chosen. Additional clarification is needed. For example:
     a) SY (WLP) = [average GW inflows (1985-2015)] – [CMWD in-lieu deliveries] + [adjustment for change in storage]; plus "modeled flux of seawater" was considered
     b) SY (ELP) = [Arroyo Simi/ALP recharge] + [1/2 basin precipitation] + [M&I return flows] + [Ag return flows] – [CMWD in-lieu-deliveries] – [CMWD ASR deliveries] + [adjustment for storage declines]
   - SY calculations are inconsistent in different locations in document. Some inconsistencies are tabulated in **Table 1**, below.
   - Extraction (pumping) is also inconsistently reported in the GSP (**Table 1**).

Table 1. Inconsistencies in the GSP document

Parameter	Time period	Value	Source of value (from Draft GSP)
Sustainable yield – WLP	1985-2015	10,000-11,000 AFY	Table ES-1, p. ES-2 Text, p. 2-52
	Simulated future[a]	12,500 ± 1,200 AFY	Text, p. 3-3
	Simulated future[a]	11,300-13,700 AFY	Table ES-1, p. ES-2
Sustainable yield – ELP	1985-2015	17,000-19,000 AFY	Table ES-1, p. ES-2 Text, p. 2-52
	Simulated future[a]	[15,700 ± 1,250 AFY] to [18,700 ± 1,500 AFY]	Text, p. 3-3
	Simulated future[a]	14,500-20,200 AFY	Table ES-1, p. ES-2
Pumping – WLP	2015	1,400 AFY (typo; should be 14,000 AFY)	Text, p. 3-3
	2015	15,350 AFY	Table 2-10b, p. 2-95
	2015	16,383 AFY	Text, p. 2-48, representing UWCD model pumping
Pumping – ELP	2015	20,500 AFY	Text, p. 3-3
	2015	23,858 AFY	Table 2-7, p. 2-87 Text, p. 2-49

[a] The simulated future scenarios use average groundwater pumping for 2015-2017, a simulated 1930-1969 climate period, and the 2070 DWR climate change data. (See GSP at p. ES-2) The range in values appears to be related to different future model scenarios (i.e., different combinations of reduction in pumping and projects) and/or uncertainty assigned to the WLP based on uncertainty in the Oxnard subbasin (see Comment 8)

2) Appendix 8, Specific Line-by-Line Comments

Page ES-8 (PDF Page 22)

Document Statement: "Based on the suite of model scenarios, the sustainable yield of the WLPMA was calculated to be approximately 12,500 AFY, with an uncertainty of ± 1,200 AFY."

Reviewer Comment: It is unclear how the authors of the Draft GSP calculated the sustainable yield for the WLPMA, and we have been unable to reproduce the calculation. The authors need to update the manuscript with calculations that clearly show what values are used to calculate sustainable yield.

Page ES-8 (PDF Page 22)

Document Statement: "In the WLPMA, additional groundwater modeling will be needed to better constrain the sustainable yield over the next 5 years."

Reviewer Comment: The authors of the Draft GSP appear to concede that the United model is deficient in its current form (although this is not necessarily clear from the uncertainty assigned to the sustainable yield in the WLP). Model performance should be improved before the model is relied upon to estimate important quantities such as sustainable yield.

Page 2-52 (PDF page 154)

Document Statement: Section "Estimates of Sustainable Yield"

Reviewer Comment: We cannot recreate the sustainable yield calculations for the WLPMA as described in this section. Please clarify and provide more detailed information, including seawater flux values (if applicable) used in this calculation.

Page 2-54 (PDF page 156)

Document Statement: Section "Projected Water Budget and Sustainable Yield"

Reviewer Comment: Please comment on the uncertainty associated with these future scenarios, particularly given the poor calibration of the United model in WLPMA and the invariant value of pumping (2015-2017 average extraction rate) that is insensitive to changes in pumping in wet and dry years.

Page 2-66 (PDF page 168)

Document Statement: “The Oxnard Subbasin uncertainty analysis was used to interpolate the uncertainty for WLPMA.”

Reviewer Comment: How is this justifiable, particularly given the relatively poor calibration of the United model in the WLPMA relative to the better calibration and model performance observed in the Oxnard subbasin? Further, it appears the uncertainty was based at least in part upon seawater intrusion, a metric that should not be applied directly in the WLP, which is distant from the coast where seawater intrusion may occur. See also Comment 5.

Page 2-67 (PDF Page 169)

Document Statement: “...the WLPMA sustainable yield for the shallow aquifer system and the LAS was estimated to be 12,500 AFY plus or minus 1,200 AFY.”

Reviewer Comment: We cannot reproduce either the sustainable yield estimate of 12,500 or the uncertainty of plus or minus 1,200 AFY presented in the third paragraph. Please include sufficient detail, including estimates of seawater flux used in the calculation, to facilitate independent evaluation.

Page 3-3 (PDF page 319)

Document Statement: “The sustainable yield of the WLPMA is approximately 12,500 acre-feet per year (AFY), with an uncertainty estimate of 1,200 AFY…”

Reviewer Comment: The sustainable yield of the WLPMA cannot be independently reproduced, and the estimate of uncertainty appears to be technically unsound (see Comment 8). Please illustrate how the sustainable yield calculation was performed.

<u>Appendix 9.</u> Specific line-by-line comments relating to Comment 9: "The Draft GSP asserts, without support, that "in-lieu" water deliveries have had a significant impact on groundwater levels and the volume of water in storage"

Page ES-7 (PDF Page 21)

Document Statement (first paragraph): "As of 2015, CMWD had stored 29,192 AF of water in the WLPMA through in-lieu deliveries."

Reviewer Comment: There is no evidence for this water being "stored." FCGWMA's own modeling efforts suggest that water is exiting the WLP sub-basin—hence, how can this water be thought of as "stored?"

Page ES-7 (PDF Page 21)

Document Statement (first paragraph): "Groundwater levels and storage would be lower if CMWD cumulative storage had not occurred."

Reviewer Comment: What is the basis for this statement? As stated above, water is continuously entering and exiting the system, and there is no scientific evidence suggesting that water levels would be substantially impacted by the in-lieu water program.

Page ES-7 (PDF Page 21)

Document Statement: (third paragraph) "Groundwater levels and storage would be lower if CMWD cumulative storage had not occurred."

Reviewer Comment: There is no evidence to support this statement. Please provide evidence for this statement, or this language should be revised or removed from the GSP.

Page ES-10 (PDF page 24)

Document Statement: "These elevations were selected because the groundwater levels in the eastern part of the WLPMA recovered, with the aid of in-lieu surface water deliveries."

