APPENDIX A

GSA Formation Documentation

APPENDIX A-1

FCGMA NOI to Become a GSA

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/.

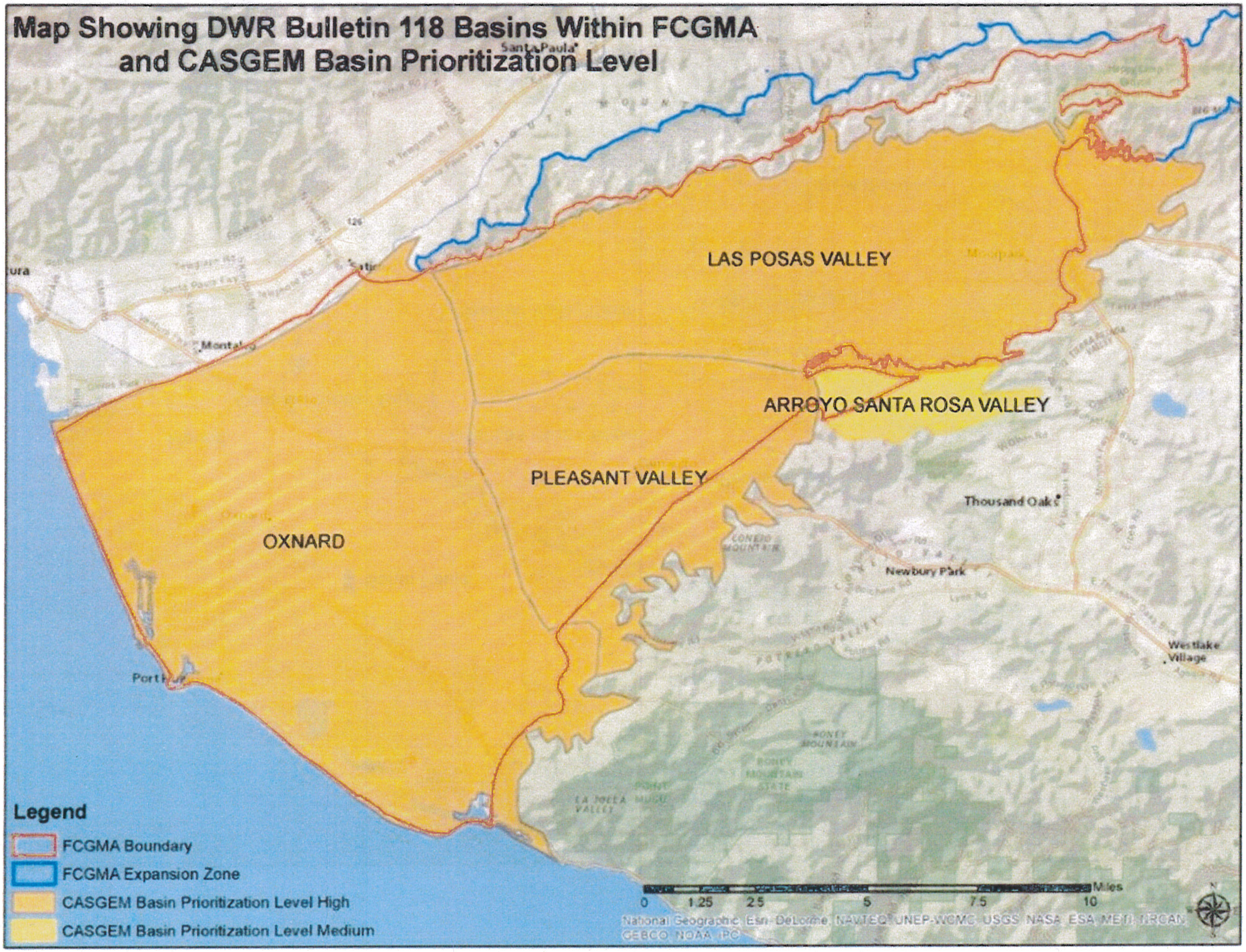
Should you require additional information or a clarification of this Notice of Intent, please contact me at (805) 654-2073.

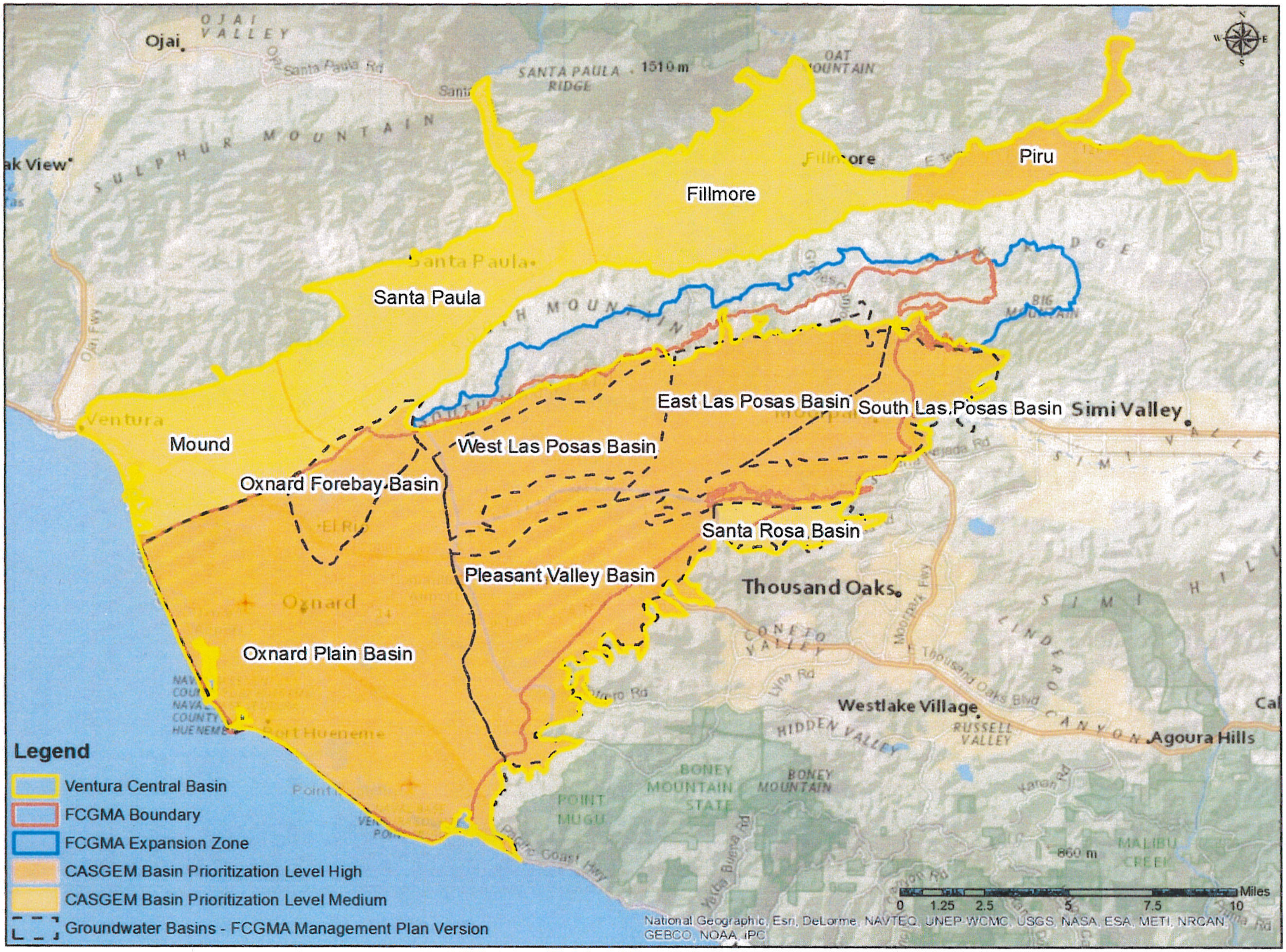
Sincerely,

Jeff Pratt, 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
Santa Paula
LAS POSAS VALLEY
ARROYO SANTA ROSA VALLEY
PLEASANT VALLEY
OXNARD
Thousand Oaks
Newbury Park
Westlake Village
Port Hue
Legend
FCGMA Boundary
FCGMA Expansion Zone
CASGEM Basin Prioritization Level High
CASGEM Basin Prioritization Level Medium
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



Piru
Fillmore
Santa Paula
Mound
East Las Posas Basin
South Las Posas Basin
West Las Posas Basin
Oxnard Forebay Basin
Santa Rosa Basin
Pleasant Valley Basin
Oxnard Plain Basin
Ojai
Fillmore
Santa Paula
Ventura
Oxnard
Port Hueneme
Simi Valley
Thousand Oaks
Westlake Village
Agoura Hills
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
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

APPENDIX A-2

County of Ventura Resolution No. 17-088 re: GSA Formation

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: ______________________
Deputy Clerk of the Board

APPENDIX A-3

Camrosa Water District Resolution No. 17-11 re: GSA Formation

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

Allocation System Ordinance

AN ORDINANCE TO ESTABLISH AN ALLOCATION SYSTEM FOR THE OXNARD AND PLEASANT VALLEY GROUNDWATER BASINS

ARTICLE 1. FINDINGS

1.1. The Pleasant Valley Groundwater Basin and Oxnard Groundwater Subbasin (collectively, "the Basins") are located within Fox Canyon Groundwater Management Agency ("Agency") and have been designated by the California Department of Water Resources as high priority groundwater basins that are subject to critical conditions of overdraft.

1.2. The Agency is required under the Sustainable Groundwater Management Act ("SGMA") to manage the Basins under a groundwater sustainability plan by January 31, 2020.

1.3. The groundwater sustainability plan must include an estimate of the sustainable yield for the Basins.

1.4. Based on current projections, the sustainable yield of the Basins will be less than recent average annual groundwater extractions from the Basins.

1.5. The 10-year period prior to January 1, 2015, the date SGMA became effective, includes a complete climate cycle and is representative of annual average precipitation, groundwater extractions from the Basins and deliveries of surface water from the Santa Clara River through United Water Conservation District's Pleasant Valley Pipeline and Pumping Trough Pipeline in lieu of groundwater extractions from the Basins. During the 10-year period, these in lieu deliveries averaged 15,600 acre-feet annually and consisted of surface water that otherwise would have been used for groundwater recharge.

1.6. During the 10-year period prior to January 1, 2015, the Conejo Creek Project supplied an average of 4,978 acre-feet of surface water annually to Pleasant Valley County Water District for agricultural use which otherwise could have been supplied by pumping groundwater from the Basins. During that period, there was a corresponding decrease in groundwater use within Pleasant Valley's service area.

1.7. The adoption of this ordinance is a necessary step in the transition from the Agency's current groundwater management programs to sustainable groundwater management under SGMA. As part of that transition, the Agency intends to move from a wellhead-based to a land-based allocation system; however, implementation of that change is not feasible until such time as the Agency has developed sufficient parcel-based water-use data to allow for effective regulation of extractions on that basis.

1.8. The measures set forth in this ordinance are necessary to improve and protect the quantity and quality of groundwater supplies within the Basins.

1.9. This ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to Water Code section 10728.6 and CEQA Guidelines sections 15061(b)(3), 15307 and 15308.

1.10. The extraction allocations established under this ordinance are consistent with the land use elements of the applicable general plans to the extent that there is sufficient sustainable yield in the Basins to serve the land use designations therein.

ARTICLE 2. PURPOSE

The purpose of this ordinance is to facilitate adoption and implementation of the groundwater sustainability plan and to ensure that the Basins are operated within their sustainable yields. It is not the purpose of this ordinance to determine or alter water right entitlements, including those which may be asserted pursuant to California Water Code sections 1005.1, 1005.2 or 1005.4.

ARTICLE 3. PERIODIC REVIEW PROCEDURE

The Board will periodically review the effectiveness of this ordinance toward meeting its purpose. This review shall occur at least once every five years. If necessary, this ordinance will be amended to ensure that the sustainability goals of the groundwater sustainability plans are met.

ARTICLE 4. DEFINITIONS

4.1 "Agency" shall mean the Fox Canyon Groundwater Management Agency.

4.2 "Agricultural Operator" shall mean an owner or operator of an extraction facility used to produce groundwater for use on lands in the production of plant crops or livestock for market and uses incidental thereto.

4.3 "Assessor's Parcel Map" shall mean an official map designating parcels by Assessor's Parcel Number.

4.4 "Assessor's Parcel Number" shall mean the number assigned to a parcel by the County of Ventura for purposes of identification.

4.5 "Base Period" shall mean calendar years 2005 through 2014.

4.6 "Base-Period Conejo Creek Deliveries" shall mean the average annual amount of Conejo Creek Water Deliveries during the base period.

4.7 "Base-Period Extraction" shall mean the average annual groundwater extraction based on reported extractions during the base period, excluding any extractions that incurred surcharges.

4.8 "Base-Period PTP Deliveries" shall mean the average annual amount of PTP deliveries during the base period as reported to the Agency by United.

4.9 "Base-Period PV Deliveries" shall mean the average annual amount of PV deliveries during the base period as reported to the Agency by United.

4.10 "Basins" shall mean the Pleasant Valley Groundwater Basin and the Oxnard Groundwater Subbasin.

4.11 "Board" shall mean the Board of Directors of the Agency.

4.12 "Conejo Creek Project" shall mean the Conejo Creek Diversion structure and appurtenances owned and operated by Camrosa Water District through which recycled water discharged from the Hill Canyon Wastewater Treatment Plant is diverted from Conejo Creek for delivery to Camrosa Water District and Pleasant Valley.

4.13 "Conejo Creek Water Deliveries" shall mean deliveries of water to Pleasant Valley from the Conejo Creek Project.

4.14 "Executive Officer" shall mean the individual appointed by the Board to administer Agency functions or his/her designee.

4.15 "Extraction Allocation" shall mean the amount of groundwater that may be obtained from an extraction facility during a given water year before a surcharge is imposed.

4.16 "Extraction Facility" shall mean any device or method (e.g. water well) for extraction of groundwater within the Basin.

4.17 "Groundwater Sustainability Plan" shall mean the plan or plans, and any amendment thereof, developed and adopted by the Agency for the Basins in accordance with SGMA.

4.18 "Management Area" shall mean an area within the Basins for which the groundwater sustainability plan may identify different minimum thresholds, measurable objectives, monitoring or projects and management actions in accordance with regulations adopted pursuant to chapter 10 of SGMA.

4.19 "Municipal and Industrial Operator" shall mean an owner or operator that supplied groundwater for domestic, industrial, commercial or other non-agricultural use.

4.20 "Municipal and Industrial (M&I) Use" shall mean any use other than agricultural irrigation.

4.21 "Mutual Water Company" shall mean a corporation organized for, or engaged in the business of, selling, distributing, supplying, or delivering water to its stockholders and members at cost for irrigation purposes or for M&I use.

4.22 "O-H Pipeline" means the water distribution system operated by United that supplies groundwater to contractors under the O-H Pipeline Agreement.

4.23 "O-H Pipeline Agreement" means the Water Supply Agreement for Delivery of Water Through the Oxnard/Hueneme Pipeline dated July 1, 1996, and any amendment thereto.

4.24 "Operator" shall mean a person operating an extraction facility. The owner of an extraction facility shall be conclusively presumed to be the operator unless a satisfactory showing is made to the Agency that the extraction facility actually is operated by some other person.

4.25 "Owner" shall mean a person owning an extraction facility or an interest in an extraction facility other than a lien to secure the payment of a debt or other obligation and shall include any mutual water company and incorporated ownership.

4.26 "Parcel" shall mean a lot or parcel shown on an Assessor's Parcel Map with an assigned Assessor's Parcel Number.

4.27 "Person" shall mean any state or local governmental agency, private corporation, firm, partnership, individual, group of individuals, or, to the extent authorized by law, any federal agency.

4.28 "Pleasant Valley" shall mean Pleasant Valley County Water District.

4.29 "Pleasant Valley's Service Area" shall mean all lands shown on the map of the boundaries of Pleasant Valley on file with the Ventura Local Agency Formation Commission.

4.30 "PTP Deliveries" shall mean deliveries of surface water from the Santa Clara River through United's Pumping Trough Pipeline.

4.31 "PV Deliveries" shall mean deliveries of surface water from the Santa Clara River through United's Pleasant Valley Pipeline.

4.32 "Sustainable Groundwater Management Act" or "SGMA" shall mean Part 2.74 of Division 6 of the California Water Code, sections 10720 et seq.

4.33 "Sustainable Yield" shall mean the maximum quantity of water that can be withdrawn annually from the Basins as provided in the groundwater sustainability plan.

4.34 "United" shall mean United Water Conservation District.

4.35 "Water Market" shall mean a program which, by ordinance, allows the transfer of extraction allocations through a market administered by or on behalf of the Agency.

4.36 "Water Purveyor" shall mean a mutual water company, special district, or municipality that supplies groundwater to others for agricultural or municipal and industrial use.

4.37 "Water Year" shall mean the period from October 1 of one calendar year through September 30 of the following calendar year.

ARTICLE 5. GENERAL PROVISIONS

5.1 Notwithstanding any other Agency ordinance provision to the contrary, including article 2 of Emergency Ordinance E, the Executive Officer shall establish an operator's extraction allocation for each extraction facility located within the Basins as set forth herein. The alternative extraction allocations authorized under section 5.6 of the Agency Ordinance Code shall not be available to an operator for extracting groundwater from the Basins. Except as expressly provided herein, the provisions governing extraction allocations set forth in section 5.2 of the Agency Ordinance Code shall apply to groundwater extractions from the Basins.

5.2 Except as provided in section 5.5, an extraction allocation established under this ordinance is assigned to an extraction facility. An operator with more than one extraction facility in the same groundwater basin may combine the extraction allocations for the individual facilities. If the groundwater sustainability plan creates one or more management areas within the Basins, the Board may limit the ability to combine extraction allocations assigned to extraction facilities in different management areas. Limitations on combining extraction facilities in different management areas shall be set forth in a Resolution adopted by the Board based on a determination that the limitation is necessary in order to implement the groundwater sustainability plan.

5.3 All extractions in excess of an allocation established by this ordinance shall be subject to extraction surcharges in the same manner as provided in the Agency Ordinance Code for extractions that exceed the historical and/or baseline allocation.

5.4 Extraction allocations may be transferred or temporarily assigned only as provided in article 9 of this ordinance.

5.5 The extraction allocation assigned to extraction facilities operated by United to supply water through the O-H Pipeline is "held in trust [by United] for Any or All Contractors" as a "Suballocation" as those terms are defined in the O-H Pipeline Agreement. Upon termination of or withdrawal of any party from the O-H Pipeline Agreement, the distribution of the extraction allocation assigned to the O-H Pipeline extraction facilities shall be decided by mutual agreement of United and the affected parties or as determined by a court. Notwithstanding any such agreement or court determination or the O-H Pipeline Agreement, the extraction allocation assigned to the O-H Pipeline extraction facilities shall be subject to all applicable Agency rules and regulations for the use and adjustment of extraction allocations, including chapter 5 of the Agency Ordinance Code, and to any allocation reductions implemented in accordance with article 10 of this ordinance.

5.6 In the event of a local, State, or Federal declaration of emergency with the potential to affect water supplies within the Agency, at the next scheduled meeting, the Board will consider whether to allow an operator to request an adjustment of the extraction allocation as a result of the emergency. The information required in support of the request will be set forth in a Resolution adopted by the Board.

ARTICLE 6. INITIAL ALLOCATIONS

6.1 Until such time as the reductions described in article 10 are implemented and except as otherwise provided in this article, an operator's extraction allocation shall be the base-period extraction as reported to the Agency pursuant to chapter 2 of the Agency Ordinance Code. The extraction allocation established under this section is called "base-period allocation."

6.1.1 In recognition of the use of surface water from the Conejo Creek Project and the corresponding reduction in total agricultural extractions within Pleasant Valley's service area during the base period, Pleasant Valley's base-period allocation shall be increased in an amount equal to base-period Conejo Creek water deliveries, subject to the adjustment described in subsection 6.1.1.1.

6.1.1.1 Pleasant Valley shall include in the Semi-Annual Extraction Statement required under section 2.3 of the Agency Ordinance Code a report on the use of Conejo Creek water during the reporting year. In each year in which Pleasant Valley receives Conejo Creek water deliveries, its base-period allocation for that year shall be reduced in an amount equal to the Conejo Creek water deliveries during the year.

6.1.1.2 The Board may transfer a portion of the allocation established under subsection 6.1.1 from Pleasant Valley to an operator of an extraction facility located within Pleasant Valley's service area upon a showing that the operator reduced extractions during the base period as a result of taking deliveries from Pleasant Valley. The transfer will avoid a windfall allocation that may otherwise result under subsection 6.1.1 of this ordinance and shall be subject to the procedures set forth in subsection 5.3.9 of the Agency Ordinance Code.

6.2 In order to encourage the coordinated use of groundwater from the Basins and surface water supplies from the Santa Clara River while eliminating overdraft and maintaining the sustainability goals established under SGMA, Pleasant Valley and United may increase groundwater use in years when these surface water supplies are less than normal, provided that a corresponding reduction in extractions occurs in years when surface water supplies from the Santa Clara River are more abundant. The coordinated use of these water supplies shall be implemented through adjustments to the extraction allocation as provided in this section. This extraction allocation flexibility is called "Santa Clara River Water Flex Allocation."

6.2.1 Santa Clara River Water Flex Allocation

6.2.1.1 In any year in which the volume of surface water available for PV deliveries is less than base-period PV deliveries, Pleasant Valley's base-period allocation for that year shall be increased in an amount equal to the shortfall in available PV deliveries. The extraction allocation available under this subsection shall be subject to any allocation reductions implemented in accordance with article 10 of this ordinance.