Reviewer Comment: As mentioned above, there is no direct evidence that in-lieu surface water delivers have prevented water levels from declining or aided them in rising. This language reads as a guess and needs to be revised or removed. Moreover, the Draft GSP authors' own cumulative departure from rainfall curve illustrates that relatively wet conditions began to prevail after ~1991…. The "recovery" could be attributed to wet conditions, and this needs to be considered in the analysis. Why are in-lieu deliveries continuously invoked as a recovery mechanism in this Draft GSP, when there is no direct evidence that they are?

Page 2-14 (PDF Page 116)

Document Statement: "Non-native surface water flows in Arroyo Simi-Las Posas, groundwater production, climate cycles, groundwater storage, and surface water delivery programs have impacted groundwater elevations in the LPVB non-native surface water flows in the LPVB."

Reviewer Comment: Some of these factors may have indeed impacted water levels, others may have not. For example, flows in Arroyo Simi-Las Posas appear to have impacted groundwater levels (which has been examined through numerical modeling), yet surface water delivery programs have unknown impacts on groundwater surface water levels. Statements like this need to be revised to clarify which processes are well-constrained, vs those which are poorly constrained or whose impacts are unknown (such as in-lieu surface water delivery).

Page 2-14 (PDF Page 116)

Document Statement: "Groundwater storage and surface water delivery programs in the LPVB have affected local groundwater elevations in different ways."

Reviewer Comment: This statement is nebulous (what is meant by "different ways"?) and needs to be clarified. Moreover, the following statement "These activities include: (1) deliveries of in-lieu surface water to groundwater producers in the WLPMA (1995-2008) and ELMPA (1995-2016)" again invokes in-lieu deliveries as impacting groundwater elevations, when there are no data to support this claim.

Page 2-18 (PDF Page 120)

Document Statement: "In-lieu water deliveries ceased in 2008. Since the in-lieu deliveries stopped, groundwater elevations have declined by up to 80 feet, approaching previously measured low groundwater levels in 1994 and 1995."

Reviewer Comment: Why is in-lieu delivery invoked in this statement? Couldn't the recent drought, or perhaps other factors, explain decreased groundwater levels?

Page 2-18 (PDF Page 120)

Document Statement: "This recovery resulted from deliveries of in-lieu surface water by CMWD that reduced groundwater pumping by approximately 1,800 feet acre-feet per year (AFY) in this area."

Reviewer Comment: How is it known that delivery of in-lieu surface water resulted in recover of groundwater levels? How was this determined and quantified?

Page 2-26 (PDF Page 128)

Document Statement: "During this time, CMWD stored approximately 29,000 AF of groundwater in the ELPMA through in-lieu deliveries…"

Reviewer Comment: How is it known that "storage" of in-lieu water remains intact?

Page 3-19 (PDF page 335)

Document statement: "For the remaining wells, the minimum threshold is based on the average low historical groundwater elevations in the early 1990's, before in-lieu surface water deliveries to the WLPMA began…"

Reviewer comment: What do in-lieu deliveries have to do with minimum thresholds? How were the benefits of in-lieu water delivery calculated?

Appendix 11. Miscellaneous line-by-line comments

Page ES-5 (PDF page 19)

Reviewer Comment: The "Historical Groundwater Conditions" section is qualitative with few citations and references to fact. For example, the authors note chronic groundwater declines in the Epworth Gravels Management areas between 1930 and 1990, and in the ELPMA prior to 1970. Please provide citations or data to support these claims.

Page ES-5 (PDF Page 19)

Document Statement: "In the ELPMA, chronic groundwater declines were observed prior to 1970."

Reviewer Comment: Where is the data to support this statement? A reference is needed here.

Page 1-6 (PDF page 36)

Document Statement: List of bullet points on this page

Reviewer Comment: There is no mention of MODFLOW model evaluation here. The baseline calibration needs to be re-evaluated with more years/data, and the future modeling scenarios need to be evaluated and if possible, validated with up-to-date data.

Page 1-7 (PDF page 37)

Document Statement: Data Gap Analysis and Priorities Section

Reviewer Comment: More detail needs to be provided regarding the budget/cost estimate for Draft GSP implementation and 5-year evaluation(s). For example, how much of the budget will be used to evaluate modeling scenarios? This is critical, as modeling is being used as a basis for the water budget, setting MTs/MOs, setting pumping cutbacks, project evaluation, etc.

Page 2-15 (PDF Page 117)

Document Statement: Section on Vertical Gradients

Reviewer Comment: How do the gradients calculate here using measured groundwater surface elevations compare to those calculated using MODFLOW?

Page 2-16 (PDF page 118)

Document Statement: "This decline is consistent with the 2011 to 2015 drought, but it is likely also influenced by management actions in the basin."

Reviewer Comment: Drought and management actions are invoked when describing water level decreases in some locations, but not in others. Reasons for water level change (or lack thereof) are assigned in a seemingly arbitrary way. This section needs to be re-examined, and subject language revised or removed.

Page 2-16 (PDF page 118)

Document Statement: "However, with reduced surface water spreading in the Oxnard Subbasin and the effects of the 2011 to 2015 drought, the groundwater elevation in this well declined approximately 60 feet between 2009 and 2015."

Reviewer Comment: Is it known that surface water spreading, and drought are affecting these water levels, or is this a guess? There are no analyses presented to support these claims.

Page 2-17 (PDF page 119)

Document Statement: Section on Vertical Gradients

Reviewer Comment: How do the gradients calculated here using measured groundwater surface elevations compare to those calculated using MODFLOW (which is the basis for the water budget in this Draft GSP)?

Page 2-19 (PDF page 121)

Document Statement: "The low groundwater elevations measured in October 2015 reflect the effects of the drought from 2011 to 2015."

Reviewer Comment: Statements attributing groundwater elevation decline to drought or other factors appear to be used intermittently and subjectively in this GSP. Where is the analysis/data that support these statements?

Pages 2-21 to 2-22 (PDF Pages 123-124)

Document Statement: "Between 1992 and 2010, groundwater elevations recovered by 70 feet in well 03N19W29F06S, partly in response to decreased production from the Epworth Gravels Aquifer as water levels declined and production wells were drilled in the FCA instead."

Reviewer Comment: How is this known? And how is it known that elevations responded "partly"…what is the other "part" of the response?

Page 2-23 (PDF Page 125)

Document Statement: Final paragraph, discussion on observed gradients

Reviewer Comment: How do the observed gradients comport (or do not comport) with calculated gradients using MODFLOW?

Page 2-35 (PDF Page 137)

Document Statement: "…the majority of the subsidence at monument P729 has occurred since 2012, coincident with a period of drought, and with reduced surface water spreading in the Forebay area of the Oxnard Subbasin to the northwest of this monument."

Reviewer Comment: This is a selective statement, which seems to attempt to link drought with subsidence. It could just as easily be said that despite there being a drought, no subsidence was observed at monument MPWD. Why is drought invoked as contributing to subsidence at one location, while no context of discussion of drought is provided when describing the lack of subsidence observed at a different monument? Statements such as this suggest the lack of a consistent and systematic analysis.

Page 2-43 (PDF page 145)

Document Statement: Bullet points at bottom of page, describing how recharged is estimated based on total rainfall

Reviewer Comment: How were these metrics implemented? What is the rationale for their use? Are the arbitrary metrics, or have they been used at other locations?

Page 2-47 (PDF page 149)

Document Statement: Section "West Las Posas Management Area."

Reviewer Comment: What is the rationale for the scheme used to describe percolation of agricultural irrigation water? It seems arbitrary, particularly compared to the more detailed analysis used to describe percolation of agricultural irrigation water in the preceding section (East Las Posas Management Area).

Board of Directors
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93004

September 23, 2019

FCGMA Board of Directors:

We appreciate the opportunity to comment on the Preliminary Draft (Subject to Change) Groundwater Sustainability Plan (GSP) for the Las Posas Basin. The comments in this cover letter will be general and brief; more detailed comments from Terry Foreman, Camrosa Water District Board member and the FCGMA Special Districts' appointee to the GSP technical advisory group (TAG), are attached for your review.

1. This year, DWR implemented a new naming convention to standardize GSA names. As of July 26, 2019, the official name for the Camrosa GSA is "Camrosa Water District GSA – Las Posas Valley."
2. p. 2-39 notes: "Imported water supplies consist of imported Metropolitan Water District of Southern California water provided by the CMWD, and pumped groundwater supplied by the Camrosa Water District from the PVB and Arroyo Santa Rosa Valley Basin." The potable water Camrosa delivers to its customers overlying the Las Posas Basin is a blend of water purchased from Calleguas (mostly, but not exclusively, State Water Project water, supplemented during periods of drought or maintenance of the SWP system, with Colorado River water) and pumped groundwater from PVB and ASRVB. The nonpotable water Camrosa delivers is a blend of Conejo Creek water, pumped groundwater, and Calleguas water.

Thank you for considering these comments. Should you have any questions, please do not hesitate to contact me. Sincerely,

Tony Stafford,

Tony Stafford

General Manager

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Due to the technical complexity of groundwater sustainability plans, Camrosa is relying on the expertise of Terry Foreman, the Special Districts' appointee to the FCGMA TAG and Vice President of the Arroyo Santa Rosa Groundwater Sustainability Agency Board, for specific comments on the Preliminary Draft (Subject to Change) of the Las Posas Groundwater Sustainability Plan.

Comments on Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin, dated July 2019
By Terry L Foreman, PG 4020, HG 155
September 23, 2019

GENERAL COMMENTS

1. There is not a specific plan to achieve Sustainability. Subarticle 5. Projects and Management Actions of the SGMA regulations, specifically Sections 354.44 (b) (1) (A) and (B), (2), (3), (4), (6), (7), and (8) require specific projects, costs, sources of funding, schedule and milestones be provided to demonstrate how sustainability will be achieved by the GSP. It appears much of these requirements are left to later determinations; however, these items are expected to be part of the Plan. The set of simulations of various future scenarios, from which the sustainable yield (SY) was estimated included annual reductions in pumping over the 20-year implementation period. However, throughout the document and in Chapter 5, there is no specific plan proposed to achieve sustainability, only that fallowing and pumping reductions are tools that could be used to achieve sustainability. This vague discussion will likely not meet DWR's requirements for a specific plan. The plan can change in the future as new projects or management actions are further assessed and adopted, but there should be a plan in place in this GSP.

2. There is less emphasis on pumping in the West Las Posas Basin (WLPB) and its impacts on seawater intrusion in the Oxnard Basin (OxB) in this GSP than in the PVB GSP, but there is not enough analysis of what pumping quantities are reasonable. Why are WLPB pumpers responsible for limiting seawater intrusion into Oxnard? What is the fair and reasonable flow to be provided from WLPB to OxB? There is no limit to OxB pumping that WLPB might be required to support in order to avoid seawater intrusion in the OxB. As presented in the GSP, it seems that WLPB pumpers are expected to make an unfair contribution to avoid seawater intrusion in OxB.

3. There is no documentation of future scenarios presented in the GSP. Sustainable Yields of each basin cannot be reviewed critically because of the gaps in documentation. Groundwater models used for simulation of future scenarios have not been documented. Documentation, similar to that prepared for groundwater models of historical conditions, is required for the following: boundary conditions, projected stream flows including stream leakage (e.g., Santa Clara River, Arroyo Las Posas, and Arroyo Simi), operations (including rules) of diversion of surface water for direct deliveries and managed recharge, location and timing of applied waters (e.g., imported water, surface water, recycled water, and groundwater), mountain front recharge, recharge from precipitation, groundwater flow between basins, location (including aquifer) and timing of groundwater pumping and location of discharge to streams, seawater (coastal groundwater) intrusion/outflow, conjunctive use operations, etc. All water budget components simulated in the models, including assumptions and methods used need to be documented. Such

documentation has not been presented for stakeholder review and understanding of the basis of presented Sustainable Yields.

There needs to be a clear presentation of all projected water supplies and their uses, especially conjunctive use expectations: timing and amounts of surface water and groundwater use. Conjunctive use operations are buried within the estimates of SY for the OxB and PVB. For example, the modeling of future scenarios varies groundwater pumping over 1000s of AFY depending on availability of surface water and the SY value is the average of pumping over the 50-year simulation period. For example, the 2015 through 2017 average pumping in the Oxnard and Pleasant Valley Basins is 76,834 and 17,181 AFY respectively, which is stated as the pumping rates used in the Base Case scenarios. However, average pumping in each basin over the 50-year simulation period is reported as 68,000 AFY and 14,000 AFY, respectively, with annual values varying significantly (e.g., between about 9,000 to 21,000 AFY in the Pleasant Valley Basin). These differences are due to conjunctive use operations and represent average pumping over the 50-year simulation period. So, it is important that these conjunctive use operations are fully disclosed and clearly documented in order to understand the basis of the SY estimates and expected variations of pumping and surface water deliveries under different hydrologic conditions (e.g., wet, dry, or average). This understanding will be important in determining impacts of allocation decisions on allowed year-to-year pumping variations.

4. The derivation of the SY value from the series of future simulations is not clearly documented. The calculations of SY should be presented so the reader understands the exact methodology used to obtain the values presented in the GSP. There was some additional information on the methodology presented at the August 21/22 workshops, but this information is still insufficient. The calculations used to arrive at the SY values presented in the report should be shown in the GSP, especially given the values in the GSP are new and have not been reviewed at TAG.