6.2.1.2 In any year in which the volume of surface water available for PV deliveries exceeds base-period PV deliveries, Pleasant Valley's base-period allocation for that year shall be reduced by the amount of excess available PV deliveries. In order to provide a minimum extraction allocation during periods when PV deliveries are not available, Pleasant Valley's allocation shall not be reduced below 50 percent of Pleasant Valley's base-period extraction. The minimum extraction allocation available under this subsection shall not be eligible for carryover under article 8 of this ordinance.

6.2.1.3 Surface water shall be deemed available for PV deliveries as demonstrated in an annual report to be submitted by United pursuant to subsection 6.2.1.8. In any year in which Pleasant Valley does not make full use of the surface water available for PV deliveries, Pleasant Valley's base-period allocation for that year shall be reduced by the amount of available surface water not taken by Pleasant Valley.

6.2.1.4 In any year in which the volume of surface water available for PTP deliveries is less than base-period PTP deliveries, United's base-period allocation for that year shall be increased in an amount equal to the shortfall in available PTP deliveries. The extraction allocation available under this subsection shall be subject to any allocation reductions implemented in accordance with article 10 of this ordinance.

6.2.1.5 In any year in which the volume of surface water available for PTP deliveries exceeds base-period PTP deliveries, United's base-period allocation for that year shall be reduced by the amount of excess available PTP deliveries. In order to provide a minimum extraction allocation during periods when PTP deliveries are not available, United's allocation shall not be reduced below 50 percent of United's base-period extraction. The minimum extraction allocation available under this subsection shall not be eligible for carryover under article 8 of this ordinance.

6.2.1.6 Surface water shall be deemed available for PTP deliveries as demonstrated in an annual report to be submitted by United pursuant to subsection 6.2.1.8. In any year in which United does not make full use of the surface water available for PTP deliveries, United's base-period allocation for that year shall be reduced by the amount of available surface water not used by United.

6.2.1.7 To provide Pleasant Valley and United with the operational flexibility to respond to annual variations in the availability of Santa Clara River water, any surcharge for excess extractions that would otherwise be assessed annually shall be determined at the end of each five-year period following the operative date of this ordinance. Surcharges for any excess extractions shall be assessed as provided in sections 6.3 and 6.4.

6.2.1.8 United shall submit an annual report on its diversion of Santa Clara River water during the preceding water year. The report shall state the total volume of river diversions, the total volume of surface water made available for PTP deliveries and PV deliveries and the total volume put to other uses. The report shall state these volumes in acre-feet, supported by meter readings, and include such other information determined by the Executive Officer to be reasonably necessary to carry out the intent of this article.

6.2.2 Pleasant Valley and United shall include in the Semi-Annual Extraction Statement required under section 2.3 of the Agency Ordinance Code a report on the use of Santa Clara River water and the resulting Santa Clara River Water Flex Allocation for the reporting year.

6.3 Pleasant Valley shall be subject to surcharges on extractions in excess of cumulative base-period allocations, as adjusted in accordance with this article, during the preceding five-year period. If excess extractions occur, Pleasant Valley shall be deemed to have exceeded the extraction allocation in each of the preceding five years. A surcharge assessed under this section shall be due and payable within 30 days of issuance of a notice of imposition of surcharges.

6.4 United shall be subject to surcharges on extractions in excess of cumulative base-period allocations, as adjusted in accordance with this article, during the preceding five-year period. If excess extractions occur, United shall be deemed to have exceeded the extraction allocation in each of the preceding five years. A surcharge assessed under this section shall be due and payable within 30 days of issuance of a notice of imposition ofsurcharges.

ARTICLE 7. ADDITIONAL REQUIREMENTS FOR REPORTING EXTRACTIONS

In order to facilitate a transition from a wellhead-based to a land-based allocation system, operators in the Basins shall comply with the following reporting requirements in addition to those specified in the Agency Ordinance Code.

7.1 Agricultural operators not subject to section 7.2 shall report thefollowing:

7.1.1 Each assessor's parcel number being supplied with groundwater produced by the operator's extraction facility;

7.1.2 The number of irrigated acres within each parcel; and

7.1.3 The source of all water used to irrigate those lands.

7.2 Mutual water companies, special districts and municipalities supplying groundwater or in lieu deliveries for agricultural use shall report the following:

7.2.1 Total volume of water from each source being supplied by the mutual water company, special district, or municipality;

7.2.2 Location and identifier of each agricultural turnout and meter owned by the mutual water company, special district, or municipality;

7.2.3 Monthly water deliveries to and meter readings from each agriculturalturnout;

7.2.4 List of assessor's parcel numbers served by each agricultural turnout and meter; and

7.2.5 Customer name associated with each parcel.

7.3 Mutual water companies, special districts and municipalities supplying groundwater or in lieu deliveries for municipal and industrial use shall report the following:

7.3.1 Total volume of water from each source being supplied by the mutual water company, special district, or municipality;

7.3.2 Monthly water deliveries for all water being supplied by the mutual water company, special district, or municipality; and

7.3.3 List of assessor's parcel numbers (or a GIS shape file) served by the mutual water company, special district, or municipality.

7.4 Domestic and municipal and industrial well operators shall report the following:

7.4.1 Each assessor's parcel number being supplied with groundwater produced by the operator's extraction facility.

ARTICLE 8. ALLOCATION CARRYOVER

Except as otherwise provided and subject to the provisions of this article, an unused extraction allocation may be carried over for use in a subsequent water year. A maximum of fifty percent of an extraction allocation shall be available for carry over. The first water extracted during any year shall be deemed to be an exercise of the carryover authorized by this article. The cumulative allocation carryover shall not exceed one hundred percent of an extraction allocation. An unused carryover extraction allocation is not transferable between operators, except in an Agency-approved water market, and shall expire five (5) years after it was accrued. Annual allocation carryover for extraction facilities combined under a single operator in accordance with section 5.2 shall be evenly divided among the combined extraction facilities. The Board may limit the use of carry over allocations consistent with the provisions of the groundwater sustainability plan, provided that any such limitation shall be imposed on all operators on an equal basis.

ARTICLE 9. ALLOCATION TRANSFERS

9.1 Allocation transfers may be necessary to provide flexibility during and after the transition from the Agency's current groundwater management program to sustainable groundwater management under SGMA. Notwithstanding section 5.3 of the Agency Ordinance Code, transfers of allocation established under this ordinance shall comply with the provisions of this article or be allowed under an Agency-approved water market.

9.2 Upon adoption of the groundwater sustainability plan, and except as otherwise provided, transfers or temporary assignments of an extraction allocation are authorized provided the Agency finds that it does not impede achievement of the sustainability goals of the groundwater sustainability plan and would not be detrimental to an Agency-approved water market. In making this determination, the Agency shall, at a minimum, consider the location of the extraction facilities, the total quantity of groundwater extracted in any year, groundwater quality impacts of the transfer and whether the proposed transfer or temporary assignment could be approved under an Agency-approved water market. Requests for the transfer or temporary assignment of extraction allocations shall be submitted jointly by the operators and owners involved and shall include the specific details of their proposal. To ensure consistency with the sustainability goals of the groundwater sustainability plan, transfers or temporary assignments of an extraction allocation shall be subject to conditions as determined by the Executive Officer. A temporary assignment of allocation shall not exceed one year.

9.3 Where there is a sale or transfer of a part of the acreage served by any extraction facility, the extraction allocation for that facility shall be equitably apportioned between the real property retained and the real property transferred by the owner of the extraction facility. This apportionment shall be approved by the Executive Officer who may modify the apportionment to assure equity.

9.4 When irrigated acreage changes to M&I use, the extraction allocation used to irrigate the acreage shall be transferred from the agricultural operator to the M&I operator on a one-to-one basis.

9.5 Transfers or temporary assignments of allocations between extraction facilities located within the same groundwater basin shall be considered for approval by the Executive Officer. All other requests for transfers or temporary assignments shall be submitted to the Board for approval.

ARTICLE 10. REDUCTION OF ALLOCATIONS

10.1 If the sustainable yield is less than the total extraction allocations established in article 6, then extraction allocations, adjusted or otherwise, shall be reduced according to a schedule and method to be determined by the Board following adoption of the groundwater sustainability plan. An operator's use of surface water in lieu of groundwater after the effective date of this ordinance shall not subject that operator to a greater allocation reduction than is imposed on other operators.

10.2 It is the intent of the Board to establish a minimum allocation for agricultural operators based on the sustainable yield and to exempt minimum allocations from the reductions contemplated in section 10.1 until such time as the Board determines that a reduction of the minimum allocation is necessary in order to facilitate implementation of the groundwater sustainability plan.

ARTICLE 11. VARIANCES

The Executive Officer may, on written request from a land owner or operator, grant a variance from the requirements of this ordinance based on the standards set forth in this article.

11.1 Variance Purpose and Standards - The sole purpose of any variance shall be to enable an owner or operator to make reasonable use of groundwater in the same manner as other users of groundwater in the Basins. Before any variance may be granted, the owner or operator must establish and the Agency must determine that all of the following standards are met:

11.1.1 That there are special circumstances or exceptional characteristics applicable to the owner or operator which do not apply generally to comparable owners or operators in the Basins; and

11.1.2 That granting a variance will not confer a special privilege inconsistent with the limitations upon other owners and operators in the Basins; and

11.1.3 That denial of a variance will result in practical difficulties or unnecessary hardships inconsistent with the general purpose of this ordinance; and

11.1.4 That the granting of a variance will not be inconsistent with the groundwater sustainability plan or the provisions of SGMA or with other regulations or ordinances of the Agency or detrimental to the Agency's ability to improve and protect the quantity or quality of groundwater supplies within the Basins; and

11.1.5 That the granting of a variance will not substantially impede the Agency's ability to achieve sustainable groundwater management or the actual sustainability of groundwater in the Basins.

11.2 Burden of Proof – A person seeking a variance shall have the burden of proving to the satisfaction of the Executive Officer that the above standards can be met.

11.3 The Agency may recognize and consider other mitigating factors demonstrated or proposed by the applicant. The Agency at its discretion may include and impose those or other factors as conditions of granting the variance request.

11.4 The Executive Officer may consider any prior requests, permits, other Agency decisions, or enforcement actions associated with the owner or operator.

11.5 Any new or increased extraction allocation granted by the Agency pursuant to a variance request may not be transferred without prior Agency approval.

11.6 Variance Procedures – All requests for a variance shall be filed in writing with the Agency.

11.7 Application Period – For the water year beginning October 1, 2020, variances may be applied for by June 30, 2010. For all subsequent water years, variances may be applied for by June 30 for use in the following the water year.

11.8 Review Period – The Executive Officer shall make reasonable efforts to render a decision on all applications within 90 days from the date the variance is requested. The Executive Officer's decision shall be in writing and include the findings made relative to the standards set forth in section 11.1.

11.9 Appeals – The Executive Officer's decision under this article is appealable in accordance with chapter 6.0 of the Agency Ordinance Code.

ARTICLE 12. CONFLICTS

Should any conflicts occur between the provisions of this ordinance and any other duly enacted Agency code or ordinance, the provisions of this ordinance shall govern.

ARTICLE 13. SEVERABILITY

Should any provision, section, subsection, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, subsections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

ARTICLE 14. EFFECTIVE DATE; OPERATIVE DATE

This ordinance shall take effect on the thirty-first day after adoption and become fully operative on October 1, 2020.

PASSED AND ADOPTED this 23rd day of October, 2019, by the following vote:

AYES: 5

NOES: Ø

ABSENT: Ø

Chair, Board of
Directors Fox Canyon
Groundwater
Management Agency

ATTEST:

By: Jamie Malo
Clerk of the Board

APPENDIX A-5

Public Draft GSP Comments

FCGMA Draft Groundwater Sustainability Plan Comments

September 2019

Pleasant Valley Basin

Commenter			Chapter	Section	Subsection	Comment
Mary	Ngo	CDFW	2 - Basin Setting	2.1-Introduction to Basin Setting	N/A	Please see attached comment Letter.
Dan	Detmer	UWCD	5 - Project Management Actions	5.1-Introduction to Projects and Management Actions	N/A	Section 5.1 This section describes just one “water-supply” project (fallowing of farmland) for the Pleasant Valley Basin and one management action (reduced pumping). The existence of additional water-supply and optimization (conjunctive use) projects proposed by United and others last year when requested by the FCGMA should also be mentioned. Some of these projects are anticipated to boost water supplies or sustainable yield for both the Oxnard Subbasin and Pleasant Valley Basin, and could make up much, if not all, of the shortfall indicated by the Draft GSP. We feel it’s important that the Draft GSP at least mention these new water-supply and optimization projects, even if they couldn’t be modeled with the available information, as they could add to our region’s water portfolio prior to 2040. Stakeholders and the public should have at least basic information about these projects so they can make appropriate decisions about when to commence any future rampdown in groundwater allocations (if rampdowns are truly needed). An excessive or premature rampdown could affect business and municipal planning decisions and have significant financial, social, and environmental impacts in the Pleasant Valley Basin. 5.3.7 p 5-7 Disappointing that the consultants didn’t coordinate more with the board so the draft GSP would look more like a plan.
Dan	Detme	UWCD	4 - Monitoring Networks	4.1-Monitoring Network Objectives	N/A	Sec 4.5 p 4-12 United relies on other indications of recent pumping besides just warm pump motors, wet conditions in fields and near the well. Table 4-3. Screened aquifer zone and aquifer system determined how? UWCD aquifer picks?
Dan	Detmer	UWCD	3 - Sustainable Management Criteria	3.1-Introduction to Sustainable Management Criteria	N/A	Sec 3.3.4.1 p 3-9 Incorrect to say no causal effect has been established between high chloride and TDS in the PVPDMA. The USGS and Izbicki references you cite say otherwise. Groundwater overdraft causes the upwelling of brines and compactions of clays, both of with can contribute poor-quality water to wells. Sec 3.4 p 3-16 GSP should specify the WLE restrictions associated with operation of the NPV desalter and offer discussion as to whether they are compatible with the MTs and MOs put forth in this document. Sec 3.4.4 p 3-18 How can you say maintaining higher water levels will help mitigate upwelling of brines but you are unwilling to say upwelling of brines is caused by groundwater overdraft? Why do you expect to gain an improved understanding of this issue without proposing specific monitoring to investigate the issue? Section 3.5.1 The interim milestones described in this section indicate that the FCGMA will define success of GSP implementation by achieving a linear, 25% increase in groundwater elevations in the Pleasant Valley Basin from 2020 to 2025, and over each subsequent 5-year period. However, Section 4 of the Draft GSP recommends collection of additional data during the next 5 years (2020 to 2025) to improve monitoring of groundwater elevations in specific aquifers and areas. In addition, Section 5 of the Draft GSP recommends “that FCGMA will evaluate, model, and conduct feasibility studies of other projects for achieving sustainable groundwater management for the 5-year update to this Draft GSP to optimize basin management and minimize extraction restrictions” (presumably referring to a 2025 update of the GSP). We agree that both collection of additional groundwater data and further evaluation of potential projects are the most critical sustainability planning activities that the FCGMA and other stakeholders should be focused on for the next 5 years. Considering that the Draft GSP indicates the FCGMA will spend the next 5 years improving the monitoring network and evaluating feasibility of new and existing projects, it seems counterproductive to set target groundwater elevations for 2025 that are almost certainly not going to be achieved (rising 25% toward the 2040 sustainable target levels), without a clear, explicit description of what actions will be taken during those 5 years to achieve that target. At present, the Draft GSP includes just one “water-supply” project—fallowing, which doesn’t produce any new water—and one management action (“Reduction in Groundwater Production”) that could potentially be implemented by FCGMA. However, the Draft GSP notes in Section 5.3.7 that “Because of the existing uncertainty associated with future conditions in the Subbasin, a plan for exact reductions and groundwater elevation triggers for those reductions has not been developed as part of this Draft GSP. Instead, FCGMA will work to develop this plan over next (sic) 20 years, as the level of uncertainty is reduced.” We recommend that the FCGMA work with stakeholders to select a more realistic interim milestone for 2025, with the expectation that subsequent interim milestones may require a “steeper path” to achieve the sustainability goals by 2040. Figure 3-9 Figure should include language that linear interpolation of path to sustainability is not necessarily the path being proposed by the plan.

Commenter			Chapter	Section	Subsection	Comment
Dan	Detmer	UWCD	2 - Basin Setting	2.1-Introduction to Basin Setting	N/A	Sec 2.1 p 2-1 Why is semi-perched aquifer described as being deposited by SCR when previous paragraph states aquifers of the UAS in PVB deposited by Calleguas Creek? Sec 2.2 p2-2 Should mention United's conceptual model for the PV basin along with others. Numerical modelling in this GSP is based on United's conceptual model and not that of Bachman Hanson or Turner, even though they are generally comparable. Sec 2.2.3 p 2-7 Should cite United's mapping of base of GCA in addition to Turner. Sec 2.3.7 p 2-26 Be careful with how you characterize TNC mapping of "potential GDEs." TNC relied on state-wide mapping of riparian vegetation by various agencies. Original mapping never characterized areas of riparian veg as potential GDEs. Sec 2.3.8 p 2-27 Need more context for the discussion of potential recharge areas in PVB. Many of the more permeable soils overlie confined aquifers, leading one to question the benefit of recharging more water to the semi-perched aquifer in these areas. Sec 2.4.3.4 p 2-41 Be aware that earlier estimated of sustainable yield in PVB did not rely on the DWR basin boundaries. United and Ventura County traditionally mapped the OP-PV near the Revolon channel which resulted in a larger PV basin than with the current DWR boundaries. Sec 2.4.4 p 2-43 Typo referencing OP and not PV (tile drains). Sec 2.4.5.1 p 2-45 Should describe pumping associated with the planned NPV desalter. This could be considered with the new projects as that pumping did not exist in the baseline period. Camarillo is expected to pump 4500 AF/Y in addition to their existing allocation for the next 20 years? Section 2.4.5.9 The first sentence of this section states "The sustainable yield for PVB was assessed by examining the modeled flux of seawater into the UWCD future water scenarios over the 30-year sustaining period predicted for the UWCD model for the Oxnard Subbasin, the PVB, and the WLPMA." It should be noted that the Draft GSP for the Oxnard Subbasin correctly notes that seawater intrusion has largely been halted in most areas within the Upper Aquifer System (UAS) of the Oxnard Subbasin (except during extreme droughts), despite a slow continuous advance of the seawater intrusion front in the Lower Aquifer System (LAS). As also noted in the Draft GSP for the Oxnard Subbasin, the most challenging long-term sustainability issue that needs to be mitigated in the Oxnard subbasin is seawater intrusion in the LAS, which, due to different aquifer properties, occurs at a much slower pace than in the UAS. The groundwater flow paths depicted on Figures 2-63 through 2-68 of the Oxnard Subbasin GSP show few additional water-supply wells being impacted by seawater intrusion during the next 5 to 10 years, regardless of whether groundwater production continues "as-is" or is ramped-down starting in 2020. Furthermore, the difference in the estimated seawater intrusion fronts 5 years from now for "as is" versus "reduced pumping" scenarios are almost indistinguishable. Therefore, although mitigating seawater intrusion is the long-term driver for achieving groundwater sustainability in the Pleasant Valley Basin, the Oxnard Subbasin, and the West Las Posas basin, it does not appear that implementing pumping reductions immediately will provide a significant benefit to the aquifers while data gaps are filled and additional water-supply projects are evaluated. We do not want to minimize the importance of addressing seawater intrusion in the LAS, and will continue working with the FCGMA to find viable solutions for this long-term challenge. However, we suggest that the FCGMA coordinate closely with stakeholders to decide whether they would prefer to commence pumping rampdowns immediately (while the FCGMA closes data gaps and evaluates potential future water-supply projects), or if they would prefer to wait until those uncertainties are reduced by 2025, even if pumping rampdowns may be a little steeper due to the delayed start.
Dan	Detmer	UWCD	1 - Administrative Information	1.1-Purpose of the Groundwater Sustainability Plan	N/A	Sec 1.4.2 p 1-20 United's Habitat Conservation Plan is still draft and final version has not been submitted to NMFS. Sec 1.8.2 p 1-37 United is not a "surface water user" in the PVB. United supplies surface water to PVCWD when it is available. United's PTP system is in the OP basin, not PV. Sec 1.8.2 p 1-38 "the primary crops grown in PV are cropland with some orchards and vineyards." Consider rewording. Table 1-2 Unclear what tasks will be performed by GSP consultant in coming years, especially in next two years while we wait for DWR review of the initial GSP.
Dan	Detmer	UWCD	Executive Summary	ES.1-Introduction	N/A	ES-1 Language appears to characterize distribution of UAS/LAS pumping for the entire OPV area and not just PVB. Should also clarify in text and not just footnote that the saline water impact front is located in OP and not PV. ES-4 Perennial surface water flows currently do not reach PV from LPV. They may again in the future under wetter climatic conditions.