5. The uncertainty analysis approach used in the GSP is not the conventional approach used in the groundwater community. The uncertainty analysis presented in the GSPs are at best gross approximations, what may change significantly using more conventional approaches. The UWCD and CMWD models peer review reports provided by Dudek as appendices in the GSPs present "uncertainty analysis" of potential SYs based on Global Sensitivity Analysis (GSA). The GSA approach limits the analysis to small sets of parameters and does not maintain calibration of the groundwater flow models in assessing uncertainty of model parameters to model outputs, which leads to serious questions of the validity of the uncertainty bounds presented (both in the peer review reports and GSPs). Use of GSA in the groundwater models peer review is a significant departure from the scope of work approved by the FCGMA Board. The peer review scope of work called for uncertainty analysis based on the following process described by USGS in ***Approaches to Highly Parameterized Inversion: A Guide to Using PEST for Model-Parameter and Predictive Uncertainty Analysis***, by John Doherty, Randall J. Hunt, and Matthew J. Tonkin, 2010. Use of GSA is not a conventional approach being used as an industry standard for uncertainty analysis in surface water and groundwater studies. GSA has been introduced relatively recently as a means to assess relative importance of parameters in groundwater modeling (see for example, ***Approaches in Highly Parameterized Inversion: PEST++ Version 3, A Parameter ESTimation and Uncertainty Analysis Software Suite Optimized for Large***

Environmental Models *by* David E. Welter, Jeremy T. White, Randall J. Hunt, and John E. Doherty, 2015.*)*. GSA is not the industry standard being used to assess uncertainty and as such has not undergone extensive scrutiny and peer review by groundwater professionals. Review of popular modeling software platforms such as GMS, Groundwater Vistas, and Visual MODFLOW typically integrate the PEST suite of programs for model calibration and uncertainty analysis. The USGS has focused their efforts on uncertainty analysis through the use of and further development of the PEST suite of programs in cooperation with Dr. John Doherty. It is recommended that the approach used by the USGS, as in the original scope of work, be considered in further assessing uncertainty. In addition, these approaches can be used to assess the worth of data of future monitoring programs to focus expensive data collection programs (such as installation of new groundwater monitoring wells).

6. Use of groundwater level thresholds as surrogates for water quality and land subsidence is not supported. There is no analysis showing how proposed groundwater level thresholds will not result in undesirable results in water quality or subsidence. The use of groundwater levels as surrogate threshold levels for various sustainability indicators is not supported in any substantial manner. Specifically, historical low groundwater levels are stated as minimum thresholds protective of degraded water quality and land subsidence. In order to use surrogates, such groundwater levels, for these sustainability indicators, there needs to be a demonstration that there is a direct relation between the sustainability indicator and the surrogate indicator, i.e., groundwater levels that will protect against an undesirable result. Presently, there is no analysis presented in the GSPs to support the selection of the surrogate indicator and its relation to the sustainability indicator to demonstrate that the minimum threshold will not be exceeded if groundwater levels are maintained above historical low levels. For example, subsidence is a slow process where consolidation of fine-grained sediments occurs in response to a decrease in groundwater levels. Subsidence may be initiated upon a drop in groundwater levels below a specific threshold value, where consolidation of fine-grained sediments is initiated, but may not go to completion (i.e., full potential subsidence) as groundwater levels recover. So, additional consolidation may be reinitiated as a groundwater levels decline below threshold levels. There has been no analysis of the potential subsidence under varying groundwater level declines except references to previous USGS analysis of subsidence in the basins. Given the observations of subsidence, including those of the USGS, Farr (2017) and UNAVCO's monitoring stations (especially Station P729 in the West Las Posas Basin), these issues need to be further explored for all the basins.

7. The bases for defining Basin-wide Undesirable results appear to be somewhat arbitrary. The basis for claiming that a certain number of wells, or timing sequences, exceeding local minimum thresholds will create a basin-wide undesirable result is not supported by any analysis or demonstrations. Such analysis and demonstration should be provided and reviewed by stakeholders to support the recommendations.

8. There needs to be clear objectives stated for proposed monitoring program and a more rigorous analysis of the cost-benefits of each monitoring element. There should be, a) clearer explanations of data being collected to address data gaps and, b) data collected to assess progress of sustainability attainment. Future monitoring will add hundreds of thousands of

dollars to GSP implementation and new monitoring features, such as monitoring wells, potentially will cost millions of dollars, so the monitoring program should be optimized to avoid collection of data of limited value. Optimization techniques as described in the USGS report identified in General Comment No. 5 above should be considered for use in evaluating data worth.

SPECIFIC COMMENTS

Specific comments are not provided due to the limitations of time given for review of the three extensive draft GSP documents. However, many of the issues identified in the draft PVB and OxB GSP are issues in this GSP, which have been folded into the General Comments on this GSP.

CALLEGUAS MUNICIPAL WATER DISTRICT

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September 23, 2019

Mr. Jeff Pratt, P.E., Executive Officer
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, California 93009-1610

Subject: Comment letter on the July 2019 Draft Groundwater Sustainability Plan for the Las Posas Valley Basin

Dear Mr. Pratt:

Calleguas Municipal Water District (Calleguas) respectfully submits this letter to the Fox Canyon Groundwater Management Agency ("Agency") to comment on the July 2019 Draft Groundwater Sustainability Plan for the Las Posas Valley basin (GSP). Calleguas thanks Agency staff for their efforts in preparing this draft GSP.

Calleguas' comments are organized in a manner that follows the structure of the GSP.

Executive Summary

a. The "sustainable yield" in the GSP is not consistent with the Water Code and the Emergency Regulations adopted pursuant to the Sustainable Groundwater Management Act (SGMA). On page **ES-2**, the GSP states that the "sustainable yield for the Las Posas Valley basin ("basin") is estimated "depending on which projects are ultimately implemented." This confuses the terms "*sustainable yield*" and "*sustainability goal*" as those terms are defined in the Water Code and the Emergency Regulations. The "sustainable yield" for the basin should be revised to reflect that the GSP must include two distinct calculations: (i) a "sustainable yield" that does not include future projects and management actions and which must be based on the "*maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result*" (Wat. Code, § 10721(w).); and (ii) a "sustainability goal" which incorporates potential future projects and management actions and is calculated based on "*the existence and implementation of one or more groundwater sustainability plans that achieve sustainable groundwater management by identifying and causing the implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield.*" (Wat. Code, § 10721(u); Cal. Code Regs., tit. 23, § 354.24.)

b. Calleguas' stored water is not part of the basin's "water budget" as defined in SGMA. In discussing the water budget for the basin, the GSP includes information related to water stored by Calleguas in the basin as the result of imported water projects. (e.g., GSP, pp. **ES-6** and **ES-7**) Pursuant to SGMA, a basin's "water budget" is defined as "*an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored*." (Wat. Code, § 10721.). Such accounting is specific to groundwater and surface water available to all pumpers and does not apply to the water stored by Calleguas because Calleguas is the only entity with a right to that water. Calleguas purchases imported water from the Metropolitan Water District of Southern California to store in the basin, and has spent more than $230 million to build conveyance infrastructure and purchase that water. Calleguas' stored water is the primary emergency drinking water supply for over three-fourths of the population in Ventura County. Calleguas' stored water is for public use during interruptions of imported water deliveries resulting from emergencies such as earthquakes, other natural disasters, or terrorism, as well as planned infrastructure maintenance. Including Calleguas' stored water in the water budget, including water stored pursuant to Agency-approved in-lieu credits programs, is incorrect because only Calleguas has the right to its stored water. The Agency has recognized the importance of Calleguas storing imported water in the basin as "essential to meet seasonal and dry year demands and provide protection from other potential water supply emergencies" as stated in its Resolution 1993-2, adopted on October 27, 1993. By adopting Resolution 1993-2, the Agency legally obligated itself to protect Calleguas' stored water and "employ its powers to protect injected and percolated foreign water for the various purposes of those agencies, cities and individuals who have injected and percolated water in accordance with the Fox Canyon Management Agency regulations and, within the boundaries of the Fox Canyon Groundwater Management Agency." (Resolution 1993-2 of the Fox Canyon Groundwater Management Agency To Support and Protect Injected and Percolated Water, passed and adopted by the Fox Canyon GMA Board on October 27, 1993.) Any basin water calculation in the GSP that includes Calleguas' stored water is not consistent with SGMA, California water rights law, or Agency adopted action. These same comments apply to the change in storage discussions found in various GSP sections, such as **Section 2.3**.

c. The GSP lacks a firm commitment by the other two groundwater management agencies with jurisdiction over portions of the basin outside Agency boundaries. Although the GSP has been prepared for the entire basin, certain portions of the basin are outside the Agency's jurisdiction and are under the jurisdiction of either Camrosa Las Posas GSA or the Las Posas Valley Outlying Areas GSA. (GSP, p. **ES-1**) The GSP does not set out any firm commitment by the other two GSAs to implement the GSP. Given the 20- to 50-year implementation period of the GSP, formal action by each respective GSA board committing to managing groundwater pumping in a manner consistent with the sustainability goal for the basin is necessary to ensure the long-term health of the basin.

d. The sustainable yield for the basin must not be at a level that hinders Calleguas' ability to access its stored water. If Calleguas cannot reasonably pump and deliver its stored water in times of emergency then many people in Ventura County may have no access to water when they will need it the most. The Agency has recognized the importance of Calleguas storing imported water in the basin as "essential to meet seasonal and dry year demands and provide protection from other potential water supply emergencies" as stated in its Resolution 1993-2, adopted on October 27, 1993. By adopting Resolution 1993-2, the Agency legally obligated itself to protect Calleguas' stored water and "employ its powers to protect injected and percolated foreign water for the various purposes of those agencies, cities and individuals who have injected and percolated water in accordance with the Fox Canyon Management Agency regulations and, within the boundaries of the Fox Canyon Groundwater Management Agency." (Resolution 1993-2 of the Fox Canyon Groundwater Management Agency To Support and Protect Injected and Percolated Water, passed and adopted by the Fox Canyon GMA Board on October 27, 1993.)

e. Sustainability criteria for the East Las Posas Management Area (ELPMA) is based on an arbitrary basin storage reduction limitation. The GSP states in multiple sections that the Minimum Threshold for these two management areas is based on a groundwater level that "limits reduction in storage to less than 20% relative to the estimated 2015 groundwater storage volume." (e.g., GSP pp. **ES-11, ES-12**) The only explanation offered as to how that 20% was arrived at is that it was "determined to be a reasonable approach by the [Agency] Board to avoid significant and unreasonable loss of supply." (e.g., GSP, p. **ES-12**) This explanation is arbitrary and falls short of meeting SGMA's requirement that the "*justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting*." (Cal. Code Regs., tit. 23, § 354.28(b)(1).

1. <u>Chapter 1: Administrative Information</u>

a. SGMA requires avoiding undesirable results, not their minimization or mitigation. There are several references in this Chapter, and throughout the GSP, related to managing the basin in a manner that “limits,” “minimizes” or “mitigates” undesirable results. Technically, SGMA requires avoiding undesirable results by implementing sustainable groundwater management “*that can be maintained during the planning and implementation horizon without causing undesirable results*.” (Wat. Code, § 10721(v).)

b. Projects cost estimates need more clarification. It is unclear whether the cost estimates shown in **Table 1-1** and **Table 1-2** are for all basins managed by the Agency or whether they are specific to the Las Posas Valley basin, which is the subject of this GSP, and whether they include costs associated with periodic reporting and addressing data gaps. It is also unclear whether the estimated cost per acre-foot shown in **Table 1-1** is based on amortized project development costs over the life of the respective project. In addition, the GSP does not include any commitment by the other two GSAs, whose pumpers stand to benefit from the projects, to contribute to those costs.

c. Section 1.8.2 must be corrected. The GSP states “[a]ll of the purveyors in the LPV, including all municipal well operators, are in whole or part supplied water by CMWD, except for one that is supplied water by UWCD.” (GSP, p. **1-32**.) This statement is not accurate and should be consistent with the information shown in **Table 2-5**.

2. <u>Chapter 2: Basin Setting</u>

a. The Hydrogeologic Conceptual Model (HCM) of the ELPMA has key inaccuracies that materially impact sustainable groundwater management; ELPMA should be subdivided based on differences in hydraulic characteristics. In **Section 2.2** (esp. pp. **2-2** and **2-3**) the GSP describes the historical subdivision of the East and South Las Posas sub-basins along the Moorpark anticline but concludes that the anticline is no longer believed to restrict groundwater flow. Furthermore, this conclusion is used to justify not subdividing the ELPMA into separate management areas. Work completed after 2016, as confirmed in discussions at Technical Advisory Group meetings, demonstrates that the anticline and other associated structures indeed restrict groundwater flow, with groundwater level trends north of the anticline following a markedly different pattern of longstanding chronic groundwater level declines compared to wells to the south, which exhibit hydraulic communication with the arroyo. These realities are recognized elsewhere in the GSP but have not been revised here or in **Section 2.5** (Management Areas). The HCM should be updated and the ELPMA should be subdivided so as to differentiate between the above-described areas. This is critical for management, as evidenced by the fact that the GSP shows that projects alone will not stabilize groundwater levels and achieve the measureable objectives in the area north of the Moorpark anticline.

b. Estimate of sustainable yield is too high and ignores important elements. The approach for estimating the ELPMA sustainable yield described in **Section 2.4.3.4**, specifically the assumption that half of the precipitation over the basin becomes groundwater recharge, is not supported by best available information or best available science, as required by SGMA. **Section 2.4.4**, item no. 2 should address the fact that inflows from Simi Valley declined notably during the second half of the water budget base period. Percolation at the Moorpark Water Treatment Plant has similarly decreased. These factors lead to the conclusion that the ELPMA estimated sustainable reported in **Section 2.4.3.4** is overstated.