Commenter			Chapter	Section	Subsection	Comment
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. 1-45 - 1-46 The GSP identifies the primary environmental users in the Pleasant Valley Basin as the willow/mulefat riparian scrub and Arundo vegetation communities found along the banks of Conejo Creek, and Calleguas Creek, lower Arroyo Las Posas and Conejo Creeks. The degree to which these ecosystems use groundwater versus percolating surface water is uncertain. 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	1-8 Past and Present Land Use within Pleasant Valley, 1990–2015	N/A	Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)] • Table 1-8 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.
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.4-Existing Monitoring and Management Plans	1.4.2-Operational Flexibility Limitations	Description of general plans and other land use plans relevant to GDEs and their relationship to the GSP [Checklist Items 2 to 3 - (23 CCR §354.8)] • Section 1.4.2 Operational Flexibility Limitations (p. 1-19 to 1-20)] A Multiple Species Habitat Conservation Plan prepared by UWCD specifies flow conditions at the Freeman Diversion to be constrained by the habitat requirements for the federally endangered Southern California steelhead (Oncorhynchus mykiss) in the Santa Clara River.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.2-Hydrogeologic Conceptual Model	2.2.4-Principal Aquifers and Aquitards	Description of general plans and other land use plans relevant to GDEs and their relationship to the GSP [Checklist Items 2 to 3 - (23 CCR §354.8)] Hydrogeologic Conceptual Model [Checklist Items 6, and 7 (23 CCR §354.14)] • Section 2.2.4 Principal Aquifers and Aquitards (p.2-6 to 2-7), with additional detail in Sections 1.3.2.1, 2.3.1.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K Notes: Description & Cross-sections are contradictory in presenting extent of Shallow Alluvial Aquifer. Also discussion of semi-perched aquifer – not clear where it is (need areal extent maps for both. Both make it clear are not principal aquifers. Section 2.2.4 describes the Shallow Alluvial Aquifer that is interconnected with surface waters (Arroyo Las Posas, Conejo Creek, and Calleguas Creek) and potential GDEs. The basin-wide cross sections provided in Figures 2-3 and 2-5 include a graphical representation of the manner in which shallow groundwater may interact with ISWs or GDEs that would allow the reader to understand this topic, though the representation doesn’t match the text language in Section 2.3.1.1, which states “The Shallow Alluvial Aquifer comprises the recent alluvial deposits [emphasis added] that line Arroyo Las Posas, Arroyo Santa Rosa, Conejo Creek, and Calleguas Creek in the PVB”. Also Figure 2-4 does not indicate presence of the Shallow Alluvial Aquifer in this area. Figure 2-2 shows the recent alluvium along Conejo Creek and lower part of Calleguas Creek, but the placement of the Shallow Alluvial Aquifer in the cross-section A-A’ in Figure 2-3 doesn’t quite match up. Including the locations of the Conejo and Calleguas Creeks would help clarify the understanding. It is also unclear where the semi-perched aquifer exists within the Pleasant Valley Basin. Neither the Shallow Alluvial Aquifer nor the semi-perched aquifer are considered principal aquifers in the Pleasant Valley Basin.
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.3-Description of Plan Area	1.3.2-Geography	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).] • Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1 Arroyo Las Posas, Conejo Creek, and Calleguas Creek have all been identified as surface water bodies that may have a connection to the Shallow Alluvial Aquifer in the Pleasant Valley Basin. Arroyo Las Posas is ephemeral in the Pleasant Valley Basin and is likely to be a disconnected losing stream. Conejo Creek and Calleguas Creek, which are perennial due to wastewater treatment discharges. Numerical modeling estimates of annual quantification of recharge to groundwater from Arroyo Las Posas, Conejo Creek, and Calleguas Creek are provided in Section 2.3.6. However, while the model results list net recharge to groundwater via stream loss, the discussion in Sections 2.3.6 and2.3.7 indicates there is insufficient knowledge to build a conceptual model of the extend of losing and gaining reaches.

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)] • Section 2.3.7 (pp. 2-25 to 2-27) 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). In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the potential GDEs. Given the uncertainty regarding the depths to groundwater within these areas, the ecosystems are appropriately considered potential GDEs, with future monitoring needs identified to assess the degree to which existing habitat is reliant on groundwater.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.4-Water Budget	2.4.1-Sources of Water Supply	Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)] • Section 2.4 The water budget includes the natural system surface hydrology components including the surface water recharge from the Arroyo Las Posas, Conejo Creek, and Calleguas Creek and natural vegetation evapotranspiration (ET) along these riparian systems. These have been modeled using the UWCD numerical model.
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 Introduction to Sustainable Management Criteria (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)." Under current and known future conditions, as described in Section 3.3.6, the sustainability goal does not require inclusion of sustainability criteria for surface water connectivity.
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. 3-12 - 3-13) The GSP clearly states: "The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat." We applaud this clear recognition of GDEs as an important beneficial use that must be protected. We also agree with further statements that 1) undesirable results are not currently occurring, 2) linkage between groundwater and the potential GDEs must be established and 3) if future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.4-Minimum Thresholds	3.4.6-Depletions of Interconnected Surface Water	Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)] • Section 3.4.6 Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-20) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.5-Measurable Objectives	3.5.6-Depletions of Interconnected Surface Water	Measurable Objectives -Checklist Item 26 – (23 CCR §354.30) • Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-25) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.4-Minimum Thresholds	3.4.6-Depletions of Interconnected Surface Water	Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)] • Section 3.4.6 Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-20) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.5-Measurable Objectives	3.5.6-Depletions of Interconnected Surface Water	Measurable Objectives -Checklist Item 26 – (23 CCR §354.30) • Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-25) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".
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) The GSP notes the lack of shallow groundwater monitoring wells in the Shallow Alluvial aquifer that can be used to monitor interconnected surface water bodies/GDEs along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. We do not think this is necessary for the Arroyo Las Posas. We would recommend further investigation of the water level records in the younger alluvium that are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker. If these water level records can demonstrate the groundwater connection, or lack thereof, then the data gap regarding connectivity can be closed. This could be very useful given that there is limited funding available to install new monitoring wells, and this is currently a low priority given that the Shallow Alluvial Aquifer is not a principal aquifer.
Ruthie	Redmond	The Nature Conservancy	4 - Monitoring Networks	4.6-Potential Monitoring Network Improvements	4.6.6-Surface Water: Flows in Agricultural Drains in the PVB	Monitoring Network [Checklist Items 47, 48 and 49 (23 CCR §354.34)] • Section 4.6.6 Surface Water: Flows in Agricultural Drains in the PVB (p.4-15) We would also recommend that we survey the water surface elevation in the drains, as they should provide easy to measure, calibration head values for the numerical model and good indication of the semi-perched aquifer elevations.
Ruthie	Redmond	The Nature Conservancy	5 - Project Management Actions	5.1-Introduction to Projects and Management Actions	N/A	Projects and Management Actions to Achieve Sustainability Goal [Checklist Items 50 and 51 (23 CCR §354.44)] • Section 5 Section 2.3.8, Potential Recharge Areas, identifies potential future recharge areas that have the most favorable soil recharge rates. These are along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. Consistent with existing grant and funding guidelines for SGMA-related work, priority should be given to multi-benefit projects that can address water quantity as well as providing environmental benefits or benefits to disadvantaged communities. TNC recommends the GSA look for environmental partners to co-develop such multi-benefit projects that benefit supply and environment; our perspective is that additional funding can be gained from such projects.
Lucia	McGovern	City of Camarillo	Tables	1-1 Estimate of Project Cost and Water Supply for First 5 Years	N/A	see attached comment letter

September 19, 2019

Via email: keely.royas@ventura.org and online portal for comments

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

Re: ***Draft GSP***

To The Board of Directors:

Our company owns land and farms in the Oxnard Basin ("Oxnard Basin") and the Pleasant Valley Basin ("PV Basin"). The purpose of this correspondence is to provide comments to both (i) the Draft Groundwater Sustainability Plan for the Oxnard Basin dated July 2019 (the "Draft Oxnard GSP") and (ii) the Draft Groundwater Sustainability Plan for the Pleasant Valley basin dated July 2019 ("Draft PV GSP"). The Draft Oxnard GSP and the Draft PV GSP shall be referred to herein occasionally as the "Draft GSPs".

We have provided comments to the Fox Canyon GMA Board (the "Board") on various issues over the past 2 years that relate to the issues re-addressed in the Draft GSPs. We request that all those comment letters be made part of the record for this comment period.

Our additional comments to the Draft GSPs are as follows:

1. The Draft GSPs must be rejected as they were not created in a fair, independent or legal process of representative government.

The Board did not undertake a proper process for creation of the Draft GSPs because (i) there is not adequate representation of overlying water rights holders on the Board; (ii) there are conflicts of interest on the Board; and (iii) Jeff Pratt has several conflicting duties and holds incompatible offices.

a. No Adequate Representation. FCGMA was created as a public agency charged with the management of groundwater resources in the southwestern portion of Ventura County, California. The Board is made up of stakeholders in groundwater management. The makeup of the Board with these various stakeholders was appropriate at the time of creating FCGMA because the goal was to manage the water resources for the benefit of all stakeholders.

However, the Board does not have the proper representative makeup now that it is acting as a GSA to regulate groundwater use. The Board has effectively moved from "manager" to "regulator". For example, the Board will now be required to perform the duties and exercise the necessary powers of a GSA to develop, implement, and enforce a groundwater sustainability program under SGMA. As such, the Board must have adequate representation from the overlying water rights holders – who own 100% of the safe yield from the basin. However, the FCGMA rules do not provide for any representation whatsoever from overlying water rights holders. Instead, the FCGMA rules require the Board to be made up with (i) a member of the Board of Supervisor; (ii) a UWCD board member; (iii) a selection for the five city councils; (iv) a mutual water company representative; and (v) a representative from a local farm group. Because overlyers have no representation on the Board, the Board cannot legally act as a GSA. This is simply not a representative agency.

b. <u>Conflicts of Interest.</u> The Board claims that is has the power "over groundwater production". (Draft PV GSP at 5.3.1). Indeed, the central tenant of the Draft GSPs is that the Board will exert an alleged power to reduce groundwater pumping and allocate groundwater pumping to the various water users. The problem is every member of the Board is engaged in groundwater production. In other words, the Board allegedly now has power over their own groundwater production as well as the power over those who are competing with the Board members for a groundwater allocation. Therefore, the entire Board has a conflict of interest and cannot by law be making decisions on reductions and/or allocations. The Board members and the agencies they represent will personally benefit from the decisions made by the Board. That is a classic and clear conflict of interest and, therefore, the Draft GSPs must be rejected in their entirety and redone by an independent body of decision makers.

Conflicts of interest regarding water rights are so important that the court system is required to move cases deciding water production issues to a court outside their district. Even judges who are professionally trained in independence are presumed to have a conflict of interest for no other reason that they are present in a district in which the water production is occurring. As an example, the court in the Las Posas litigation moved the case from the Ventura County to Santa Barbara due to the possible conflicts of interest. The judge was not a groundwater pumper, he simply lived in Ventura County and, therefore, was legally deemed to have a conflict of interest. Here, it is even worse. The Board members are not just present in the district, they are in the groundwater business. So, the Board's conflicts are not just legal (like in the Las Posas case) they are actual and obvious. In short, the Board cannot legally exert power over water production decisions because they have a conflict of interest.

Clearly, FCGMA was never intended to have power "over groundwater production". If it were intended to have such power, the Board would consist of neutral parties who do not have any "legal" or "actual" conflicts of interest. This Board is made up of actual groundwater businesses that will personally benefit from exercising their newly claimed power "over groundwater production". This is a clear conflict requiring the Draft GSPs to be redone by a neutral party. If on the other hand, the Board claims there is no conflict, then the Board must at least even the playing field by appointing overlyers to the Board (see section 1.a., above). The Board cannot legally claim there is no conflict on the one hand and then on the other hand bar the most senior water rights holders from representation on the Board due to claims they are conflicted. The "rules" for some water users should apply to all water users as far as representation on the Board.

c. Incompatible Office. Jeff Pratt is currently holding two incompatible offices. The existence of incompatible offices occurs when the functions of one person in two distinct roles or offices are inherently inconsistent or detrimental to the public interest. Here, Mr. Pratt is both the Director of Public Works for Ventura County (in charge of the administration, billing, customer service, operation, maintenance, design, inspection, and construction of water services for the County) and the Executive Officer of the FCGMA (which now has the alleged power under the Draft GSPs "over groundwater production"). In short, Mr. Pratt runs the entity that consumes the groundwater (Public Works in Ventura County) and also the entity that has the power to decide who gets to consume the groundwater (FCGMA). He has been given the powers of the fox guarding the hen house. It is inherently inconsistent to have one of the main consumers of groundwater also in charge of allocating all of the groundwater. This is not only a conflict, but it raises to the level of incompatible offices because it is determinantal to the public interest in having fair, equitable and sustainable decisions made about the use and allocation of groundwater resources. Because the public interest and trust is so important, there is strong legal doctrines to prevent this type of self-dealing. The GSPs must be redone in a legal and independent process in order to protect this public interest.

2. The Draft GSPs must be rejected because they fail to present viable management actions to achieve sustainability.

The underlying premise of both Draft GSPs is that the Board has the power to reduce groundwater pumping. Indeed, the plan in the Draft GSPs to achieve sustainability is for the Board to force dramatic reductions in groundwater pumping. In some cases, the Board assumes it has the power to reduce groundwater pumping by 50-100% simply by using regulations. In other words, the Board assumes it has the power to regulate away all existing water right. There is no discussion in the Draft GSPs of where this power comes from or the legal basis for exercising the power. The Draft GSPs just assume that the Board has the power "over groundwater production". The assumption is wrong and the Drafts GSPs are woefully short of complying with SGMA.

SGMA requires that a GSP include a full description of every management action being used to meet the sustainability goals. In addition, SGMA requires a summary of the permitting or regulatory process for every management action and an explanation of how the management action will be accomplished, the legal authority for the management action and the costs.

Here, the Draft GSPs fail to follow SGMA because there is no explanation in the Draft GSPs of how the regulation of groundwater pumping will be accomplished, the legal authority for the regulations or the cost to implement regulations. The Draft GSP simply assumes the Board has the right to ignore water rights laws and regulate away all ground water pumping. There is no language in the Draft GSPs that even attempts to explain this power or otherwise comply with the legal requirement of SGMA regarding explanations of management actions. Nothing. As such, neither the State nor any stakeholders have the ability to properly review the Draft GSPs and the management actions therein to determine their viability. For that reason alone, the Draft GSPs must fail.

In addition, the Board does not have the legal power to regulate away groundwater rights. The right to groundwater production is a legal property right that has long been recognized in California. And, SGMA itself clearly states that nothing in the provisions nor in any groundwater management plan "determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights". The Draft GSPs do not in any way acknowledge this legal fact or incorporate it into the management actions. Accordingly, the Draft GSPs cannot be legally implemented in their current form.

The Draft GSP must incorporate existing water rights law. The current groundwater rights in the Oxnard Basin and PV Basin entitle overlyers to 100% of the safe yield. There has been no adjudication to alter this legal fact. The Draft GSPs must apply current water rights to the management actions. That has not been done here. The Board has instead considered several "allocation plans" over the past few years that would result in a re-assignment of water rights away from their rightful legal owners (the overlyers) and to the non-overlying entities (the cities, counties and mutual water districts that are represented by the Board members). In other words, the Board is using the SGMA process to self-adjudicate the basins in their own conflicted vision of redistributing water rights. The Board desires to take water rights from their rightful legal owners and assign the rights to their own entities. This attempted taking is illegal under the California Constitution, SGMA, California water codes and common law water rights. In short, the Draft GSPs have incorporated an illegal taking of groundwater rights as it principal management action and, therefore, must be completely rejected.

In addition, the overlyers right to 100% of the safe yield is a correlative right and, therefore, not subject to allocation. Using this as the starting point, the Draft GSPs are required to then explain the management actions to reach sustainability – which all stakeholders acknowledge may require reductions to groundwater production. The Draft GSP must explain how these reductions will be accomplished, the legal authority for the reduction plan and the costs of the plan. For example, the Draft GSPs could suggest a management action to purchase a portion of the 100% of groundwater owned by the overlyers. Some estimates call for 30,000 acre-feet of reductions. Using this example, the Draft GSP is required by SGMA to explain the purchase plan (maybe using the market that is also suggested in the Draft GSPs), the legal authority for the purchase plan and the costs (which using $1,500/ acre-foot would be $45,000,000 annually). If the Draft GSP provided all that detail (as required by SGMA), the proper analysis of the management action could be done. However, the Draft GSPs cannot simply assume there is an omnipresent power to steal the $45,000,000 of groundwater from its rightful owners under the guise of "management". Again, there is no power to take these water rights away from their rightful owners. The Draft GSPs need to fully explain a legal management action plan for the reduction of groundwater production. Stealing water rights is not a legal management plan.

3. <u>The Draft GSPs must be rejected because no CEQA or environmental permitting issues have been addressed.</u>

The Draft GSPs must only be considered after there has been a proper environmental impact report and all permitting issues have been explained. Admittedly, the creation of a GSP is exempt from CEQA. However, the implementation of a GSP and all projects or management actions must comply with CEQA. In addition, a GSP must (i) summarize how the management actions and projects are going to comply with CEQA; (ii) explain any and all permitting requirements; and (iii) analyze the costs of complying with CEQA and permits. Without meeting these requirements there is no way to analyze the projects, managements actions and general viability of a GSP.

In this case, the Draft GSPs propose the most significant change to groundwater pumping and stormwater control in the history of Ventura County. And, no one has done any review whatsoever of the environmental, physical, safety or economic consequences of these major changes. In addition, the Draft GSPs do not even explain the process, implications or costs for doing that review. In other words, there has been no due diligence on environmental matters. Why approve a plan now that will be later undone and/or substantially amended when the environmental review is conducted? That will just push back the proper management of these basins for years and years. For that reason, SGMA requires that all management actions be explained in detail along with the permitting and costs associated with implementation. These Draft GSPs fail to do so and, therefore, have not presented "viable" management action plans.

As one example, stormwater control in Ventura County will be substantially and forever impacted by the Draft GSPs. The Draft GSPs propose a substantial and permanent increase in the groundwater levels in the OPV Basin and the PV Basin. They further suggest that these groundwater levels be maintained every year – even in drought conditions. So, there will be no hydrological fluctuations that would naturally occur in the basins due to the occurrence of rainy, normal and dry years. Every year will maintain a high-water level. This type of artificial manipulation of the groundwater basins has never been done before. The effect on stormwater management will be the elimination of significant percolation and storage of stormwater runoff. In other words, every year will be an El Nino for stormwater runoff because there will no longer be any place for percolation and ground storage of rainfall. This will have significant and costly affects for the environment, for infrastructure and for health and safety of citizens. Significant flooding and erosion will occur every year – not just in wet years because the groundwater levels will be maintained at levels higher than those of recent wet years. These effects need to be studied in order to ensure the health and safety of the environment and citizen of Ventura County.

As another example, the Draft GSPs suggest that there will be a substantial reduction in groundwater pumping and do not provide an equal or offsetting source of replacement water. As such, some or all of the existing uses of water for residential, municipal, industrial or agricultural uses will be reduced – and in some cases, that reduction may be substantial. The Draft GSPs do not in any way discuss the environmental effects of such reductions. There is no doubt there will be substantial effects to the health and wellbeing of the citizens of Ventura County and the environment when safe water is no longer available in adequate amounts - think Flint, Michigan or dust bowl era effects. Ignoring these effects is simply at attempt at pollical expediency. Thankfully, SGMA does not allow the Board to ignore the citizens of Ventura County. SGMA requires the management actions be explained in full, the permits (like CEQA) analyzed and the costs analyzed in the GSP. That was not done here.

These are just two examples of the Draft GSPs potential effects. There are considerably more that all necessitate a professional and full analysis before any plans are approved and put into action. SGMA requires such analysis and these Draft GSPs need to be updated and brought into compliance with all such SGMA requirements.

4. <u>The process for adoption of the Draft GSPs does not account for stakeholder input.</u>

The Board is required to make a real effort to obtain stakeholder input on the Draft GSPs. Here, there is no plan for actual stakeholder input. Instead, the Board has adopted the fastest possible timeframe in order to exclude any real inclusion of stakeholder input in the final product. By doing so, the Board is not following the letter or spirit of SGMA.

The Board states that public comments to the Draft GSPs will be presented to the Board in early November and the final GSPs will be adopted on December 13, 2019 (just one month later). There is no schedule for public meetings, debates or review sessions to go over public comments. In addition, there is no time for staff and/or the third-party consultants to actually review the legal, scientific and logistical issues raised in the public comments. In short, the Board's plan is to simply attach the comments to the Draft GSPs and not actually engage in any analysis, debate or refinement of the Draft GSPs. This is unconscionable. This will be the biggest change to groundwater use, stormwater management and the overall economy in the history of Ventura County. And, the Board is going to just cram it down the throats of the citizens of Ventura County without any real public input in the process? Clearly, that should not, and cannot, legally happen.

The Draft GSPs need to be properly reviewed in a transparent and public process for a realistic period of time to allow for proper inclusion of comments. There are significant issues being raised in the public comments that staff and the third-party consultants need to review and address. A simple attachment of the comments is a failure for the entire process. The Board needs to finish the work required by SGMA and properly implement necessary changes to the Draft GSPs to address the public comments.

For the reasons stated above, and in the previous comment letters we have provided on the issues raised by the Draft GSPs, we suggest the Draft GSPs be pulled and redone in a way the addresses these concerns and legal deficiencies.

Sincerely,

Thomas D. Deardorff, II

City of Camarillo

Department of Public Works

601 Carmen Drive, Camarillo, CA 93010
Office: 805.388.5340 - Fax: 805.388.5387

September 23, 2019

Mr. Jeff Pratt, P.E.
Executive Officer
Fox Canyon Groundwater Management Agency
800 S. Victoria Avenue
Ventura, CA 93009-1600

Attn: Kim Loeb

RE: Comments on Draft Groundwater Sustainability Plan for Pleasant Valley Basin

The City of Camarillo (City) appreciates the opportunity to provide comments on the Preliminary Draft Groundwater Sustainability Plan (GSP) being developed by the Fox Canyon Groundwater Management Agency (FCGMA) for the Pleasant Valley Basin (PV Basin).

The City provides the following comments:

Chapter 1. Table 1-10: The "Existing Surface Water Monitoring Programs" in Table 1-10 don't include the monitoring programs conducted by the Ventura County Agricultural Irrigated Lands Group nor the Calleguas Creek Watershed (CCW) Total Maximum Daily Load (TMDL) Monitoring Program (which performs monitoring for all of the TMDLs for the CCW, not just the Salts TMDL).

Chapter 1. Table 1-11: The NPV Desalter is referenced using present tense on page 1-20, as follows:

> *"The Pleasant Valley Pipeline is subject to both demand and capacity limitations. Although there are some facilities and projects allowing for the extraction, treatment, and use of brackish groundwater (see "Groundwater Supply Policy" in Table 1-11, under Existing Groundwater Management Programs), areas of shallow and brackish groundwater in the northern PVB are being utilized by Camarillo's North Pleasant Valley Desalter."*

The last part of the passage should be corrected as follows:

> *"..., areas of shallow and brackish groundwater in the northern PVB will be utilized by Camarillo's North Pleasant Valley Desalter."*

<u>Chapter 1. Table 1-11:</u> The entry in Table 1-11 for the Salinity Management Pipeline refers (in the present tense) to desalters that don't exist yet, as follows:

> *"A brine disposal pipeline that collects brine generated by desalting facilities in the LPVB, PVB, and Oxnard Subbasin and conveys it to an ocean outfall for disposal. Future construction of the pipeline is expected to serve additional facilities, including those in the ASRVB."*

The table entry should be corrected as follows:

> *"A brine disposal pipeline that collects brine generated by desalting facilities in the LPVB, PVB, and Oxnard Subbasin and conveys it to an ocean outfall for disposal. Future construction of the pipeline is expected to serve additional facilities, including those in the LPVB, PVB, and ASRVB."*

<u>Chapter 1. Page 1-30</u>: The following passage describes the NPV desalter project:

> *"Groundwater quality in the City's north basin wells has worsened since approximately 1990, likely due to poor-quality recharge water from Arroyo Las Posas (City of Camarillo 2016b, p. 6-4). Therefore, the groundwater from these wells has been blended with imported water to meet water quality standards. The City is in final stages of design on a groundwater desalter that is to treat brackish groundwater extracted from the northern part of the PVB. Because the City has not yet obtained final approvals for the project, the UWMP does not include the potential water supply in future supply calculations (City of Camarillo 2016b, p. 6-2)"*

The passage should be corrected as follows:

> *"...The City started construction in Fall 2019 of a groundwater desalter that is to treat brackish groundwater extracted from the northern part of the PVB. Because the City obtained FCGMA approval in Fall 2016 for the project, the UWMP does not include the potential water supply in future supply calculations (City of Camarillo 2016b, p. 6-2)"*

<u>Chapter 2. Basin Setting:</u> The City requests that the following description of current surface flows in the Arroyo Las Posas on page 2-30 be revised.

> *"Arroyo Las Posas is generally perennial (average or wet years) in its most downstream reach within the LPVB, then fully infiltrates its baseflow upon crossing into the PVB. As described by Bachman (2016), baseflow in Arroyo Simi–Las Posas is a mixture of natural dry-weather flows, discharges from WWTPs, discharge from dewatering wells in Simi Valley, and agricultural tailwaters. The terminus of the baseflow originally occurred in the LPVB, but in the early 1990s it began to move downstream as the LPVB Shallow Alluvial Aquifer began to fill as a result of higher baseflow contributions from Simi Valley. Bachman (2016) reports that the baseflow crossing into the PVB infiltrates along a 1,400-foot-long reach of Arroyo Las Posas at the northern margin of the PVB. Bachman (2016) also estimated that the next 5,500 feet of the creek can infiltrate some or all of the storm flow in the creek that crosses into the PVB during an individual storm event. Bachman (2016) estimated that this*

> *lower reach has an infiltration capacity of approximately 89 AF per day. However, surface flows from the LPVB have not occurred since about 2012 due to drought conditions." (page 2-30, emphasis added)*

However, during large storm events, surface flows have temporarily extended into the PVB during 2012-2019. The last sentence in this passage should be corrected as follows:

> *"...However, surface flows from the LPVB have not occurred during dry weather since about 2012 due to drought conditions."*

<u>Chapter 2. Page 2-33:</u> On page 2-33, the Camarillo diversion pipeline is described in present tense, as follows:

> *"CSD constructed an effluent discharge line that eliminates most, if not all, current discharges to Conejo Creek. This pipeline conveys effluent to the Calleguas Salinity Management Pipeline operated by CMWD and to CWD to provide additional recycled water supply for agriculture (CWD 2015)."*

The paragraph should be revised as follows:

> *"CSD constructed an effluent discharge line that eliminates most, if not all, current discharges to Conejo Creek. This pipeline will connect to Camrosa Water District's recycled water distribution system to provide additional recycled water supply for agriculture."*

<u>PV Basin Sustainable Yield versus the Desalter Allocation:</u> The Draft GSP for PVB included the 4,500 AFY allocation for the desalter project in the "future baseline" conditions for the model runs. The GSP states that the future baseline conditions for the PVB included the 2015-2017 average total basin production (14,000 AFY) plus the additional future allocation of 4,500 AFY for the City's desalter.

The City operates two well fields, the northern (Wells A and B) and southern (Wells 3 and D). Under the City's existing extraction allocation (FCGMA TEA), the City pumps 3,197 AFY distributed among all four wells (Wells A, B, D, 3).

Wells A (02N20W19L05S) and B (02N20W19F04S) will become the source water for the Desalter. On average, during 2015-2017, extractions from the northern wells A and B were 147 AF and 1,303 AFY, respectively, for a total average of 1,448 AFY (see following table).

Year	Well A (02N20W19L05S)	Well B (02N20W19F04S)
2015	216.64 AF	1279.41 AF
2016	134.74 AF	1242.68 AF
2017	88.49 AF	1383.11 AF
Average	147 AFY	1303 AFY

Once the desalter project is online, the City will extract 3,197 AFY from Wells 3 and D, and 4,500 AFY from wells A and B.

The GSP appears to have accounted for this operational shift in the following passage (see underlined sentence), although it is not clear how the value of 1,300 AFY is derived.

> *"No projects currently under development were identified in the Oxnard Subbasin, but two projects under development in the PVB were incorporated into the future baseline simulation because these projects affect inflows to the Oxnard Subbasin. The two projects in PVB are the City of Camarillo's North Pleasant Valley Desalter (desalination) Project and Conejo Creek Diversion deliveries to PVCWD. The North Pleasant Valley Desalter Project was simulated by dividing the total project pumping of 4,500 AFY between project extraction wells 02N20W19L05 and 02N20W19F04. Additionally, pumping from Well 02N21W34C01 increased by 1,300 AFY to reflect a shift in areas of production." (page 2-46)*

The City is committed to the protection of the region's water supplies and groundwater quality. We appreciate the opportunity to comment on the Draft GSP, and support the collaborative process in achieving a feasible and sound GSP. We look forward to the continued opportunity to work closely with the FCGMA in this endeavor.

If you have any questions, or need additional information, please contact Lucia M. McGovern at (805) 388-5334 or at the following email lmcgovern@cityofcamarillo.org

Sincerely,

David J. Norman
City Manager

September 23, 2019

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

ATTN: Board of Directors

SUBJECT: TECHNICAL REVIEW COMMENTS - PLEASANT VALLEY BASIN DRAFT GROUNDWATER SUSTAINABILITY PLAN

Dear Directors:

Daniel B. Stephens and Associates, Inc. (DBS&A) appreciates the opportunity to submit our technical review comments on the draft Groundwater Sustainability Plan (GSP) for the Pleasant Valley basin. Our comments are being submitted on behalf of Marathon Land, Inc. It is apparent that an extensive effort was needed to produce the draft GSP and the stakeholders are appreciative of the efforts of the Board of Directors, staff, and its consultants.

Our technical review comments can be grouped into two major categories:

- Plan adequacy; and
- Process documentation and data transparency.

We have provided additional comments as an attachment to this letter. In some instances, the attachment provides additional elaboration on the Plan Adequacy and Process Documentation and Data Transparency comment categories.

Plan Adequacy

Our technical team evaluated the draft GSP from the perspective of how well the GSP conformed with the expectations of the California Department of Water Resources (DWR) as outlined in their guidance documents (GDs) and best management practices (BMPs), as well as the expectations of the stakeholders in the basin.

From a high-level perspective, our review of the draft GSP failed to identify a clearly defined plan for this basin over the next five years. The plan contains many references to what might be done in the future (e.g., gather more data, investigate possible projects, perform additional groundwater modeling, develop allocation plans, propose groundwater extraction ramp down scenarios), but does not provide the stakeholders (or the Board of Directors) with a clear vision of how the GSP leads the agency and its stakeholders to sustainability by 2040.

Daniel B. Stephens & Associates, Inc.

3916 State Street, Suite 1A 805-683-2409

Santa Barbara, California 93105 FAX 805-683-2419

It is appropriate for the GSP to identify activities that it would likely perform to minimize data gaps, evaluate the groundwater resource impacts of various projects, explore groundwater extraction ramp down scenarios, etc., but it was expected that the GSP would include a rationale for each of these activities. As an example, it is logical to suggest that additional monitoring wells would be needed to address data gaps, but the GSP does not offer a definitive plan that explains what questions would be addressed by new monitoring wells, where they should be located, their construction timing, sampling protocols, or the costs (both CAPEX and OPEX). The draft GSP did not contain a *Sampling and Analysis Plan (SAP)* to determine the sampling frequency, sampling protocols, and analytical program needed to minimize the data gaps. It was expected that a *Data Quality and Objectives (DQO)* document (consistent with that referenced in two of the best management practices) would be a part of the GSP. The DQO would give the reader an understanding of why the collection of these data are important to achieving basin sustainability.

The draft GSP contains numerous references to the FCGMA's authority to implement a groundwater extraction ramp down, but also states that the ramp down plan has not yet been finalized. In the absence of a stated plan, it is impossible for stakeholders to evaluate the adequacy of the GSP to guide them towards sustainability or to determine the impacts the yet to be defined ramp downs will have on their municipal or agricultural operations.

The draft GSP also alludes to its ongoing efforts to prepare a groundwater extraction allocation plan. Unfortunately, a formal allocation plan is not a part of the draft GSP. It is unclear what the action of the Board of Directors will be upon its adoption of the GSP and consequently stakeholders have difficulty evaluating the GSP with this information void.

Process Documentation and Data Transparency

Transparency is a fundamental premise of the GSP development process. This transparency extends from the development of the communication and engagement plan and implementation of the stakeholder outreach process to sharing the details of the data sets and analyses used in the GSP.

The draft GSP says that allocation schemes and potential ramp down programs will be developed in the future, but in fact, albeit inadvertently, the draft GSP does include an "allocation plan" AND a variety of ramp down programs, but does not clarify which, if any, of the programs are guiding the draft GSP. The draft GSP offers sustainable yields for this basin that were derived, at least in part, from groundwater modeling that was performed by United Water Conservation District that included an allocation scheme (i.e., groundwater extractions set at average 2015-17 quantities) and various groundwater extraction ramp downs (e.g., 25% reduction of UAS, 60% reduction from LAS). Based on the discussions at multiple Board meetings over the past several months, it is clear that the FCGMA intends to implement a, yet to be defined, ramp down program upon adoption of the GSP but it is unclear to the stakeholders from reviewing this plan what the proposed timing, magnitude and economic impacts might be in implementing this plan.

The ramp downs embedded in UWCD's modeled scenarios included in the GSP are entirely dependent on future projects (or lack of future projects). The projects portion of the GSP is inadequate and appears to arbitrarily exclude reasonable project concepts. The Operations Committee project vetting process was overly restrictive, but was, in general, consistent with DWR guidelines. The FCGMA Board of Directors developed criteria that were used to establish whether a potential project would be included in the GSP. Potential projects that could have positively impacted the sustainable yield of the basin, or at a minimum offer options to assist reaching sustainability goals were excluded from the process. The plan fixates on the demand side of the equation (pumping curtailment) but needs to discuss additional realistic possibilities of increasing the supply side.

The GSP should list the projects that were rejected so the stakeholders can determine if those projects should be advanced to determine their impact on sustainable yield. It was offered that many projects did not survive the vetting process as a project proponent had not been identified. It is clearly within the authority of the FCGMA, as a GSA, to assume the project proponent role and bring other projects into the sustainable yield setting process.

The project evaluation process should include an evaluation of the estimated CAPEX and OPEX project costs so that stakeholders and the Board can compare the cost effectiveness of each project or suite of projects. Project costs did not appear to get detailed consideration in the draft GSP.

Similarly, the draft GSP does provide summaries of the groundwater modeling efforts performed by United Water Conservation District, but the results of that modeling effort (e.g., groundwater elevation maps, comparisons of modeled groundwater elevations with Minimum Thresholds [MTs] and Measurable Objectives [MOs], detailed descriptions of the modeling input parameters). This information is a critical part of the GSP and it is recommended that this information be added to the plan as a technical appendix. In the absence of this information, it is difficult for the stakeholders or technical representatives to feel comfortable with modeling summaries (and the sustainable yields derived from the modeling effort).

Future Baseline Scenarios set groundwater extractions to a constant simulated value of 2015-17 average, but these were adjusted based on surface water deliveries. Was the pumping also adjusted based on precipitation or ET or some other parameter to account for fluctuations in demand? For example, although not described in the GSP, it is believed from communication with UWCD staff, that total water use was not reduced during wet periods in the modeling scenarios. Farmers are typically not watering their crops when it is raining as erroneously assumed in the modeled scenarios. In addition, not all groundwater pumpers have access to surface water, so it is assumed in the absence of documentation, that these pumpers did not have their groundwater extractions reduced even if demand was lower due to precipitation. Were the groundwater extraction rates for those without surface water access kept at the 2015-17 average value?

It is unclear how exactly the sustainable yield and associated uncertainty was estimated for the basin. From the information available in the GSP, the method appears to be highly subjective, arbitrary and unsupported as a standard method for establishing a basin's sustainable yield. The sustainable yield as proposed in the GSP is highly tied to the modeled scenarios and their inherent assumptions. Different scenarios could result in very different sustainable yield values.

Summary

An extensive amount of information is contained in this draft GSP. However, our review has identified shortcomings that we feel warrant addressing prior to adoption of the GSP by the FCGMA Board of Directors. We are most concerned that the draft GSP does not contain a definitive path (e.g., activities, timelines, costs, impacts) that demonstrate how groundwater sustainability can be achieved by 2040. As currently presented, the GSP provides in various places in the document, a variety of generic activities that might be pursued in the future, but without any indication of why or if those activities contribute to refining the sustainable yield, minimizing a data gap, or management actions. Without a definitive plan, it is not clear what the Board of Directors will be asked to consider for adoption. It is perfectly acceptable to lay out a plan for filling data gaps, etc., but it is awkward for the Board of Directors to be asked to consider adopting a GSP that has no definitive plan, undefined impacts on the groundwater extractors in the basin, and an unclear path to sustainability.

We want to emphasize, that we believe the UWCD groundwater model to be the best available science and tool for use in this GSP, and are confident in its predictive capabilities. At the same time, however, we are not convinced that this tool and the regional groundwater resource expertise available to the FCGMA has been appropriately leveraged to adequately identify projects which maximize basin yield and potentially lessen the impact to groundwater extractors in the basin.

We appreciate the hard work that went into the preparation of this draft GSP and for the opportunity to submit our comments for your consideration. If you need further clarification of any items in this letter or on the materials provided in support of this letter, please do not hesitate to contact me at 805-290-3862 (cell) or tmorgan@geo-logic.com.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.

Tony Morgan, PG, CHG
Vice President/Principal Hydrogeologist, DBS&A
Market Leader, Water Planning and Development, GLA

Attachments: Tech Review Comment Table - Pleasant Valley basin

cc: Marathon Land, Inc.
Project File

Draft Pleasant Valley GSP (July 2019) Technical Review Comments

Category	Section - Page #	Comment
Admin / General		The draft GSP has compiled significant quantities of groundwater and related information. However, the GSP is lacking in a clearly stated plan for the next 20 years. The reader sees multiple references to topics that will be discussed in the next 5 years and that "conditions might change" or projects may or may not be constructed, but is left without concrete descriptions of what the GSA proposes to do to implement steps towards sustainability. Stakeholders need to see what the agency intends to do over the next 20 years to achieve sustainability. The approach of the GSP appears to be "...we'll study it some more over the next 5 years..." Does the GSA/FCGMA intend to modify groundwater extraction quantities in the next 5 years or start the fallowing program mentioned in the GSP?
Admin / General		The draft GSP contains many references to documents prepared by others. It would be helpful for the stakeholders to have ready access to these documents since they are integral to the creation of the GSP.
Admin / General		John Mann's 1959 report: "A Plan For Ground Water Management" does not appear to be referenced anywhere in the GSP including the Basin Setting Section. Many later investigators relied heavily on this predominately primary source work. Was this reference considered in preparing the Basin Setting Chapter of the GSP?
Admin / General	ES-5	The GSP makes only a very limited effort to identify conditions that would maximize the sustainable yield. Given the magnitude of the groundwater extraction reductions anticipated to be needed to achieve the sustainable yield, an "optimization" effort is appropriate for inclusion in this version of the GSP.
Admin / General	1.3.1 - page 1-11 to 1-12	UWCD Pleasant Valley historically used basin boundaries should be added to the list of formerly used Administrative Boundaries identified on page 1-11. Early version of UWCD's VRGWFM may have used these boundaries. Were DWR 2016 boundaries used consistently in modeling scenarios and water budget calculations? Are 2018 boundaries anticipated to be used in annual reporting and 5-year GSP updates?
Admin / General	ES-9	Groundwater extraction reductions are identified as the primary management action proposed in the GSP. Where do we find a discussion of the GSA's proposed extraction reduction scheme? Section 5-3 deflects this topic to "will be determined by the FCGMA Board sometime over the next 5 years"
Admin / General	ES-2	This section mentions that "...additional studies [will be] undertaken to fill data gaps..." Where are those recommended studies identified in the GSP?
Admin / General	1.2.6 - page 1-4	"This GSP will be implemented by FCGMA in coordination with the other GSAs in the PVB*…"* Later in the GSP it is stated, *"The County and CWD will rely on this GSP and coordinate with the FCGMA, as necessary, to ensure that the Subbasin is sustainably managed in its entirety, in accordance with SGMA."* Were formal coordination agreements adopted by the FCGMA that detail proposed coordination activities with the other GSAs in the Subbasin? Do the County and CWD Boards need to officially adopt the GSP, as well, since FCGMA boundaries do not cover the EPVMA or all of the PVB Outlying Areas? Seems appropriate to have all three GSAs (i.e., FCGMA, Camrosa WD, and Pleasant Valley Basin Outlying Areas) adopt the final GSP.

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Sustainable Management Criteria	3.3	Did not locate documentation of FCGMA Directors discussing and agreeing on what set of conditions make each SMC metric significant and unreasonable.
Sustainable Management Criteria	3.3	Expected to see SMC-specific discussion of the appropriate metrics, rationale used for establishing the significance and unreasonableness of the metric for each SMC, and more detailed validation of the undesirable results avoided by not exceeding the MTs. No discussion of how the decision was made to select groundwater elevation as the surrogate metric for all SMCs. (e.g., how does groundwater elevation relate to SMC such as degraded water quality)(page 3-9 to 3-11).
Sustainable Management Criteria	ES-7	The GSP states in regards to determining if the Subbasin is experiencing undesirable results, *"The groundwater level in any individual key well is below the minimum threshold for either three consecutive monitoring events or three of five consecutive monitoring events, which occur in the spring and fall of each year."* Typically water levels in a given well are lowest in the fall and highest in the spring. Spring high water level measurements are often more reliable than fall low water levels which are more susceptible to data quality issues (e.g., non-static unrecovered water levels impacted from a nearby pumping well). A potential result of the above rule is that one key well that may or may not be characteristic of the area it represents may drive the determination of a finding of undesirable results. In addition the "three of five consecutive monitoring events" clause could create a situation where difficult to accurately measure fall water level measurements in one well could drive the determination of a finding of undesirable results. It might make sense to amend the rule to state that a pressure transducer and data logger would be installed in a well if *"three of five consecutive monitoring events"* show water levels below the MT to assess the quality of the data and determine if a true fall static water level is below the MT. Or alternatively, a focused study would be conducted to determine if the water levels measured in the well are representative of surrounding wells of similar construction.
Sustainable Management Criteria	ES-6	The GSP states that in order to allow for operational flexibility during periods of drought, *"In order to prevent net seawater intrusion over periods of drought and recovery, the periods during which groundwater elevations are below the measurable objective must be offset by periods when the groundwater elevations are higher than the measurable objective."* Likely water levels will rarely be at exactly the MO so should this be taken to mean that water levels must be above the MO at least one half of the time? This seems to be setting a much higher bar than required by SGMA. Did the estimates of sustainable yield account for the requirement of a "pay-back" system for periods of drought that must then be offset by an equal period of above MO water levels? If it takes 20 years (or more) to raise water levels to the MO then must the groundwater of the Subbasin be managed to