c. A projected water budget for plan implementation and discussion of assumptions must be included in the GSP pursuant to the Emergency Regulations. The GSP implementation is not discussed in sufficient detail to identify which projects and/or management actions are planned for implementation to achieve the sustainability goal. Rather the GSP describes a number of future model scenarios, none of which achieve the sustainability goal in all areas. Thus, the GSP does not present a projected water budget for aquifer response to GSP implementation, as required by the Water Code. A discussion of the assumptions and projected water budget uncertainties should accompany the missing projected water balance. The assumptions and uncertainties discussion should address key issues impacting the projections including, but not limited to, model error, model predictive capability for simulated stresses under future conditions (esp. streamflow percolation with lower shallow aquifer groundwater levels), uncertainties in actual future rates of discharge by the Simi Valley and Moorpark wastewater plants and Simi Valley dewatering wells, and representativeness of historical streamflow data given the urbanization of Moorpark and Simi Valley.

d. The estimates of future sustainable yield (Sections 2.4.5.1.9 and 2.4.5.2.7) are not supportable and the GSP should not rely on Calleguas' stored water to achieve the sustainability goal. The GSP includes a number of future model scenarios, none of which achieve the sustainability goal in all areas of the basin. The estimated sustainable yield is not based on an analysis of the aquifer response to GSP implementation designed to achieve sustainability and is, therefore, not valid and not consistent with SGMA's requirement that such analysis be supported by best available information and best available science. Additionally, the modeling scenarios completed to estimate the future sustainable yield do not separate Calleguas' stored water from the analysis of projects and management actions that will be needed to achieve the sustainability goal. Including Calleguas' stored water in the modeling analysis is wrong and overestimates predicted groundwater levels. All other factors being equal, the estimated sustainable yield would be lower if Calleguas' storage is removed from the analysis, requiring greater pumping reductions (or additional projects) to achieve the GSP's measureable objectives. In short, the sustainable yield analysis implicitly assumes that Calleguas' stored water is/will be available to contribute toward meeting the sustainability goal, which is not correct and would violate Calleguas' rights to its stored water under California law. The analysis should specify projects and/or management actions that would be required to achieve the sustainability goal absent Calleguas' stored water.

3. Chapter 3: Sustainable Management Criteria

a. Statements that undesirable results may occur between 2020 and 2039 are inconsistent with SGMA. There are numerous statements in **Chapter 3** and throughout the GSP that presume that the occurrence of undesirable results between 2020 and 2039 is allowed under SGMA. This is not accurate. SGMA requires that the GSP outlines measures to be taken by the Agency in order to "*achieve the sustainability goal in the basin within 20 years of the implementation of the plan*." (Wat. Code, § 10727.2.) The sustainability goal "*culminates in the absence of undesirable results within 20 years*" of the implementation of the GSP. (Cal. Code Regs., tit. 23, § 354.24.) These requirements do not translate to permitting undesirable results up until the year 2039. Such interpretation does not take into consideration the length of time needed to rectify the undesirable result and implies that one year may be sufficient (because undesirable results should not occur beginning with the year 2040). Further, assuming this GSP is approved, DWR has the authority to declare, at a future time, the approved GSP as either "incomplete" or "inadequate" following its periodic review of the Agency's progress towards achieving the sustainable goal for the Subbasin. (Cal. Code Regs., tit. 23, § 355.6(d).) One of the key criteria for DWR to make such future determination is whether "*the exceedances of any minimum thresholds or failure to meet any interim milestones are likely to affect the ability of the Agency to achieve the sustainability goal for the basin.*" (Cal. Code Regs., tit. 23, § 355.6(c)(1).). An "incomplete" or "inadequate" determination by DWR may result in intervention by the State Water Resources Control Board as authorized under the Water Code. (Wat. Code, § D. 6, Pt. 2.74, Ch. 11.) Additionally, all references in the GSP to avoiding one or more undesirable results "after 2040" are vague because "after 2040" could mean any time period, and should be corrected to say that undesirable result would not occur "beginning in 2040," consistent with SGMA.

b. The criteria for determining whether a management area is experiencing an undesirable result is unclear. The GSP lists two criteria for each management area to determine whether that management area is experiencing an undesirable result. (GSP, pp. **ES-10**, **ES-11**, **ES-12**, **Chapter 3**) It is unclear how the two criteria operate, whether together or independently, or whether on a first-to-occur basis.

c. Any proposed reduction in production must be consistent with California water rights law. Compliance with SGMA does not exempt the Agency from complying with California water rights law. (Wat. Code, § 10720.5.) The GSP states in this Chapter and in other chapters that the Agency is contemplating reducing production linearly over the 20-year GSP implementation period. (e.g., GSP, p. **3-3**) Established case law has upheld reduction in groundwater production to safe yield that spans over a period ranging between 5 and 7 years. Further, any proposed pumping regime must protect Calleguas' stored water which it has a right to under California law. These are important considerations for the Agency in terms of achieving the sustainable goal of the basin. It informs the Agency's strategy in fulfilling its obligations under SGMA by necessitating the Agency to look at projects as the principal mechanism for bringing the basin's yield into balance.

d. Model assumptions must be recognized as a source of uncertainty in the model predictions. The GSP does not recognize the model assumptions, which are the basis upon which model outputs are generated and thus the GSP relies, as a source of uncertainty as well. This recognition needs to be expressly stated in the GSP.

e. Lack of sustainability criteria for water quality. Ongoing migration of water quality exceeding the Regional Water Quality Control Board Basin Plan Objectives is documented in the GSP for both the West Las Posas Management Area (WLPMA) and ELPMA. However, the GSP asserts that sustainability criteria for degraded water quality are not required because the groundwater quality is not "directly correlated" with groundwater production. (GSP, pp. **3-19**, **3-23**.) SGMA does not require that such direct correlation between pumping and groundwater quality degradation be demonstrated as a condition for including sustainability criteria for degraded water quality.

f. Measureable objectives are arbitrary and inconsistent with modeling results. No justification based on best available information or best available science is provided for the measureable objective for the eastern WLPMA, thus, making it arbitrary and inconsistent with SGMA. Further, the GSP states that the measureable objectives for ELPMA are based on 2040 groundwater levels with gradual reductions in groundwater production between 2020 and 2040. However, this statement does not agree with the model scenario results shown on **Figures 3-10a through 3-10e**, which, in some cases, show that projects would be required to achieve the measureable objective in addition to the "gradual reductions in groundwater production." (GSP, **Section 3.5.2**.)

g. Interim milestones presented in the GSP do not comply with the Emergency Regulations. The GSP does not include interim milestones for most locations with proposed measurable objectives. The GSP attempts to justify this by noting that 2015 current groundwater levels are higher than the measureable objective at some locations. The Emergency Regulations do not provide such an exemption. The interim milestones should be provided not only to comply with the regulations, but also to provide clarity concerning what the planned groundwater elevations are during GSP implementation. Interim milestones are presented, they are established based on an apparently arbitrary linear interpolation between 2015 groundwater levels and measureable objectives. No justification based on best available information or best available science as required by SGMA is provided for why a linear path would be expected, and such a path is inconsistent with the information contained **Chapter 5**. To comply with the Emergency Regulations, the interim milestones must be presented and be based on expected groundwater elevations resulting from plan implementation.