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		maintain water levels above the MO to "pay-back" for the 20 years implementation period to get to sustainability?
Sustainable Management Criteria	3.3.2 - Page 3-6 to 3-8	Undesirable results for reduction in groundwater storage is limited to that associated with potential lowering of WLEs to a level that promotes seawater intrusion in the Oxnard Subbasin. How about a metric assessing the quantity of groundwater in storage for future droughts? We did not see a discussion of this aspect of this SMC. If this aspect is not applicable (e.g., hydrographs indicate that water levels are sufficient to provide water for a 5 or 7-year drought - groundwater modeling could be useful), then it would be helpful to indicate as such.
Sustainable Management Criteria	3.3.4 - page 3-9 to 3-11	How does groundwater elevation relate to degraded water quality? The document only discusses qualitative relationships and does not show, for example, graphical relationships between WLEs and water quality values.
Sustainable Management Criteria	3.3.4 - page 3-9	The draft GSP indicates that the increased chloride and TDS values from ELPBMA groundwater and surface water flows into NPVMA have impacted groundwater quality and impaired its use by the City of Camarillo. What data do we have to suggest that the proposed WLEs (MTs) in the NPVMA will control/mitigate this impaired water quality? The hydrograph for Well 02N20W19M05 shows a ~100 ft WLE (~0 to 100 ft) swing in the time period from 2000 to present. During that same time frame, the water quality time series (only two data points for this time frame) for TDS, chloride, and boron show only slight increases and sulfate and nitrate have slight downward trends. How was the MT of -135 ft selected for this management area?
Sustainable Management Criteria	2.3.5 - page 2-24	Hanson et al used groundwater modeling to infer small amounts of subsidence and the InSAR data showed less than 1 ft of subsidence. Is there any anecdotal evidence (e.g., agricultural fields needing to be regraded for drainage, damaged well casings, disruptions in subsurface infrastructure [such as sewer or water lines] for subsidence in the basin? If not, then stating that fact would be supporting evidence for little or no subsidence issues.
Projects and Budgets	5.1 - page 5-1	The Operations Committee project vetting process was overly restrictive, but was, in general, consistent with DWR guidelines. The FCGMA Board of Directors developed criteria that were used to establish whether a potential project would be included in the GSP. Potential projects that could have positively impacted the sustainable yield of the basin, or at a minimum offer options to assist reaching sustainability goals were excluded from the process. As a result of the restrictive criteria, only a **single project** (temporary agricultural land fallowing) was included in the GSP. The GSP should list the projects that were rejected so the stakeholders can determine if those projects should be advanced to determine their impact on sustainable yield. It was offered that many projects did not survive the vetting process as a project proponent had not been identified. It is clearly within the authority of the FCGMA, as a GSA, to assume the project proponent role and bring other projects into the sustainable yield setting process.
Projects and Budgets	5.3.7 - page 5-7	According to text in this section, the *"...FCGMA will work to develop and refine this plan over next 20 years, as the level of uncertainty is reduced. FCGMA recognizes that a specific long-term plan that incorporates stakeholder feedback and the need for flexibility in groundwater management will have to be adopted by 2040 to provide users of groundwater in the PVB with the*

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		tools necessary to plan for sustainable groundwater production into the future." SGMA requires that sustainability be achieved by 2040, but the draft GSP only commits the FCGMA to adopting a plan by 2040 to *"...plan for sustainable groundwater production into the future."* A plan to achieve sustainability must be adopted well in advance of the 2040 deadline. The draft GSP does not lay out the plan describing how the agency will lead the effort to develop a plan in time for its implementation phase to achieve the yet to be defined sustainable groundwater conditions.
Sustainable Yields	2.4.5 - page 2-44	The sustainable yield was shown at the stakeholder workshop as a graphical "interpolation" of the groundwater extraction rate at which seawater flux was zero in the Oxnard subbasin UAS. We did not find a similar graphic in the GSP. The various groundwater extraction rates were derived from the model scenarios. The GSP text says that none of the scenarios were successful in approximating a zero seawater flux condition in both the UAS and LAS. How can the groundwater extraction information from unsuccessful modeling scenarios be used to interpolate the sustainable yield?
Sustainable Yields	ES-2 & ES-5	Sustainable yield values are reported as 11,600 AFY +/-1,000 (ES-2) and 12,600 AFY +/-1000 AFY (ES-5).
Management Actions		Management actions were not proposed for this basin in the draft GSP, but the FCGMA reserved the right to implement a reduction in groundwater extractions. The reader is left to wonder if extraction reductions are being considered in the near future (e.g., immediately after adoption of the GSP by the Board) or at some later date and how would those reductions would be beneficial to achieving sustainability. The draft GSP identifies a few scenarios where various groundwater extraction schemes and project implementations were simulated using the groundwater model in an attempt to define a sustainable yield. Unfortunately, none of the scenarios achieved the desired goal of no net onshore seawater flux or off shore groundwater flow. Please clarify if the management action of groundwater extraction reductions will be initiated, the timing of that initiation, the magnitude of the reduction, and the positive effects such a reduction will have on the sustainable yield.
Management Actions	3.5.1 Interim Milestones and Figure 3-9	Is it misleading to submit a linear interpolated interim milestone path to sustainability to DWR without including in the GSP a description of the plan to get to sustainability? Without an allocation plan and/or proposed pumping ramp down schedule in place and included in the GSP, is it likely that the 2025 interim milestone will be met? Would it make more since to use an exponential function path that would commit stakeholders to a less extreme early path towards sustainability and allow them time to plan for the future while also using the early time to gather the needed data to reduce the uncertainty of the subbasin's sustainable yield range?
Modeling / Scenarios	2.4.5.1 - page 2-45	Future Baseline Scenarios set groundwater extractions to a constant value of 2015-17 average, but adjusted based on surface water deliveries. Was the pumping adjusted based on precipitation or ET or ?? to account for fluctuations in demand? Not all groundwater pumpers have access to surface water. Were the groundwater extraction rates for those without surface water access kept at the 2015-17 average value?

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Modeling / Scenarios	2.4.5.1 - page 2-46	This section indicates two projects were included in the future scenario modeling effort, but page 5-1 says only one project (fallowing) was included. Please clarify what projects were used in the modeling effort.
Modeling / Scenarios	Figure 2-44	Why was a modeling scenario not generated that turned off all groundwater pumping within the model domain? This recommended scenario although dependent on assumptions and simplifications could serve as a pre-development baseline. Prospectively this scenario would show a condition in which the LAS flux would be seaward and would be valuable in estimating LAS sustainable yield.
Water Budgets	Table 2-10 - page 2-79 to 2-80	The table shows pumping amounts from UWCD's model. UWCD prepared a Tech Memo, *"Reported Pumping Database Comparison Within the Oxnard Plan and Pleasant Valley Basins, FCGMA and UWCD Record Sets"*, in response to Dudek's preliminary comparison of FCGMA and UWCD's independently maintained groundwater pumping database. The UWCD Tech Memo (dated September 2017) was delivered to Dudek. There are a number of differences in reported pumping in Table 2 of the Tech Memo from that reported in GSP Table 2-10. Was the UWCD Tech Memo considered in preparing the GSP?
Stakeholder Engagement	Appendix B - 1.1 - page 1-3	Section 1.1 seems to discuss the composition of the FCGMA Board and neglects to present how that Board makes decisions (the title of the section). The section was expected to discuss how the Board would consider, for example, input from its Technical Advisory Committee (i.e., is the input from the TAG merely advisory [as the name implies] or is it afforded some other level of credence), how the Board would address stakeholder input that was poorly informed, what are the roles and responsibilities of the Board v. staff v. consultant in the implementation of the Public Outreach and Engagement Plan (POEP), does the Board have guiding principles that set the tone for how the engagement process would be developed and implemented, and how will the Board handle stakeholder responses that are inconsistent with FCGMA Director interests.
Stakeholder Engagement	Appendix B - 4.2.1 - page	There are many more stakeholder groups with interests in the groundwater resources of this basin. Stakeholder groups are not meant to be limited to the just the groundwater extractors in the basin. SGMA defines "stakeholder" much more broadly and could include environmental groups, residents, or community groups, for example. The intent of SGMA is for stakeholder groups, in the broadest definition, to have opportunities to provide input into the GSP development process and their input should not be defined as just *"...providing opportunities for their voices to be heard in open public forums before the FCGMA Board."*
Stakeholder Engagement	Appendix B	The POEP is intended to be the play book stakeholders can refer to which guides them on how to engage with the FCGMA on the GSP development process and to document to DWR how a GSA complied with the stakeholder engagement process that is a part of SGMA. It is expected that the POEP would identify the specific stakeholders for this basin (e.g., which DACs, what industry or municipal groups, tribal entities, municipalities, general interest public groups, residents of which cities, towns, or communities), the specific points of contact (POC) for these groups, and a summary of the outreach efforts made to these POCs. Listing generic groups without any details of the "who, what, when, and where" of the outreach to these groups is not in the spirit of

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		SGMA and does not provide convincing evidence to DWR that concerns of "interested parties" were considered in preparation of the GSP.
Stakeholder Engagement	Appendix B - 5 - page 15	The discussion of the draft GSPs being brought before the FCGMA Board in December 2017 is confusing. A preliminary draft was released, but the draft GSP was released in July 2019. It would be helpful to update this language to reflect the current GSP review and update process.
Stakeholder Engagement	2.4.5 - page 2-43 to 2-45	How were the stakeholders engaged in selecting the six modeling scenarios and associated assumptions and pumping reductions contained in each? Were they informed early in the process how pivotal the results of modeled scenarios would be in arriving at the subbasin's sustainable yield range?
Monitoring	4.3.1	2nd full paragraph: The location of the dedicated monitoring well in the Hueneme Aquifer is not apparent on the map.
Monitoring	4.3.1	The document states (PDF pg. 324) that, "The spatial and temporal coverage of the existing groundwater monitoring network is sufficient to provide an understanding of representative conditions in the upper alluvium and LAS in the PVB and this network will be used to demonstrate progress toward the sustainability goals for the PVB." It appears that the only criterion for adequacy discussed in Chapter 4 is the number of wells per square mile as compared to CASGEM Groundwater Elevation Monitoring Guidelines. However, as depicted in Fig 4-2, there are four wells screened in the Fox Canyon Aquifer in the northern half of the Pleasant Valley Pumping Depression Mgt. Area, three wells in the northern portion of the North Pleasant Valley Mgt. Area, and no wells in the East Pleasant Valley Mgt. Area. With no wells in the southern half of the Pleasant Valley Pumping Depression Mgt. Area, no wells in the southern half of the North Pleasant Valley Mgt. Area, and no wells in the East Pleasant Valley Mgt. Area, it's not clear how the document arrives at the conclusion that spatial distribution of this network of monitoring wells is adequate.
Monitoring	4.3.1	The document should address the adequacy of monitoring well coverage within each management area. 23 CCR §354.34(d)-(j) states: … If management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the basin setting and sustainable management criteria specific to that area. Based on Fig 4-1 and 4-2, there are no monitoring or non-monitoring wells screened in the Oxnard, Mugu, Hueneme, Fox Canyon aquifers of the East Pleasant Valley Mgt. Area of the PVB.
Monitoring	4.3.1	DWR's BMP on Monitoring Networks and Identification of Data Gaps states that, "Spatial data gaps may occur from a monitoring network with low or uneven density in three dimensions". Discussion should also address the impact of clustered wells such that significant portions of the management areas are not covered.
Monitoring	4.6.4	The analysis of the need for subsidence monitoring presented in this section appears to be inadequate. The Monitoring Networks and Identification of Data Gaps BMP states that prior to development of a specific subsidence monitoring network a screening level analysis should be conducted that includes review of

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		any known regional or correlative geologic conditions where subsidence has been observed. The USGS presents areas of recorded subsidence—historical and current—across California. Significant portions of the PVB are included in the areas mapped by the USGS. The map is located at < https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html> It is recommended that this section be reconsidered to address this information and all other available data and information on subsidence in the basin.
Monitoring	Chapter 4	While it may be addressed on a general level elsewhere in the GSP, the chapter on monitoring networks does not state that a 5-year review of the adequacy of the monitoring network will be conducted as specified in 23 CCR §354.38. Assessment and Improvement of Monitoring Network (BMP 2; PDF pg. 26).
Monitoring	4.5	The GSP Regulations specifically call out the need to utilize protocols identified in the Groundwater Monitoring Protocols, Standards, and Sites BMP (BMP #1), or develop similar protocols. The document wording on monitoring program protocols is vague. No specific protocols are identified that will be used. There is a description of what is currently used, and a statement that the FCGMA plans to work with agency partners to ensure that future data collection is conducted according to relevant protocols in the BMPs. More appropriate would be a statement that affirms that the GSA has adopted (as part of this GSP), or will develop and adopt prior to the first sampling date after the deadline date for submittal of the GSP, sampling protocols consistent with BMP #1 that will be used at all times for sampling in the PVB..
Monitoring	4.4	BMP #1 (pdf pg. 8) states that at a minimum, for each monitoring site, long-term access agreements are needed. Access agreements should include year-round site access to allow for increased monitoring frequency. That information or procedure should be collected and documented. Experience teaches that site access can cause major time delays in groundwater studies. While it may be obvious to the GSA that site access agreements are not a problem, a discussion of the plan to secure site access agreements for both existing and newly established monitoring points should be included in the document. In other words, in this regard, the current plan as written does not sound like a plan, but rather sounds like a plan to write a plan.
Monitoring	4.1	BMP #1 and BMP #2 both suggest that,"… each GSP incorporate the Data Quality Objective (DQO) process following the US EPA Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA, 2006). Although strict adherence to this method is not required, it does provide a robust approach to ensuring data is collected with a specific purpose in mind,". Associated with the DQO process, the BMPs also recommend that a description be given of the data necessary to evaluate the sustainability indicators and other GSP requirements (i.e., water budget). Although exact replication of the EPA DQO process may not be necessary, the discussion of the monitoring plan would be improved by a section that demonstrates the nexus between the data being collected and factors that comprise the water budget, the groundwater model, the sustainability criteria and how sustainability will be evaluated through that nexus. Inclusion of this methodical approach would ensure that a complete evaluation of the adequacy

Draft Pleasant Valley GSP (July 2019) Technical Review Comments

<table>
<tr><th>Category</th><th>Section - Page #</th><th>Comment</th></tr>
<tr><td></td><td></td><td>of the monitoring system for the three-dimensional aquifer systems of the PVB is conducted.

For example, groundwater elevation contours will need to be interpreted for individual aquifer systems in order to evaluate the stored groundwater status, direction of flow, and gradients. The text (PDF pg. 328) states that there are two total wells in the older alluvium (age equivalent strata to what is referred to as the Oxnard Aquifer in the Oxnard Subbasin). However, if the data quality objective is to draw groundwater contours, two data points are not sufficient to credibly accomplish that task. The DQO process is designed to reveal this type of inadequacy so that a plan can be developed to overcome this challenge.</td></tr>
<tr><td>Monitoring</td><td>4.6.1</td><td>This section does not sound like a plan. Rather it sounds like recommendations for the GSA to consider at some unspecified time in the future. For example, the following phrases are used in describing the need for additional wells:
• “Additional monitoring wells could be used to improve spatial coverage for groundwater elevation measurements in all three management areas of the PVB”
• “In the PVPDMA, the groundwater monitoring network in the PVB could be improved by adding a monitoring well or wells to the south of 5th Street”
• “In the NPVMA, the groundwater monitoring network could be improved by adding a monitoring well or wells. Currently, there are no dedicated monitoring wells screened in any of the primary aquifers in this NPVMA.”
• There are additional examples of this kind of vague plan language.

A proper plan (and what is specified in the collective DWR BMPs) states exactly what will be done, why it will be done, how it will be done (and, in this case of multiple agencies, who is responsible for execution), when it is scheduled to be done, how it meets the DQO objectives, and how the resulting data will be used. A straightforward qualifying statement can be added stating that the plan is subject to change, depending on the field and financial conditions encountered at the time of implementation.

This section should be re-written in this way, as an actual plan, and then considered for approval by the GSA board.</td></tr>
</table>

The Nature Conservancy
Protecting nature. Preserving life.

CALIFORNIA WATER | **GROUNDWATER**

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nature.org
GroundwaterResourceHub.org

September 17, 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: Pleasant Valley Basin Groundwater Sustainability Plan

Dear Mr. Pratt,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the Pleasant 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 Pleasant 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 the TNC-led analyses of GDEs that were included in the draft GSPs for Oxnard Subbasin and Las Posas Valley Basin and helped guide the approach for the Pleasant Valley Basin.

2. Basin GDE and ISW Maps

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 Pleasant 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.

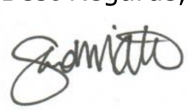
Conclusion

The Nature Conservancy has thoroughly reviewed the Pleasant 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 **adequate** with respect to addressing environmental beneficial uses and meeting the ecosystem objectives of SGMA. We have provided some general and specific comments to further improve the GSPs identification and consideration of environmental uses, and in particular groundwater dependent ecosystems (GDEs).

Our specific comments related to the Pleasant Valley Basin Draft GSP are provided in detail in **Attachment B** and are in reference to the numbered items in **Attachment A. Attachment C** provides a list of the freshwater species located in the Pleasant 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 develop your GSP.

Best Regards,



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

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

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
Pleasant Valley Basin Groundwater Sustainability Plan, Public Review Draft

A complete draft of the Pleasant 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.

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

- Section 1.8.2, pp. 1-45 - 1-46
  The GSP identifies the primary environmental users in the Pleasant Valley Basin as the willow/mulefat riparian scrub and Arundo vegetation communities found along the banks of Conejo Creek, and Calleguas Creek, lower Arroyo Las Posas and Conejo Creeks. The degree to which these ecosystems use groundwater versus percolating surface water is uncertain. 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 1-8
  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.

Description of general plans and other land use plans relevant to GDEs and their relationship to the GSP [Checklist Items 2 to 3 - (23 CCR §354.8)]

- Section 1.4.2 Operational Flexibility Limitations (p. 1-19 to 1-20)]
  A Multiple Species Habitat Conservation Plan prepared by UWCD specifies flow conditions at the Freeman Diversion to be constrained by the habitat requirements for the federally endangered Southern California steelhead (Oncorhynchus mykiss) in the Santa Clara River.

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

- Section 2.2.4 Principal Aquifers and Aquitards (p.2-6 to 2-7), with additional detail in Sections 1.3.2.1, 2.3.1.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K
  Notes: Description & Cross-sections are contradictory in presenting extent of Shallow Alluvial Aquifer. Also discussion of semi-perched aquifer – not clear where it is (need areal extent maps for both. Both make it clear are not principal aquifers.
  Section 2.2.4 describes the Shallow Alluvial Aquifer that is interconnected with surface waters (Arroyo Las Posas, Conejo Creek, and Calleguas Creek) and potential GDEs. The basin-wide cross sections provided in Figures 2-3 and 2-5 include a graphical representation of the manner in which shallow groundwater may interact with ISWs or GDEs that would allow the reader to understand this topic, though the representation doesn't match the text language in Section 2.3.1.1, which states "The Shallow Alluvial Aquifer comprises the **recent alluvial deposits** [emphasis added] that line Arroyo Las Posas, Arroyo Santa Rosa, Conejo Creek, and Calleguas Creek in the PVB". Also Figure 2-4 does not indicate presence of the Shallow Alluvial Aquifer in this area. Figure 2-2 shows the recent alluvium along Conejo Creek and lower part of Calleguas Creek, but the placement of the Shallow Alluvial Aquifer in the cross-section A-A' in Figure 2-3 doesn't quite match up. Including the locations of the Conejo and Calleguas Creeks would help clarify the understanding. It is also unclear where the semi-perched aquifer exists within the Pleasant Valley Basin. Neither the Shallow Alluvial Aquifer nor the semi-perched aquifer are considered principal aquifers in the Pleasant Valley Basin.

<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>

- Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1
  Arroyo Las Posas, Conejo Creek, and Calleguas Creek have all been identified as surface water bodies that may have a connection to the Shallow Alluvial Aquifer in the Pleasant Valley Basin. Arroyo Las Posas is ephemeral in the Pleasant Valley Basin and is likely to be a disconnected losing stream. Conejo Creek and Calleguas Creek, which are perennial due to wastewater treatment discharges. Numerical modeling estimates of annual quantification of recharge to groundwater from Arroyo Las Posas, Conejo Creek, and Calleguas Creek are provided in Section 2.3.6. However, while the model results list net recharge to groundwater via stream loss, the discussion in Sections 2.3.6 and2.3.7 indicates there is insufficient knowledge to build a conceptual model of the extend of losing and gaining reaches.

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

- Section 2.3.7 (pp. 2-25 to 2-27)
  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). In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and

ecological conditions of the potential GDEs. Given the uncertainty regarding the depths to groundwater within these areas, the ecosystems are appropriately considered potential GDEs, with future monitoring needs identified to assess the degree to which existing habitat is reliant on groundwater.

Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)]

- Section 2.4
  The water budget includes the natural system surface hydrology components including the surface water recharge from the Arroyo Las Posas, Conejo Creek, and Calleguas Creek and natural vegetation evapotranspiration (ET) along these riparian systems. These have been modeled using the UWCD numerical model.

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

- Section 3.1 Introduction to Sustainable Management Criteria (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)."

  Under current and known future conditions, as described in Section 3.3.6, the sustainability goal does not require inclusion of sustainability criteria for surface water connectivity.

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

- Section 3.3.6 Depletions of Interconnected Surface Water (p. 3-12 - 3-13)
  The GSP clearly states: "The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat." We applaud this clear recognition of GDEs as an important beneficial use that must be protected. We also agree with further statements that 1) undesirable results are not currently occurring, 2) linkage between groundwater and the potential GDEs must be established and 3) if future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."

Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)]

- Section 3.4.6 Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-20)
  We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if

projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".

Measurable Objectives -Checklist Item 26 – (23 CCR §354.30)

- Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-25)
  We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".

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.

- Section 4.6.5 Shallow Groundwater Monitoring near Surface Water Bodies and GDEs (p.4-15)
  The GSP notes the lack of shallow groundwater monitoring wells in the Shallow Alluvial aquifer that can be used to monitor interconnected surface water bodies/GDEs along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. We do not think this is necessary for the Arroyo Las Posas.
  We would recommend further investigation of the water level records in the younger alluvium that are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker. If these water level records can demonstrate the groundwater connection, or lack thereof, then the data gap regarding connectivity can be closed. This could be very useful given that there is limited funding available to install new monitoring wells, and this is currently a low priority given that the Shallow Alluvial Aquifer is not a principal aquifer.

- Section 4.6.6 Surface Water: Flows in Agricultural Drains in the PVB (p.4-15)

We would also recommend that we survey the water surface elevation in the drains, as they should provide easy to measure, calibration head values for the numerical model and good indication of the semi-perched aquifer elevations.

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

- Section 5
  Section 2.3.8, Potential Recharge Areas, identifies potential future recharge areas that have the most favorable soil recharge rates. These are along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. Consistent with existing grant and funding guidelines for SGMA-related work, priority should be given to multi-benefit projects that can address water quantity as well as providing environmental benefits or benefits to disadvantaged communities. TNC recommends the GSA look for environmental partners to co-develop such multi-benefit projects that benefit supply and environment; our perspective is that additional funding can be gained from such projects.

Attachment C

Freshwater Species Located in the Pleasant 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 Pleasant 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[4]. 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[5] as well as on The Nature Conservancy's science website[6].

Scientific Name	Common Name	Legally Protected Species		
		Federal	State	Other
BIRDS				
Actitis macularius	Spotted Sandpiper			
Aix sponsa	Wood Duck			
Anas americana	American Wigeon			
Anas cyanoptera	Cinnamon Teal			
Anas discors	Blue-winged Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
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 mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Chroicocephalus philadelphia	Bonaparte's Gull			
Cistothorus palustris palustris	Marsh Wren			
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Himantopus mexicanus	Black-necked Stilt			

[4] 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
[5] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS
[6] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Ixobrychus exilis hesperis	Western Least Bittern		Special Concern	BSSC - Second priority
Limnodromus scolopaceus	Long-billed Dowitcher			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Mergus serrator	Red-breasted Merganser			
Numenius americanus	Long-billed Curlew			
Numenius phaeopus	Whimbrel			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oreothlypis luciae	Lucy's Warbler		Special Concern	BSSC - Third priority
Oxyura jamaicensis	Ruddy Duck			
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Piranga rubra	Summer Tanager		Special Concern	BSSC - First priority
Plegadis chihi	White-faced Ibis		Watch list	
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Vireo bellii	Bell's Vireo			
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
CRUSTACEANS				
Cyprididae fam.	Cyprididae fam.			
Hyalella spp.	Hyalella spp.			
FISH				
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Anaxyrus punctatus	Red-spotted 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
Taricha torosa	Coast Range Newt		Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTEBRATES				
Ablabesmyia spp.	Ablabesmyia spp.			
Anax spp.	Anax spp.			
Apedilum spp.	Apedilum spp.			
Argia spp.	Argia spp.			
Baetis adonis	A Mayfly			
Baetis spp.	Baetis spp.			
Callibaetis spp.	Callibaetis spp.			
Centroptilum spp.	Centroptilum spp.			
Chaetarthria spp.	Chaetarthria spp.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Cladopelma spp.	Cladopelma spp.			
Cladotanytarsus spp.	Cladotanytarsus spp.			
Coenagrion spp.	Coenagrion spp.			
Coenagrionidae fam.	Coenagrionidae fam.			
Corisella decolor				Not on any status lists
Corixidae fam.	Corixidae fam.			
Cricotopus bicinctus				Not on any status lists
Cricotopus spp.	Cricotopus spp.			
Cryptochironomus spp.	Cryptochironomus spp.			
Cryptotendipes spp.	Cryptotendipes spp.			
Culicidae fam.	Culicidae fam.			
Dicrotendipes spp.	Dicrotendipes spp.			
Enallagma spp.	Enallagma spp.			
Ephydridae fam.	Ephydridae fam.			
Eukiefferiella spp.	Eukiefferiella spp.			
Fallceon quilleri	A Mayfly			
Fallceon spp.	Fallceon spp.			
Hydrobius spp.	Hydrobius spp.			
Hydrophilidae fam.	Hydrophilidae fam.			

Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Ischnura spp.	Ischnura spp.			
Limnophyes spp.	Limnophyes spp.			
Micropsectra spp.	Micropsectra spp.			
Nanocladius spp.	Nanocladius spp.			
Optioservus spp.	Optioservus spp.			
Parachironomus spp.	Parachironomus spp.			
Paraphaenocladius spp.	Paraphaenocladius spp.			
Paratanytarsus spp.	Paratanytarsus spp.			
Pentaneura spp.	Pentaneura spp.			
Petrophila spp.	Petrophila spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Polypedilum spp.	Polypedilum spp.			
Procladius spp.	Procladius spp.			
Progomphus borealis	Gray Sanddragon			
Pseudochironomus spp.	Pseudochironomus spp.			
Pseudosmittia spp.	Pseudosmittia spp.			
Psychodidae fam.	Psychodidae fam.			
Rheotanytarsus spp.	Rheotanytarsus spp.			
Simulium argus				Not on any status lists
Simulium spp.	Simulium spp.			
Simulium vittatum				Not on any status lists
Sperchon spp.	Sperchon spp.			
Tanytarsus spp.	Tanytarsus spp.			
Tipulidae fam.	Tipulidae fam.			
Tribelos spp.	Tribelos spp.			
Tricorythodes explicatus	A Mayfly			
Tricorythodes spp.	Tricorythodes spp.			
MOLLUSKS				
Ferrissia spp.	Ferrissia spp.			
Hydrobiidae fam.	Hydrobiidae fam.			
Lymnaea spp.	Lymnaea spp.			
Lymnaeidae fam.	Lymnaeidae fam.			
Physa spp.	Physa spp.			
PLANTS				
Bolboschoenus maritimus paludosus	NA			Not on any status lists
Cotula coronopifolia	NA			
Ludwigia peploides peploides	NA			Not on any status lists

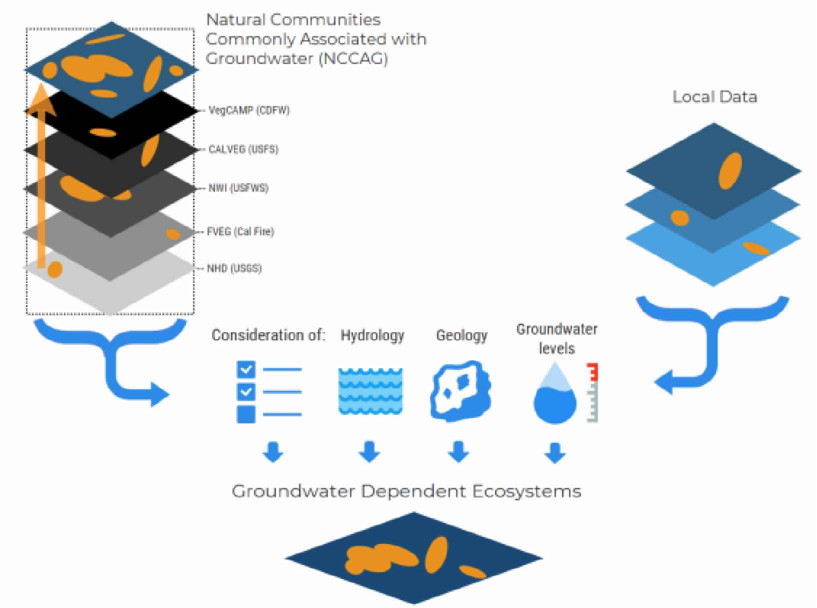
Rumex kerneri	NA			
Schoenoplectus americanus	Three-square Bulrush			
Typha domingensis	Southern Cattail			
Veronica anagallis-aquatica	NA			

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[7] 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)[8]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.



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

[8] 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[9]. 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[10] on the Groundwater Resource Hub[11], 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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[9] 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

[10] "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/

[11] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

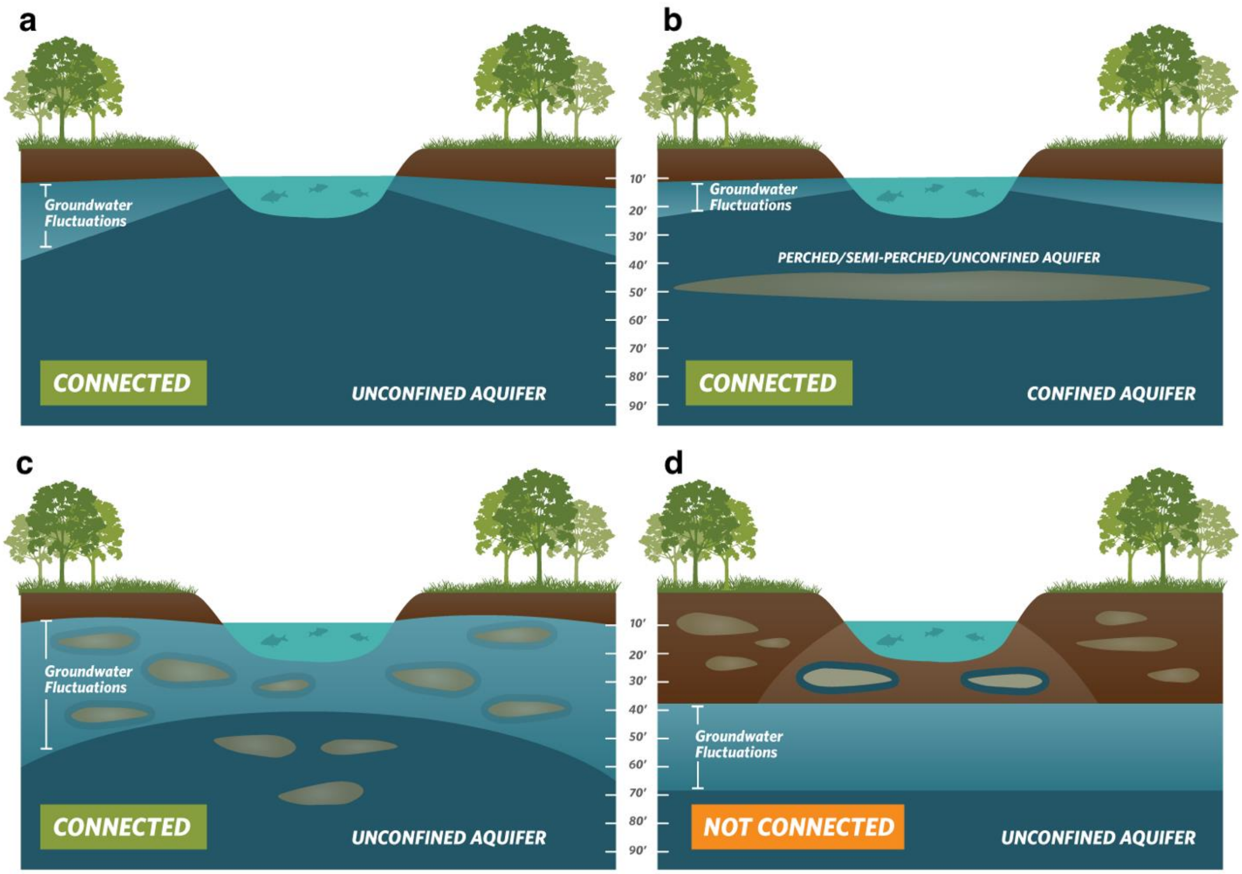

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying 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[12] 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[13] 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[14] 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[15]. 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).

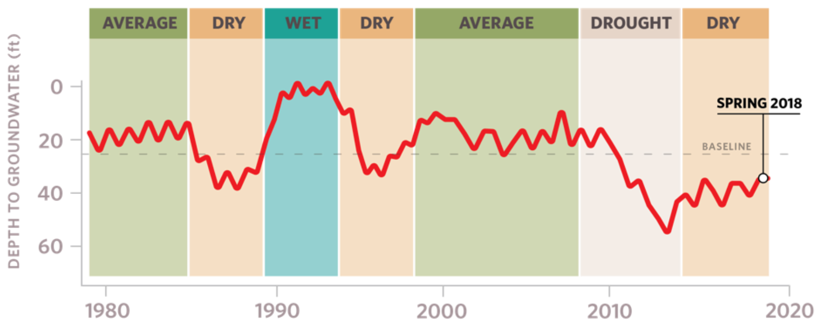

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so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

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[12] 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

[13] *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)]*

[14] 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]).

[15] *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[16], 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).

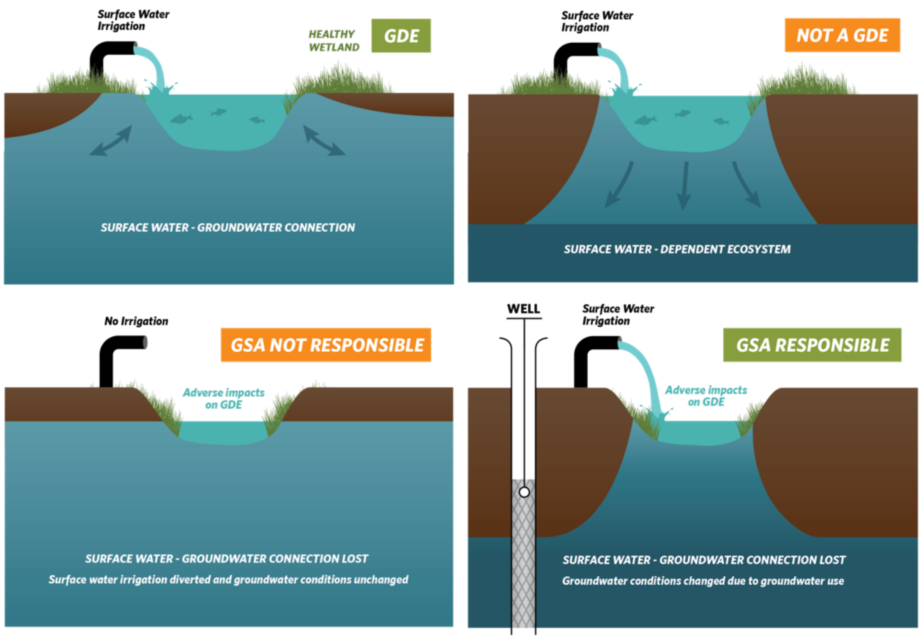

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **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.

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[16] *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.

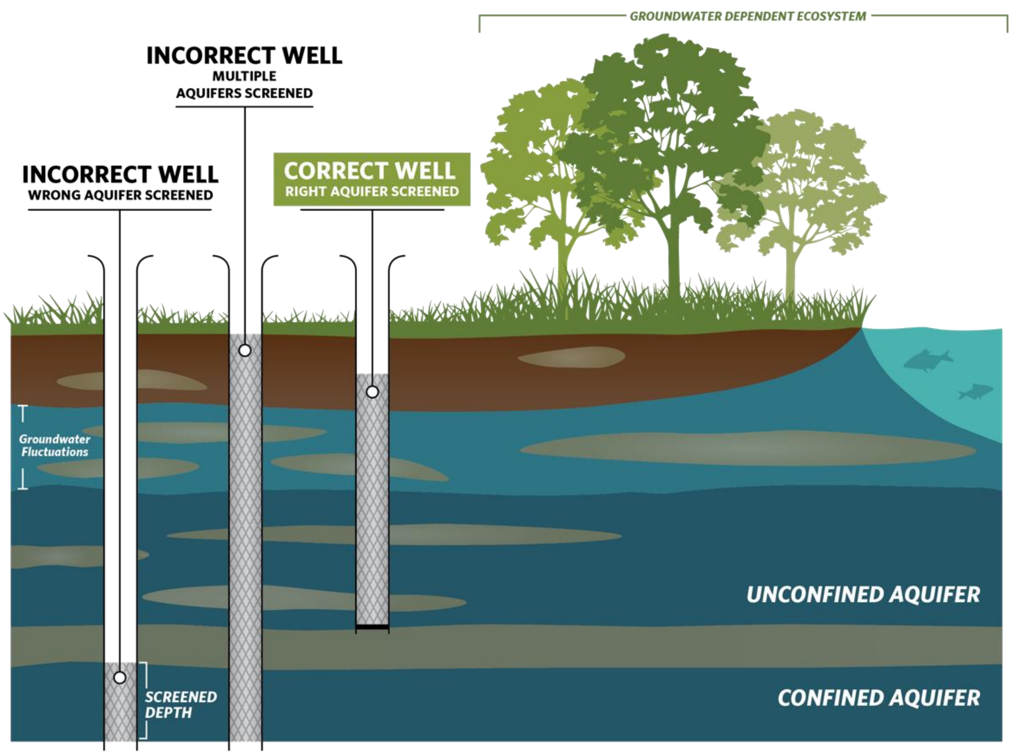


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

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)[17] 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.

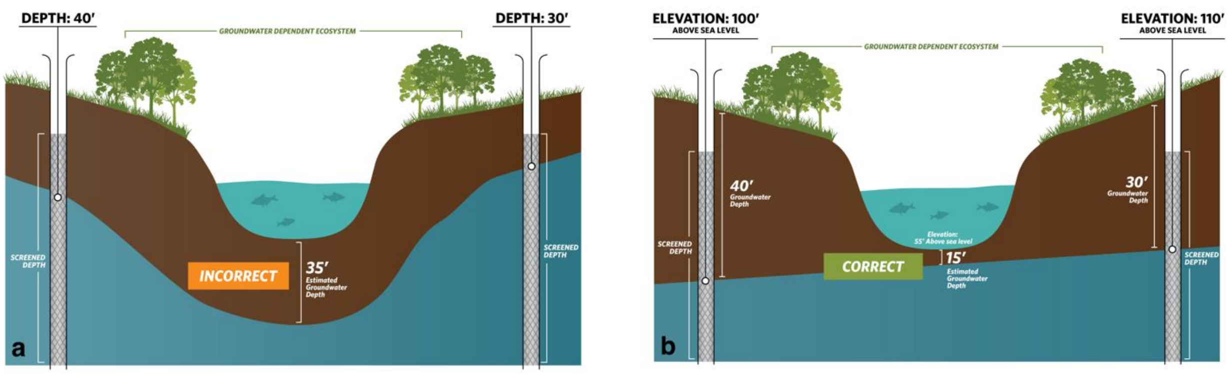


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

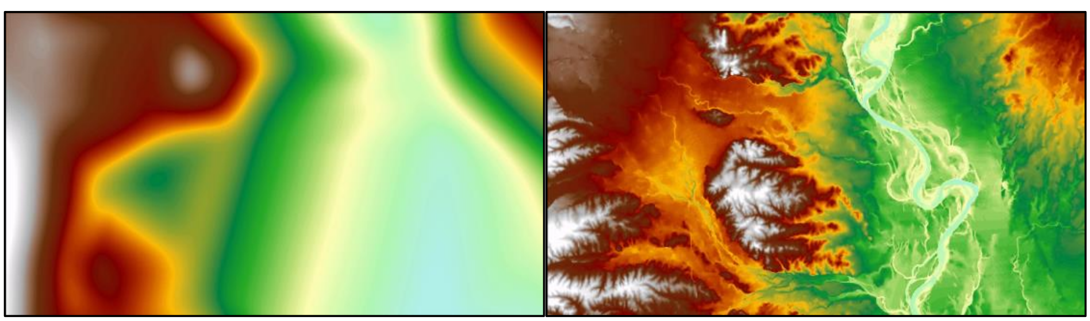


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation 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.

[17] 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.

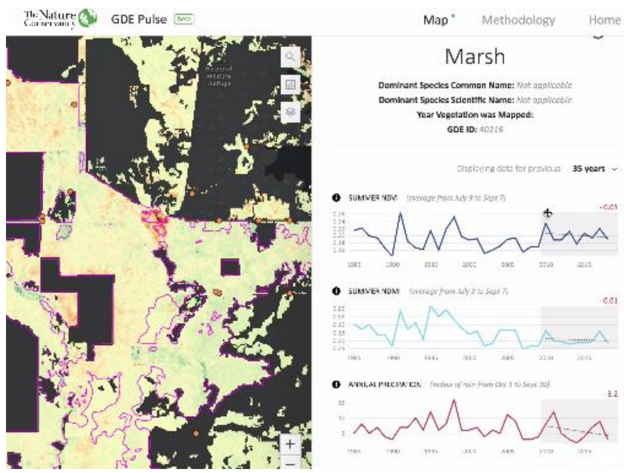
Attachment E

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[18]. 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[19]. 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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[18] *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/#*

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

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:

The Camrosa Water District GSA – Pleasant Valley (Camrosa) cannot at present support the draft GSP and will not be able to adopt it in its current form. The plan does not recognize the area of the PVB under Camrosa jurisdiction as a discrete and autonomous management area and there is no mechanism that distributes responsibility between the two agencies.

Section 1.1 PURPOSE OF THE GROUNDWATER SUSTAINABILITY PLAN states, "The County of Ventura (County) and the Camrosa Water District (CWD) have each elected to act as the GSA for portions of the PVB not within FCGMA's jurisdiction. The County and CWD will rely on this GSP and *coordinate with FCGMA as necessary* to ensure that the PVB is sustainably managed in its entirety, in accordance with SGMA" (p. 1-1; emphasis added). Camrosa has attempted to coordinate with FCGMA staff over the course of many months to arrive at a coordination agreement or similar mechanism acceptable to both agencies that would allow for the cooperative management of the area of the PVB under Camrosa's jurisdiction, but as of this writing, we have been unable to accomplish that.

At particular issue is the so-called University Well, which feeds Camrosa's Round Mountain Water Treatment Plant, a 1 MGD brackish groundwater desalter. Since it first began investigating the well for drinking water purposes in the 1990s, Camrosa has conducted extensive review of the University Well area, including: lithologic logs of wells in and around the University Well area; groundwater quality of wells in the University Well area and in the GMA to the west; groundwater levels and trends in wells in the University Well area and in the GMA to the west; well production rates and aquifer response to test pumping of the University Well; local and regional stratigraphy; and the lateral continuity of strata in both the University Well area and the GMA area to the west. Results of these studies strongly indicate that the University Well does not produce from the Lower Aquifer System strata that exists in areas west of the University Well. In fact, the Lower Aquifer System does not appear to exist in the University Well area and groundwater produced from the University Well most likely consists of groundwater from laterally discontinuous shallow zones that are either confined or semi-perched, and underly fractured bedrock material.

Significant portions of this characterization were made by Norm Brown in 2010 and verified by Dr. Brown as recently as this month; both far more recent than Turner 1975 and Jakes 1979 relied upon by the GSP for characterization of the Bailey Fault, which is the geological formation of greatest consequence in this discussion.