4. <u>Chapter 4: Monitoring Networks</u>

a. Data gaps inconsistencies. The data gaps identified in **Chapter 2** do not appear to be fully addressed by the recommendations for new monitoring wells presented in **Chapter 4**. **Section 4.6** recommendations are also inconsistent with the figures presented following the chapter. For example, a Grimes Canyon Aquifer monitoring well is recommended for the ELPMA in **Section 4.6.1**, but no such proposed well is depicted on **Figure 4-8**.

b. Calleguas' monitoring schedule is not accurately represented in the GSP. Calleguas is willing to work with Agency staff on this issue and make corrections to **Table 4-5** and associated maps.

5. Chapter 5: Projects and Management Actions

a. Information regarding potential projects is not sufficient to meet SGMA requirements. In subsection **ES.5**, the GSP makes clear that the "inclusion of these projects does not constitute a commitment" by the Agency Board "to construct or fund them" and the timing of the management actions is ambiguous. (GSP, p. **ES-13**) SGMA requires that projects "*shall be supported by best available information and best available science*." (Cal. Code Regs., tit. 23, § 354.44(c).) SGMA also requires, among other things, that any projects identified in the GSP be accompanied with a "*description the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred*" as well as, for each project, a "*time-table for expected initiation and completion, and the accrual of expected benefits.*" (Cal. Code Regs., tit. 23, § 354.44(b)(1)(A) and (b)(4).)

b. Discussion of proposed projects do not analyze impact to Calleguas' stored water. As mentioned above, SGMA requires specificity as to project triggers and timetables. The GSP identifies a range of options under existing conditions, but no clear direction as to how the Agency intends to achieve sustainability without a significant disruption to Calleguas' ability to pump its stored water.

c. Timing and scope of the proposed management actions are unclear. It is unclear when and how the proposed management actions will be implemented. SGMA requires that management actions "*shall be supported by best available information and best available science*." (Cal. Code Regs., tit. 23, § 354.44(c)

d. Clarification is needed regarding funding for Project No. 1. This project description should be revised to clearly distinguish it from existing Agency-approved in-lieu programs. Specifically, the description should clarify that no in-lieu storage credits will accrue as a result of this proposed project.

We appreciate the Agency Board's consideration of these comments. If you have any questions about Calleguas' comments, please contact me at (805) 579-7138 or tgoff@calleguas.com.

Sincerely,

Anthony Goff
General Manager

cc: Eugene West, Chair, Fox Canyon Groundwater Management Agency Board of Directors
Department of Water Resources

CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

Board of Directors
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93004

September 23, 2019

FCGMA Board of Directors:

We appreciate the opportunity to comment on the Preliminary Draft (Subject to Change) Groundwater Sustainability Plan (GSP) for the Las Posas Basin. The comments in this cover letter will be general and brief; more detailed comments from Terry Foreman, Camrosa Water District Board member and the FCGMA Special Districts' appointee to the GSP technical advisory group (TAG), are attached for your review.

1. This year, DWR implemented a new naming convention to standardize GSA names. As of July 26, 2019, the official name for the Camrosa GSA is "Camrosa Water District GSA – Las Posas Valley."
2. p. 2-39 notes: "Imported water supplies consist of imported Metropolitan Water District of Southern California water provided by the CMWD, and pumped groundwater supplied by the Camrosa Water District from the PVB and Arroyo Santa Rosa Valley Basin." The potable water Camrosa delivers to its customers overlying the Las Posas Basin is a blend of water purchased from Calleguas (mostly, but not exclusively, State Water Project water, supplemented during periods of drought or maintenance of the SWP system, with Colorado River water) and pumped groundwater from PVB and ASRVB. The nonpotable water Camrosa delivers is a blend of Conejo Creek water, pumped groundwater, and Calleguas water.

Thank you for considering these comments. Should you have any questions, please do not hesitate to contact me. Sincerely,

Tony Stafford,

Tony Stafford

General Manager

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Due to the technical complexity of groundwater sustainability plans, Camrosa is relying on the expertise of Terry Foreman, the Special Districts' appointee to the FCGMA TAG and Vice President of the Arroyo Santa Rosa Groundwater Sustainability Agency Board, for specific comments on the Preliminary Draft (Subject to Change) of the Las Posas Groundwater Sustainability Plan.

Comments on Draft (Subject to Change) Groundwater Sustainability Plan for the Las Posas Valley Basin, dated July 2019
By Terry L Foreman, PG 4020, HG 155
September 23, 2019

<u>GENERAL COMMENTS</u>

1. There is not a specific plan to achieve Sustainability. Subarticle 5. Projects and Management Actions of the SGMA regulations, specifically Sections 354.44 (b) (1) (A) and (B), (2), (3), (4), (6), (7), and (8) require specific projects, costs, sources of funding, schedule and milestones be provided to demonstrate how sustainability will be achieved by the GSP. It appears much of these requirements are left to later determinations; however, these items are expected to be part of the Plan. The set of simulations of various future scenarios, from which the sustainable yield (SY) was estimated included annual reductions in pumping over the 20-year implementation period. However, throughout the document and in Chapter 5, there is no specific plan proposed to achieve sustainability, only that fallowing and pumping reductions are tools that could be used to achieve sustainability. This vague discussion will likely not meet DWR's requirements for a specific plan. The plan can change in the future as new projects or management actions are further assessed and adopted, but there should be a plan in place in this GSP.

2. There is less emphasis on pumping in the West Las Posas Basin (WLPB) and its impacts on seawater intrusion in the Oxnard Basin (OxB) in this GSP than in the PVB GSP, but there is not enough analysis of what pumping quantities are reasonable. Why are WLPB pumpers responsible for limiting seawater intrusion into Oxnard? What is the fair and reasonable flow to be provided from WLPB to OxB? There is no limit to OxB pumping that WLPB might be required to support in order to avoid seawater intrusion in the OxB. As presented in the GSP, it seems that WLPB pumpers are expected to make an unfair contribution to avoid seawater intrusion in OxB.