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Website: www.camrosa.com

FCGMA staff dispute Camrosa's characterization of the University Well, presenting as evidence unsubstantiated reference to United Water Conservation District's conceptual hydrostratigraphy.

More to the point, the University Well lies outside the jurisdiction of the FCGMA. This makes sense, given that the preponderance of evidence suggesting that the University Well produces from different geological formations than the main water-bearing formations of the Pleasant Valley Basin. The area necessitates a different approach to groundwater management than that developed for the areas of the Pleasant Valley Basin to the west.

This is the gist of the agreement over which Camrosa has been trying to come to terms with the FCGMA, and to which effect we propose adding into the GSP the following language:

The University Well area, situated as it is outside of the Pleasant Valley Basin and FCGMA jurisdiction, will be managed separately from the areas of the Pleasant Valley Basin subject to the FCGMA GSP. Management actions proposed for the area, including but not limited to production reporting, the restriction of allocation of pumping, and extraction and replenishment fees, must be adopted by both the FCGMA and Camrosa through Board action.

We look forward to finalizing a mutually satisfactory agreement between Camrosa and the FCGMA to resolve this issue so the Camrosa GSA can adopt the FCGMA Pleasant Valley GSP.

Corollary to this, the Camrosa GSA area is not recognized in the plan as a separate management area, despite the well-documented differences in geology summarized above and described in the Plan itself, as well as statements within the GSP that portions of the East Pleasant Valley Management Area (EPVMA) are within Camrosa's jurisdiction. More on this below.

The remainder of Camrosa's comments come in two parts: comments from Camrosa staff, followed by comments from Terry Foreman, Camrosa Water District Board member and the FCGMA Special Districts' appointee to the GSP technical advisory group (TAG).

1. **THROUGHOUT.** As of July 26, 2019, DWR separated the Camrosa OPV Management Area GSA into two separate GSAs, the Camrosa Water District GSA – Pleasant Valley and the Camrosa Water District GSA – Oxnard Subbasin. This change needs to be reflected in the GSP whenever "Camrosa OPV Management Area GSA" is referenced.

2. **Camrosa Water District GSA – Pleasant Valley Management Area.**

   Management areas of the PVB are generally treated superficially in the draft GSP; the Camrosa management area is ignored almost completely. Such delineation was the object of Camrosa's attempts at a coordination agreement with FCGMA over the draft development period; its absence comprises our primary comment and reason for not being able to support the GSP.

   ES.1 INTRODUCTION states that the "Camrosa OPV GSA jurisdictional area coincides with the portion of the Camrosa Water District Service area in the EPVMA. The PVB Outlying Areas GSA covers the remaining portions of the EPVMA not within Camrosa OPV GSA jurisdiction" (p. ES-3).

   While acreage information and percent coverage of the PVB are described in Table 1-3 (p. 1-48) and the bounds of the Camrosa GSA are depicted in Figure 1-2 (p. 1-63), the Camrosa area does not receive adequate attention throughout the GSP.

For example, Section 2.5 MANAGEMENT AREAS simply states that "the PVB has been divided into three management zones: the North Pleasant Valley Management Area (NPVMA), the Pleasant Valley Pumping Depression Management Area (PVPDMA), and the East Pleasant Valley Management Area (EPVMA)." Despite the assertion that "the EPVMA lies within the jurisdiction of the Camrosa OPV GSA and the Pleasant Valley Basin Outlying Areas GSA" (p. 2-57), the Camrosa GSA is not depicted in Figure 2-46, "Pleasant Valley Basin Management Areas" (p. 2-173).

Section 2.5 also states that "…minimum thresholds and measurable objectives for the PVPDMA and NPVMA will be applied to age- and/or depth-equivalent hydrostratigraphic units in the EPVMA" (p. 2-57). The shallow aquifer of the University Well area is different from the Semi-Perched Aquifer, Shallow Alluvial Aquifer, and Upper Aquifer System summarized in ES.2 and detailed in Section 2.2.4 Projected Aquifers and Aquitards. It is imperative that this delineation is correctly characterized throughout the GSP.

3. **ES. 5 PROJECTS AND MANAGEMENT ACTIONS.** In keeping with the correct delineation of authority and jurisdiction discussed above, Management Action No. 1 – Reduction in Groundwater Pumping needs to be revised. It currently states that "FCGMA has had the authority to monitor and regulate groundwater production in the PVB since 1983" (p. ES-9). This needs to be amended as follows (additions in **bold**): "FCGMA has had the authority to monitor and regulate groundwater production in the **portion of** the PVB **within its boundaries** since 1983."

   The same addition needs to be made in the first sentence of the following paragraph: "…for groundwater users in the **portions of the** PVB **within FCGMA boundaries**."

4. **1.1 PURPOSE OF THE GROUNDWATER SUSTAINABILITY PLAN.** The first sentence of this section should clarify that FCGMA is acting as the GSA for the portions of the PVB within its jurisdictional boundary (additions in **bold**): "…acting as the Groundwater Sustainability Agency (GSA) for the **portions of the** Pleasant Valley Basin (PVB) **within its jurisdictional boundaries**" (p. 1-1).

5. **1.2.3 Organization and Management Structure.** Additions in bold: "Extractors within the **portions of the** PVB **within FCGMA jurisdictional boundaries** will be subject to FCGMA's groundwater management actions under this GSP."

   A coordination agreement between FCGMA and Camrosa would provide for cooperative management of the basin; the draft agreements Camrosa provided FCGMA included language to the effect that groundwater management actions by either agency would only affect areas within the other agency's jurisdiction upon adoption by both agency boards.

6. **1.6.2. Urban Water Management Plans**, p. 1-32, fourth paragraph under *Description/Summary of Agency and Plan*, first sentence. Addition in bold: "CWD's **other** supply sources include…"

7. **1.6.2. Urban Water Management Plans**, p. 1-33, first paragraph under *Coordination with SGMA and Other Agencies*, fourth sentence. This paragraph states that "the management plans and

actions of each [FCGMA and Camrosa] will need to be coordinated.” The GSP is silent on how such coordination will occur; similar to note 5, draft coordination agreements provided by Camrosa to the FCGMA included descriptions of coordination processes in keeping with SGMA. Completing this agreement will provide the level of coordination this paragraph envisions.

8. **2.4.1.1. Surface Water Flows**, p. 2-30, third paragraph, final sentence; and 2.4.3.2. Historical Water Budget, p. 2-39, third paragraph, third sentence. These two sections refer to Table 2-5, “Stream Flows in Arroyo Las Posas and Conejo Creek, Conejo Creek Diversions, Deliveries by CWD, and Discharges from CSD into Conejo Creek (AF) (pp. 2-69 and 2-70). Footnote (d) to Table 2-5 states that “For water supplied by CWD to PVCWD, 56% is used in the Oxnard Subbasin and 44% in the PVB.” Without this context, the final column, “Total Conejo Creek Flow Diversions (AF),” could be misinterpreted as referring to *all* Conejo Creek deliveries. Please amend as follows (addtions in **bold**):

   p. 2-30: “Table 2-5 shows the amounts of water diverted by CWD via the Conejo Creek Diversion **and delivered within the PVB** based on records presented by CWD.”

   p. 2-39: “Table 2-5 shows the average amount of Conejo Creek water delivered by CWD **to the PVB** (3,562 AF).”

   Table 2-5, p. 2-70, final column header: “Total Conejo Creek Flow Diversions **Delivered to the PVB** (AF)”.

   Stating that portions of Conejo Creek diversions are delivered to the Oxnard Subbasin in the text and discussing how the 56/44 ratio was determined would remove confusion.

9. **2.2. SUSTAINABILITY GOAL**, p. 3-3, first full paragraph, first sentence. The text states that “proposed reductions in groundwater production must take into account both the potential economic disruption to the agricultural industry and the uncertainty in the estimated sustainable yield of the PVB.” Pumping reductions could impact the M&I sector, as well.

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

[comments continue next page]

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 Camrosa Water District Board, for specific comments on the Preliminary Draft (Subject to Change) of the Pleasant Valley Groundwater Sustainability Plan. His comments on behalf of Camrosa are provided below in two parts: general comments followed by more specific line-by-line questions and responses to various sections of the draft plan.

Comments on Draft (Subject to Change) Groundwater Sustainability Plan for the Pleasant 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 seems as though much of these requirements are left to later determinations; however, it is clear that 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 too much emphasis on pumping in the Pleasant Valley Basin (PVB) and its impacts on seawater intrusion in the Oxnard Basin (OxB). Why are PVB pumpers responsible for limiting seawater intrusion into Oxnard? There has/is projected to be groundwater flow from PVB to OxB in all future scenarios. Why isn't flow from the East Las Posas Management Area required to provide groundwater flow to PVB, so that PVB can continue to meet flow to OxB? What is the fair and reasonable flow to be provided from PVB to OxB? There is no limit to OxB pumping that PVB might be required to support in order to avoid seawater intrusion in the OxB. As presented in the GSP, it seems that PVB pumpers are expected to make an unfair contribution to avoid seawater intrusion in OxB. At TAG, we pointed out that the cuts proposed in PV to limit seawater intrusion in Oxnard appeared to be disproportionate and unreasonable.

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, Conejo Creek, and Calleguas Creek), 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 vary groundwater pumping over 1,000s 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 analyses 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 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 issue 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 numbers 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

Table of Contents

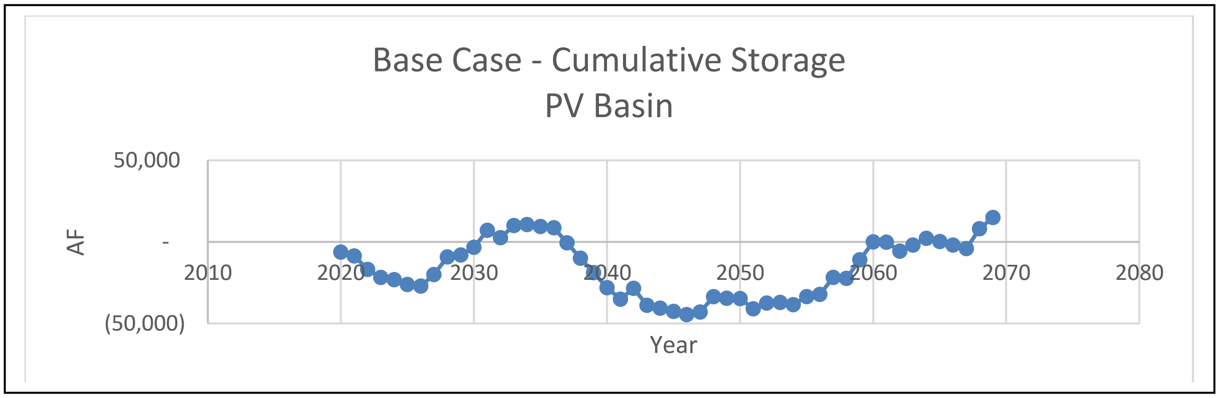
The labelled list of Appendices does not match the Appendices provided with the files download.

Executive Summary

p. ES-1, para. 3. This paragraph indicates that pumping from the Pleasant Valley Basin (PVB) affects seawater intrusion into the Oxnard Basin (OxB) because the basins are interconnected, so pumping in the PVB affects the water balance in the OxB. However, there is not a similar commentary about the Las Posas Basin being interconnected with the PVB, which affects the water balance in the PVB. In effect all these basins are interconnected and the water balance in one basin can affect the water balance in the other basins. However, the magnitude of the interbasin effects will depend on many factors which have only been lightly explored to date. I think the impacts of pumping in the PVB have been over-emphasized in this GSP given the analyses to date. There is no commentary about the interbasin flow between LPB and PVB, which effects the water balance in the PVB, the significance of which has not been assessed to date.

p. ES-1, para. 3. The 13,200 AFY value referenced in this paragraph is average simulated pumping (which is actually 13,150 AFY) over the last 30 years in the United Water Conservation District (UWCD) groundwater flow model used to simulate future base case conditions over a 50-year period (assuming 1930 through 1979 hydrologic conditions, adjusted using California Department of Water Resources [DWR] climate change factors). The actual 2015 to 2017 average pumping in the PVB is reported by FCGMA database to be 17,181 AFY. References to average 2015 through 2017 are used repeatedly in this GSP but it is not clearly stated that this value represents simulated pumping, and actual average pumping in the PVB over this period. This confusion needs to be cleared up throughout the GSP.

p. ES-1, para. 3. It is stated that for the Base Case condition, that groundwater levels in the PVB would not recover during multi-year cycles of droughts and recovery. It is not clear that this is the case, as a plot of cumulative change in groundwater storage in the PVB does recover and at the end of the 50-year simulation the basin has more water in storage than at the start of the simulation period. This is shown in the following plot.



p. ES-2, para. 1. The basis of the estimate of Sustainable Yield (SY) given as 11,600 AFY + 1,000 AFY is not clearly documented in this GSP. The discussion of SY in Chapter 2 involves several simulations conducted with UWCD's groundwater flow model using various assumptions about pumping and "projects" in the various FCGMA groundwater basins. Each simulation produces various levels of seawater intrusion in the OxB, which is discussed in Chapter 2. However, the leap to a specific SY value from these simulation results is not clearly described. This methodology used to arrive at the specific SY value needs to be provided. As described in the General Comment No. 5, the uncertainty analysis used is not a conventional analysis, so the uncertainty assigned to the SY value should be either eliminated and/or heavily qualified as a potential gross approximation of uncertainty that could change significantly upon a more conventional uncertainty analysis.

p. ES-2, para. 1. Comparison to the base case model simulated (last 30 years average) pumping average value is misleading as the actual reported average pumping value is 17,181 AFY. Note that the average pumping value for the historical 1985-2015 period is 15,671 AFY as reported in Table 2-10.

p. ES-4, para. 2. The focus of this paragraph is on Arroyo Las Posas flows and its contribution of recharge to the PVB. There is no comparable discussion of the Conejo Creek flows, which are a major contributor to recharge of the PVB, even more so than the Arroyo Las Posas flows, based on UWCD's model.

p. ES-4, para. 4. There are many references to impacts to groundwater quality from movement of brines and connate water due to lowered groundwater levels. However, this GSP is inconsistent in attributing impacts to groundwater quality to these potential sources. Realizing the uncertainties associated with trying to attribute water quality impacts to these sources, it seems appropriate to identify data gaps and monitoring programs to address them so that these sources can be ruled out or not and sustainable criteria can be established in a more certain manner.

p. ES-5, para. 2. The SY value (12,600 AFY) given at the end of this paragraph is not consistent with the value of 11,600 AFY given earlier in this section.

p. ES-7, bullet list. There is no basis or rationale given for the proposed conditions listed in this bullet list. The proposed conditions appear to be arbitrary. There is no basis or rationale given in the body of the report either.

p. ES-7, Section ES.4. It is stated that the current monitoring network is capable of delineating groundwater conditions in the PVB. However, the discussion goes on to mention various data gaps and potential additional monitoring. There needs to be a more comprehensive assessment of monitoring program needs and prioritization of installation of new monitoring features as future monitoring is expected to be a significant future expense. This topic has not been fully fleshed out at TAG or with stakeholders. The current assessment and discussion does not do this topic the justice it merits.

p. ES-8, Section ES.5. This section does not provide a recommended roadmap to bring the PVB to sustainability, including specific milestones to be met over the 20-year implementation period. There are only ideas such as fallowing and pumping reductions but no specific plans to implement either to achieve SY. I think DWR is expecting to see an adopted plan to achieve sustainability, with the understanding that the plan might change in the future. I think there needs to be a commitment to a specific plan until a new plan is adopted in subsequent GSP updates. Otherwise, DWR will not see a commitment to achieve SY and milestones to show progress.

<u>Chapter 1</u>

p. 1-2, para. 1. Please provide references to the documentation of historical land subsidence and depletion of interconnected surface waters.

p. 1-2, Section 1.2. This section describes the Agency and organization and management structure of the FCGMA, which is one of the GSAs for the PVB. It seems that the agencies, organizations and management structures should be provided for each of the applicable GSAs.

p. 1-9, Cost Estimate. It needs to be made clear that the cost estimates in Table 1-2 are for the entire FCGMA budget and not for PVB only. Also, it needs to be clear that these are preliminary estimates and subject to FCGMA Board approval annually.

p. 1-15, Projected Climate. The discussion in this section is irrelevant. The discussion should be based on the DWR projections which are used for this specific study. There should be documentation of how climate change has been accounted for in the future scenarios as indicated in General Comment No. 3.

p. 1-32, para. 5. CWD also pumps from the Woodcreek well which is in the north PVB. An additional well is under construction in the same area as the Woodcreek well.

<u>Chapter 2</u>

p. 2-12, Section 2.3. Much work and time was put into creating groundwater level contour maps for 2015 for each aquifer of the PVB (and OxB). UWCD and FCGMA produces groundwater level contour maps annually, yet there was no comparison and contrasts of the findings of this GSP effort with those efforts. These new groundwater level contour maps show the importance of contouring individual aquifers as opposed to aquifer systems. In addition, it would be useful to understand from the groundwater modeling, significant observations about groundwater levels differences between aquifers and potential implications regarding potentially significant and unreasonable adverse impacts. The modeling analysis could provide insight to whether or not monitoring of individual aquifers is important or not for various basin operating scenarios. So, recommendations should be provided regarding future production of groundwater level contour maps as compared to current mapping approach of FCGMA.

p. 2-14, Section 2.3.1.1, para. 1. United Water Conservation District collected data for many Shallow Aquifer wells. It does not appear that these data have been included, so it would be useful to include this information in this section.

p. 2-14, Section 2.3.1.1, para. 3. There is no discussion of the more than 20 foot rise in water levels. This appears to demonstrate significant recharge over the period of observations. This should be discussed in the context of DBS&A recharge assessments and increased flows in the creeks. Also, it would be useful to discuss data gaps that limit your ability to draw contour maps and temporal trends, which can be evaluated, including an analysis of data gaps using the numerical groundwater flow model, i.e., where would additional data be most useful in understanding groundwater conditions and will the data be value added in this understanding?

p. 2-14, Section 2.3.1.2. It would be useful to discuss data gaps that limit your ability to draw contour maps and temporal trends, which can be evaluated, including an analysis of data gaps using the numerical groundwater flow model, i.e., where would additional data be most useful in understanding groundwater conditions and will the data be value added in this understanding?

p. 2-16, Section 2.3.1.3. It would be useful to discuss data gaps that limit your ability to draw contour maps and temporal trends, which can be evaluated, including an analysis of data gaps using the numerical groundwater flow model, i.e., where would additional data be most useful in understanding groundwater conditions and will the data be value added in this understanding? In particular, there is a dearth of monitoring points in the northeast area of the basin and east of Bailey Fault. The northeast area of the basin contains numerous faults that may affect groundwater flow conditions, both from a quantity and quality standpoint. Hopkins (2008) shows that groundwater may be somewhat "compartmentalized," so this should be discussed further regarding any implications of groundwater production, recharge and impacts on groundwater levels, which may justify different objectives and thresholds, etc. The same is true for the area east of Bailey Fault.

p. 2-18, Section 2.3.3. I think the discussion about pumping in PVB affecting seawater intrusion in OxB is overstated. I think this discussion should be more measured and balanced, as pumping in the OxB is a more important consideration. I think a statement could be added to the effect that the water balance of the entire FCGMA basins is interconnected so that changes in water balances in one basin has some effects on the water balance in the other basins, but that these effects are dependent on many conditions and actions in each basin.

p. 2-19, Section 2.3.4. In general, there is no discussion of the quality of source waters that directly or indirectly recharge the basin. This is a significant oversight as the stakeholders and public should understand the quality of the various sources of recharge waters and potential implications to groundwater quality. In addition, there should be more discussion of coordination with other water quality plans, such as the Salt and Nutrient Management Plans and Total Maximum Daily Load Implementation Plans. DWR recognizes that guidance is lacking regarding addressing groundwater quality in the GSPs, so they are now working with the State Water Resources Control Board to develop some additional guidance on this subject. Secondly, there is no discussion about trends in groundwater quality. It is unreasonable for the reader to review all the data in appendices to assess historical trends. Historical trends should be provided as part of the discussion.

p. 2-19, para. 3. The statements about water quality concerns are not supported anywhere in the GSP with actual data or analysis. Also, see previous comment.

p. 2-20, Section 2.3.4.1. There is no attempt to explain the variation in TDS throughout the basin; it is only a presentation of data for a limited snapshot in time. Also, there is no discussion of whether values are increasing, decreasing or steady. To the extent it is possible to discuss these issues they should be discussed. There have been studies of potential sources of TDS and trends, so selective use of those studies observations and findings would be appropriate. This would help readers understand what if any groundwater quality impacts may be associated with pumping versus other effects, such as recharge source water quality. This comment applies to all constituents discussed in the GSP.

p. 2-24, Section 2.3.5. This section is incomplete and somewhat confusing. In part, it seems to suggest that subsidence is a potential (i.e., see reference to USGS report), yet there are no data or need to assess it (only reference to keeping groundwater levels to above historical lows). Subsidence was discussed at TAG meetings. For example, at the October 2015 TAG meeting, Mr. Foreman presented a proposal from Neva Ridge Technologies to assess the potential for applying InSAR technology to identify potential subsidence in the basin. This proposal was not pursued by GMA staff even though the cost was minimal and the technology is widely accepted. The State of California has engaged the Jet Propulsion Laboratory (JPL) to assess subsidence statewide as mentioned in the GSP (Farr 2017). The publication shows some potential subsidence in the western part of the Oxnard Basin for March 2015 to September 2016. The GSP states that the Farr, 2017 report shows less than one foot of subsidence. There is no quantification of how much less, but any subsidence over a 15-month period is potentially significant and would warrant further assessment. Further use of InSAR data may be used to assess whether there has been subsidence in the past and potential for the future as proposed by Neva Ridge Technologies. It seems like there is a data gap regarding subsidence which should be addressed in any proposed monitoring program.