3. There is no documentation of future scenarios presented in the GSP. Sustainable Yields of each basin cannot be reviewed critically because of the gaps in documentation. Groundwater models used for simulation of future scenarios have not been documented. Documentation, similar to that prepared for groundwater models of historical conditions, is required for the following: boundary conditions, projected stream flows including stream leakage (e.g., Santa Clara River, Arroyo Las Posas, and Arroyo Simi), operations (including rules) of diversion of surface water for direct deliveries and managed recharge, location and timing of applied waters (e.g., imported water, surface water, recycled water, and groundwater), mountain front recharge, recharge from precipitation, groundwater flow between basins, location (including aquifer) and timing of groundwater pumping and location of discharge to streams, seawater (coastal groundwater) intrusion/outflow, conjunctive use operations, etc. All water budget components simulated in the models, including assumptions and methods used need to be documented. Such

documentation has not been presented for stakeholder review and understanding of the basis of presented Sustainable Yields.

There needs to be a clear presentation of all projected water supplies and their uses, especially conjunctive use expectations: timing and amounts of surface water and groundwater use. Conjunctive use operations are buried within the estimates of SY for the OxB and PVB. For example, the modeling of future scenarios varies groundwater pumping over 1000s of AFY depending on availability of surface water and the SY value is the average of pumping over the 50-year simulation period. For example, the 2015 through 2017 average pumping in the Oxnard and Pleasant Valley Basins is 76,834 and 17,181 AFY respectively, which is stated as the pumping rates used in the Base Case scenarios. However, average pumping in each basin over the 50-year simulation period is reported as 68,000 AFY and 14,000 AFY, respectively, with annual values varying significantly (e.g., between about 9,000 to 21,000 AFY in the Pleasant Valley Basin). These differences are due to conjunctive use operations and represent average pumping over the 50-year simulation period. So, it is important that these conjunctive use operations are fully disclosed and clearly documented in order to understand the basis of the SY estimates and expected variations of pumping and surface water deliveries under different hydrologic conditions (e.g., wet, dry, or average). This understanding will be important in determining impacts of allocation decisions on allowed year-to-year pumping variations.

4. The derivation of the SY value from the series of future simulations is not clearly documented. The calculations of SY should be presented so the reader understands the exact methodology used to obtain the values presented in the GSP. There was some additional information on the methodology presented at the August 21/22 workshops, but this information is still insufficient. The calculations used to arrive at the SY values presented in the report should be shown in the GSP, especially given the values in the GSP are new and have not been reviewed at TAG.

5. The uncertainty analysis approach used in the GSP is not the conventional approach used in the groundwater community. The uncertainty analysis presented in the GSPs are at best gross approximations, what may change significantly using more conventional approaches. The UWCD and CMWD models peer review reports provided by Dudek as appendices in the GSPs present "uncertainty analysis" of potential SYs based on Global Sensitivity Analysis (GSA). The GSA approach limits the analysis to small sets of parameters and does not maintain calibration of the groundwater flow models in assessing uncertainty of model parameters to model outputs, which leads to serious questions of the validity of the uncertainty bounds presented (both in the peer review reports and GSPs). Use of GSA in the groundwater models peer review is a significant departure from the scope of work approved by the FCGMA Board. The peer review scope of work called for uncertainty analysis based on the following process described by USGS in ***Approaches to Highly Parameterized Inversion: A Guide to Using PEST for Model-Parameter and Predictive Uncertainty Analysis***, by John Doherty, Randall J. Hunt, and Matthew J. Tonkin, 2010. Use of GSA is not a conventional approach being used as an industry standard for uncertainty analysis in surface water and groundwater studies. GSA has been introduced relatively recently as a means to assess relative importance of parameters in groundwater modeling (see for example, ***Approaches in Highly Parameterized Inversion: PEST++ Version 3, A Parameter ESTimation and Uncertainty Analysis Software Suite Optimized for Large***

Environmental Models *by* David E. Welter, Jeremy T. White, Randall J. Hunt, and John E. Doherty, 2015.*)*. GSA is not the industry standard being used to assess uncertainty and as such has not undergone extensive scrutiny and peer review by groundwater professionals. Review of popular modeling software platforms such as GMS, Groundwater Vistas, and Visual MODFLOW typically integrate the PEST suite of programs for model calibration and uncertainty analysis. The USGS has focused their efforts on uncertainty analysis through the use of and further development of the PEST suite of programs in cooperation with Dr. John Doherty. It is recommended that the approach used by the USGS, as in the original scope of work, be considered in further assessing uncertainty. In addition, these approaches can be used to assess the worth of data of future monitoring programs to focus expensive data collection programs (such as installation of new groundwater monitoring wells).

6. Use of groundwater level thresholds as surrogates for water quality and land subsidence is not supported. There is no analysis showing how proposed groundwater level thresholds will not result in undesirable results in water quality or subsidence. The use of groundwater levels as surrogate threshold levels for various sustainability indicators is not supported in any substantial manner. Specifically, historical low groundwater levels are stated as minimum thresholds protective of degraded water quality and land subsidence. In order to use surrogates, such groundwater levels, for these sustainability indicators, there needs to be a demonstration that there is a direct relation between the sustainability indicator and the surrogate indicator, i.e., groundwater levels that will protect against an undesirable result. Presently, there is no analysis presented in the GSPs to support the selection of the surrogate indicator and its relation to the sustainability indicator to demonstrate that the minimum threshold will not be exceeded if groundwater levels are maintained above historical low levels. For example, subsidence is a slow process where consolidation of fine-grained sediments occurs in response to a decrease in groundwater levels. Subsidence may be initiated upon a drop in groundwater levels below a specific threshold value, where consolidation of fine-grained sediments is initiated, but may not go to completion (i.e., full potential subsidence) as groundwater levels recover. So, additional consolidation may be reinitiated as a groundwater levels decline below threshold levels. There has been no analysis of the potential subsidence under varying groundwater level declines except references to previous USGS analysis of subsidence in the basins. Given the observations of subsidence, including those of the USGS, Farr (2017) and UNAVCO's monitoring stations (especially Station P729 in the West Las Posas Basin), these issues need to be further explored for all the basins.

7. The bases for defining Basin-wide Undesirable results appear to be somewhat arbitrary. The basis for claiming that a certain number of wells, or timing sequences, exceeding local minimum thresholds will create a basin-wide undesirable result is not supported by any analysis or demonstrations. Such analysis and demonstration should be provided and reviewed by stakeholders to support the recommendations.

8. There needs to be clear objectives stated for proposed monitoring program and a more rigorous analysis of the cost-benefits of each monitoring element. There should be, a) clearer explanations of data being collected to address data gaps and, b) data collected to assess progress of sustainability attainment. Future monitoring will add hundreds of thousands of

dollars to GSP implementation and new monitoring features, such as monitoring wells, potentially will cost millions of dollars, so the monitoring program should be optimized to avoid collection of data of limited value. Optimization techniques as described in the USGS report identified in General Comment No. 5 above should be considered for use in evaluating data worth.

SPECIFIC COMMENTS

Specific comments are not provided due to the limitations of time given for review of the three extensive draft GSP documents. However, many of the issues identified in the draft PVB and OxB GSP are issues in this GSP, which have been folded into the General Comments on this GSP.