p. 2-29, 2nd bullet of bullet list. CWD's supplies also include diversions of surface water from the Conejo Creek Project.

p. 2-30, para. 2. Calleguas MWD's consultant (Intera) has estimated flow from Las Posas to PVB. Bachman (2016) is referenced (in paragraph 2) regarding stream flows but his flows are not presented and compared to UWCD. Hopkins (2008) also presented an analysis of stream flows and losses to groundwater basin. These estimates need to be resolved, data gaps should be identified and future monitoring to reduce uncertainties going forward should be identified.

p. 2-32, para. 2. It is not clear if the partitioning of water delivered to PVCWD is Dudek's or UWCD's partitioning. Please clarify if the partitioning is used by UWCD in their groundwater model.

p. 2-32, para. 3. It is not clear if UWCD's model includes the CWD's delivered water quantities as described in this paragraph as UCWD's groundwater model was finalized prior to this information be made available to Dudek. Please clarify if UWCD's model includes the water deliveries described in this paragraph.

p. 2-32, para. 4. The UWCD groundwater flow model assumes that only 5% of M&I water deliveries become recharge to groundwater. The 5% value is less than water losses reported by most M&I

agencies. If 60% of M&I water use is outdoor use, and 20% of that outdoor water becomes groundwater recharge, then UWCD's value is low by a factor of 2 to 3. This additional recharge may not be significant in the overall water budget but it is important as a potential source of M&I water supply, as M&I agencies have a right to recapture their percolated foreign waters. As in the previous comment, it is not clear that UWCD includes all foreign water delivered by CWD.

p. 2-34, para. 1. Dudek retained Daniel B. Stephens & Associates (DBS&A) as a subconsultant to assess water budgets of the groundwater basins of the FCGMA. DBS&A used their Distributed Parameter Watershed Model (DPWM) to estimate groundwater recharge from precipitation and applied waters for irrigation. Dudek indicated that they had high confidence in the DBS&A DPWM analysis and used the results from DPWM in the water budget tables presented in the previous draft of this GSP. The DBS&A DPWM work has been eliminated from this draft, which I think is inappropriate. I think the DPWM (or similar model such as DWR's Integrated Water Flow Model Demand Calculator [IDC]) would be a better, more useful tool for estimating water budgets for input to the groundwater models. These models also provide a means to incorporate climate changes conditions, including temperature change projections, which are not easily addressed by the current methodology used by UWCD. As stated in this paragraph, the estimates of recharge from precipitation are subject to uncertainty, but this was not evaluated in the uncertainty analysis discussed in Appendix I.

p. 2-35, para. 1. The value of 1,559 AFY of mountain front recharge is for the UAS only. The total recharge is 1,880 based on UCWD's spreadsheet provided at TAG.

p. 2-35, Section 2.4.1.7. This item is not in UWCD's model and should be included explicitly.

p. 2-35, para. 2.4.1.8. This item should be updated based on DBS&A as DBS&A did a more thorough assessment of delivered water. UWCD's estimates of delivered water, particularly by M&I providers, should be reviewed in light of DBS&A's work and updated appropriately.

p. 2-36, Section 2.4.1.9. Same comment as provided on p. 2-34, para. 1 above.

p. 2-36, Section 2.4.2.1. Unreported pumping is stated to be minor. However, Kim Loeb reported at a FCGMA Board meeting that unreported pumping by agricultural pumpers within the FCGMA may be 5% based on review of reporting in the proposed allocation base period of 2005-2014. This item does not address potential under reporting or non-reporting west of the Bailey Fault. Eta estimates (as described in Attachment 3 of Camrosa's April 3, 2018 comment letter on the Preliminary Draft [Subject to Change] Groundwater Sustainability Plan [GSP] for Pleasant Valley Basin) could help identify irrigated areas that may not be reported or under reported. Pumping uncertainty has not been assessed in the uncertainty analysis discussed in Appendix I. This is a data gap that should be addressed in future studies.

p. 2-37, Section 2.4.2.2. The tile drain flow is reported to be 1,080 AFY, which is much lower than reported by UWCD previously. In May 2017, UWCD and in the previous draft of this GSP section, reported that drain flow averaged 2,777 AFY in the PVB. Please explain why there is a difference and what changed, if anything, in the UWCD' model to effect this change. Pleasant Valley County Water District is reportedly gaging discharge of some drains, so this information should be pursued to assess computed drain flows. Drain flow uncertainty has not been assessed in the uncertainty analysis discussed in Appendix I. This is a data gap that should be addressed in future studies.

p. 2-37, Section 2.4.2.3. Eta estimates vary between DBS&A (2017) and UWCD's groundwater model. Potentially these estimates could be substantially improved through implementation of the approach described in Attachment 3 of Camrosa's April 3, 2018 comment letter on the Preliminary Draft (Subject to Change) Groundwater Sustainability Plan (GSP) for Pleasant Valley Basin. Eta uncertainty has not been assessed in the uncertainty analysis discussed in Appendix I. This is a data gap that should be addressed in future studies.

p. 2-40, Section 2.4.3.4. The discussion of historical sustainable yield presented in this section is largely speculative and relies on observed or projected (simulated) seawater intrusion in the OxB, suggesting that pumping in the PVB is a major factor in affecting seawater intrusion in the OxB. For the historical conditions of 1985 through 2015, the cumulative change in storage is a positive 68,400 AF, showing a surplus of inflows compared to discharges! I think that subsequent groundwater modeling simulations show that pumping in PVB basin is not as critical a factor to seawater intrusion as is pumping in the OxB. Figure 2-44 shows that there is not significant difference in seawater intrusion in the LAS between scenarios Reduction Without Projects 2 (a 55% reduction in OxB and 25% reduction in PVB) and Reduction Without Projects 3 (55% reduction in OxB and 0% reduction in PVB). This comparison suggests that the sacrifice in PVB pumping is not a fair apportionment of pumping reductions to limit seawater intrusion.

p. 2-42, Section 2.4.4. The uncertainty analysis approach used in the GSP (Appendix I Peer Review) is not the conventional approach used in the groundwater community as described in General Comment No. 5. The uncertainty analysis presented in the GSPs are at best gross approximations, what may change significantly using more conventional approaches. Also, a number of additional uncertainties and data gaps have been identified in my comments preceding this comment, which are not addressed in this section. Uncertainties, data gaps and plans to address data gaps through additional studies and/or monitoring should be provided in a summary table, at a minimum, to highlight future efforts to improve sustainable yield estimates.

p. 2-42, para. 1 of Section 2.4.5. There were many assumptions used in developing the hydrology and other model input conditions, most of which have not been documented as a part of the GSP. There has been no analysis/discussion of potential uncertainties associated with the future scenarios models. The uncertainty analysis applied in the Peer Review report (Apendix I) was for the historical model and not the future scenarios modeling. Discussion of the assumptions of the model inputs, limitations and uncertainties should be part of the GSP documentation.

p. 2-43, para. 2 of Section 2.4.5. See comment on p. 2-40, Section 2.4.3.4.

p. 2-44, last para. The GSP references the climate cycles assuming the reader understands how and why the referenced cycles are used in the GSP. There needs to be discussion of what climate cycles are and why the particular cycles were selected and how they were selected. Also, see comment on p. 2-42, para. 1 of Section 2.4.5 above.

p. 2-45, 1st bullet in the bullet list. It needs to be clear that the pumping values referenced in this bullet are not the average pumping over 2015 through 2017. These pumping values are the simulated pumping values in the base case, which fluctuates pumping based on conjunctive use with Santa Cara River flows available for delivery to agricultural users. Also, it needs to be clear over which period these values are taken, the full 50 years or last 30 years of the simulation.

p. 2-45, 3rd through 5th bullets in the bullet list. There is no documentation of the flows mentioned, assumptions used and methodology as to how these flows were derived and the actual flows developed for use in the models. The brief statements on approach are not sufficient to base any meaningful review of the information.

p. 2-46, para. 1. There is no documentation of the flows mentioned, assumptions used and methodology as to how these flows were derived and the actual flows developed for use in the models. The brief statements on approach are not sufficient to base any meaningful review of the information.

p. 2-46, para. 2 through 4. In meetings with UCWD on August 13, 2019, it became clear that implementation of the projects described here requires description of the methodology used for implementation and results in terms of actual pumping that was simulated. For example, the City of Camarillo desalter pumping only occurs from 2020 through 2045, then pumping ceases, so the City of Camarillo pumping would drop below its potential allocation based on the 2005 through 2014 base period. Second, the pumping transferred to CWD through the Conejo Creek Project was not maintained because groundwater levels dropped significantly and the groundwater model procedure reduced pumping. Lastly, there is no discussion of the availability of Santa Clara River water, rules for diversion to UWCD's surface water delivery systems and ultimate delivery to PVCWD's systems, and reductions in pumping as a result of surface water deliveries. There needs to be documentation so the reader understands the base case, including hydrological conditions, water uses, and operational assumptions on which it is based. Also, see General Comment No. 3.

p. 2-46, last para. In discussing the results of the Baseline simulation, the discussion is limited to seawater intrusion in the OxB. There is no discussion of other conditions such as water level fluctuation and storage. As shown above, under my comment on p. ES-1, para. 3., a plot of cumulative change in groundwater storage in the PVB does recover and at the end of the 50-year simulation the basin has more water in storage than at the start of the simulation period.

p. 2-47, Section 2.4.5.2. As stated in my comments relative to p. 2-46, para. 2 through 4, there needs to be documentation of all modeled scenarios so the reader understands the scenario, including hydrological conditions, water uses, and operational assumptions on which it is based. This comments applies to all the scenarios. Also see General Comment no. 3.

p. 2-49, para. 1. Some of the pumping values given in this paragraph are not consistent with the spreadsheets that UWCD shared with TAG. Inconsistencies include: the simulated production in the LAS in 2020 is 8,870 AFY, not 11,400 and the average production in the LAS for the sustaining period is 5,250 AFY not 7,000 AFY, based on the spreadsheets UWCD provided to TAG.

p. 2-49, footnote 8. The information in this footnote indicates that production rates are a function of a number of variables which are not documented in the GSP. As stated in my comments relative to p. 2-46, para. 2 through 4, there needs to be documentation of all modeled scenarios so the reader understands the scenario, including hydrological conditions, water uses, and operational assumptions on which it is based. Also, see General Comment No. 3. This comments applies to all the scenarios.

p. 2-50, para. 2. Some of the pumping values given in this paragraph are not consistent with the spreadsheets that UWCD shared with TAG. Inconsistencies include: the simulated production in the LAS in 2020 is 10,481 AFY, not 13,000 and the average production in the LAS for the sustaining period is 5,154 AFY not 7,000 AFY. The total basin production over the sustaining period is 8,054 AFY, not 10,000 AFY.

p. 2-50, footnote 9. The information in this footnote indicates that production rates are a function of a number of variables which are not documented in the GSP. As stated in my comments relative to p. 2-46, para. 2 through 4, there needs to be documentation of all modeled scenarios so the reader understands the scenario, including hydrological conditions, water uses, and operational assumptions on which it is based. Also, see General Comment No. 3. This comments applies to all the scenarios.

p. 2-51, para. 2. Some of the pumping values given in this paragraph are not consistent with the spreadsheets that UWCD shared with TAG. Inconsistencies include: the simulated production in the LAS in 2020 is 10,366 AFY, not 12,000 and the average production in the LAS for the sustaining period is 6,502 AFY not 8,000 AFY. The total basin production over the sustaining period is 9,611 AFY, not 11,000 AFY.

p. 2-51, footnote 10. The information in this footnote indicates that production rates are a function of a number of variables which are not documented in the GSP. As stated in my comments relative to p. 2-46, para. 2 through 4, there needs to be documentation of all modeled scenarios so the reader understands the scenario, including hydrological conditions, water uses, and operational assumptions on which it is based. Also, see General Comment No. 3. This comments applies to all the scenarios.

p. 2-53, Section 2.4.5.7. The GSP references the climate cycles assuming the reader understands how and why the referenced cycles are used in the GSP. There needs to be discussion what climate cycles are and why the particular cycles were selected and how they were selected. Also, see comment on p. 2-42, para. 1 of Section 2.4.5 above.

p. 2-54, Section 2.4.5.8. The uncertainty analysis approach used in the GSP (Appendix I Peer Review) is not the conventional approach used in the groundwater community as described in General Comment No. 5. The uncertainty analysis presented in the GSPs are at best gross approximations, what may change significantly using more conventional approaches. In addition, there is no discussion of future conditions, assumptions, limitation and associated uncertainties with regards to SY estimates.

p. 2-55, para. 5. The methodology used to interpolate uncertainty for the PVB from the OxB should be provided along with specific calculations used to derive the PVB values so there is no question as to how the values were derived.

p. 2-56, para. 1. The uncertainty value is given as ±1,200 AFY but elsewhere (e.g., see page ES-5) the uncertainty range is given as ±1,000 AFY.

p. 2-56, para. 5. This paragraph presents a SY value for the PVB, as well as values for the shallow aquifer and LAS, but the derivation of these values is not provided, just a general suggestion that it comes out of the various future scenarios simulations. Calculations showing how the SY value was derived should be presented so the reader does not have to guess as to how the value is derived.

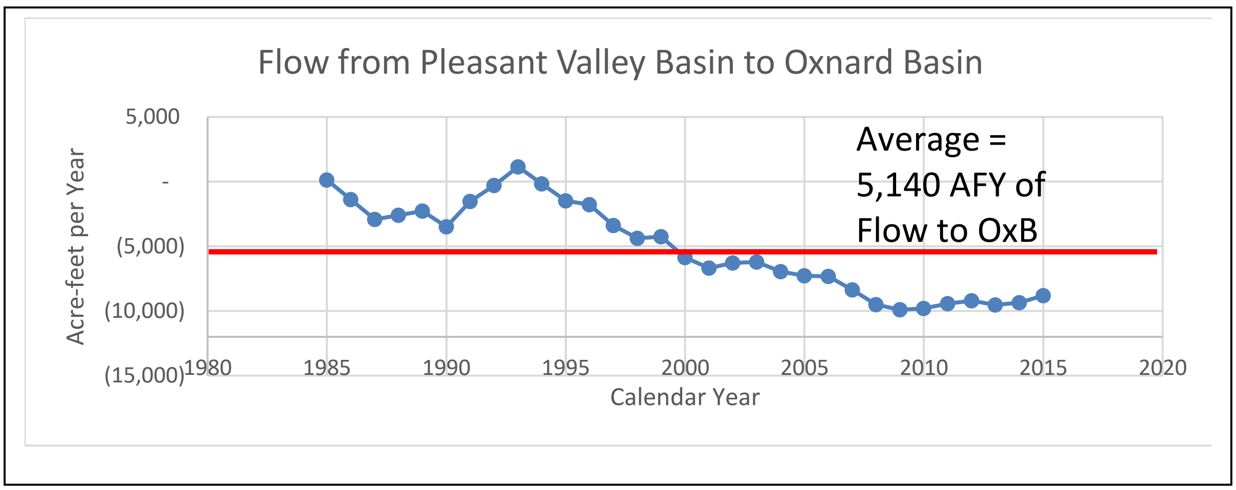
Table 2-6a. It appears the values for Calleguas Creek Percolation and Conejo Creek Percolation have been switched or the columns are mislabeled.

Table 2-6c. It is unclear where the column labeled Recharge comes from. The spreadsheets that UWCD provided does not have a column for Recharge, but it has a column for Mountain Front Recharge, the values of which are different from this Recharge column. Also, if you add the average values at the bottom of the table, the sum is 9,786, which is inconsistent with the reported value in the table. The value of 9,360 is consistent with the value obtained from UWCD's spreadsheet provided to TAG.

Table 2-11. It appears that the time period chosen to average production rates shown in this table are not consistent. The first three scenarios appear to use the full 50-year simulation period whereas the last three scenarios appear to use the last 30 years for averaging purposes. Please clarify.

<u>Chapter 3</u>

p. 3-2, para. 1. The premise of the sustainability goal as described in this Section 3.2 is that it is the responsibility of pumpers in the PVB to maintain groundwater levels so as to avoid seawater intrusion in the OxB. It is not the responsibility of pumpers in the PVB to maintain whatever groundwater flow necessary to prevent seawater intrusion in the OxB. There has been no assessment of the fair quantity of flow out of PVB to the OxB or any adjudication of a fair quantity of groundwater flow between the basins. According to UCWD's groundwater flow model, there has been significant net groundwater flow to the PVB over the historical period of 1985 through 2015 as shown in the nearby plot. The future scenario groundwater model simulations completed by UWCD show that this net flow increases substantially over the 50-year simulation period for all scenarios, even in the Baseline scenario. I think there needs to be further examination of which part of pumping from OxB and PVB is contributing to groundwater levels dropping below sea level and inducing seawater intrusion as opposed to suggesting that pumping in the PVB is responsible for maintaining groundwater levels above sea level in the OxB.



p. 3-2, para. 3. I think there needs to be care in how sustainability is evaluated using the 30-year period from 2040 through 2069. The sustainability is evaluated based on achievement of measurable objectives and complying with minimum thresholds in the 30 year period. However, the water balance, including pumping, in the earlier 20-year period contributed to the sustainable conditions that are achieved in the later 30 years of the 50-year period. So, it is inappropriate to suggest that the sustainable yield is the pumping that occurred in the 30-year sustaining period only. The sustainable yield is the average pumping over the full 50-year period. I submitted a Memorandum dated February 11, 2019 regarding Sustainable Yield Analysis to support my view on estimating sustainable yield from the future scenario groundwater model simulations. I asked that this memorandum be put on a future agenda for discussion at TAG but it was never agendized. I include this memorandum as Attachment 1 to my comments here.

p. 3-4, para. 3. See comment on p. 3-2, para. 1.

p. 3-4, bullet 2 in bullet list. See comment on p. 3-2, para. 1.

p. 3-5, para. 1. The GSP seems to change views on whether groundwater pumping affects brine migration/poor quality water movement. It seems that the UWCD (2016) document referenced in this section indicates that pumping and resulting decreased groundwater levels does result in groundwater quality degradation. There does not appear to be any quantification of the cause (lowered water levels) and effect (increase in TDS or Cl, etc.), however UWCD does present data, including information from the USGS, that suggest there is a linkage. In addition, UWCD (2016) indicates that shallow groundwater contains poor quality groundwater (e.g., high TDS and Cl) that migrates downward due to vertical gradients produced by pumping. This issue of shallow poor water migration has not been addressed in this GSP. The GSP seems to minimize the relation between groundwater quality and lowered groundwater levels and resulting impacts on degraded water quality, thereby, simply suggesting that maintaining groundwater levels above historical low groundwater levels should solve the issue. At a minimum, this seems to be a data gap that deserves further assessment to determine a more quantitative relation between groundwater levels and brine/poor quality water migration. SGMA requires that groundwater levels can be used as a surrogate minimum threshold if there is a clear relation between the sustainable criterion and groundwater level, which has not been done in this GSP.

p. 3-5, para. 3. See comment on p. 3-2, para. 1. Also, there is no acknowledgement that pumping in OxB lowers groundwater levels in the PVB and which pumping is more significant. It seems that the analysis of the future scenarios indicates that pumping is OxB may be the more significant effect.

p. 3-6, para. 3. There are monitoring wells in parts of the EPVMA. It is not clear why these wells have not been identified and considered for monitoring. The accessibility and condition of these wells will need to be evaluated to include them in any proposed monitoring program.

p. 3-8, para. 1. See previous comment.

p. 3-9, para. 4. See comment on p. 3-5, para. 1. SGMA regulations and best management practices require consideration of Federal and State water quality standards, which do not appear to be addressed. Also, there are some TMDL requirements that relate to groundwater. You need to revisit Section 2.3.4 to address these regulatory programs as required by SGMA. GSPs are required to explain if and why State and Federal requirements are not used as standards.

p. 3-10, para. 6. The cause of increases in nitrate, sulfate, and boron is not substantiated in this GSP.

p. 3-10, para. 7. The GSP seems to minimize the relation between groundwater quality and lowered groundwater levels and resulting impacts on degraded water quality, thereby simply suggesting that maintaining groundwater levels above historical low groundwater levels should solve the issue. At a minimum, this seems to be a data gap that deserves further assessment to determine a more quantitative relation between groundwater levels and poor quality water migration. SGMA requires that groundwater levels can be used as a surrogate minimum threshold if there is a clear relation between the sustainable criterion and groundwater level, which has not been done in this GSP. The next paragraph in this section does acknowledge the data gap.

p. 3-11, para. 6. You need to describe the groundwater level conditions that could lead to subsidence and its magnitude. Some stakeholders might have varying opinions on different levels of subsidence and what is significant or unreasonable, especially if there is differential subsidence, which would result where different thicknesses of fine-grained units exist. The potential for subsidence, its location and magnitude as related to specific groundwater conditions need to be fleshed out for stakeholders to review and provide input as to significance and unreasonableness. Potential subsidence needs to be further investigated and reviewed with stakeholders to determine whether there are significant and unreasonable impacts and ways to address them as appropriate. It is not clear whether all the subsidence that could occur with historical low water levels has occurred. Subsidence may have been initiated but not reached its full potential at that historical low water level, so this is a data gap that needs to be explored further. Given there is potential for further subsidence (based on the earlier USGS analysis), it seems that monitoring for subsidence would be a prudent recommendation.

p. 3-12, para. 2. The last sentence states that potential land subsidence in the NPVMA resulting from groundwater withdrawal is limited. This "limited" potential subsidence should be quantified and discussed to provide clarification.

p. 3-13, para. 4. The proposed undesirable result condition seems to be arbitrary as there is no rationale or explanation for the proposal; 4 of 9 wells below their respective minimum threshold. There should be a rationale provided for the proposal.

p. 3-14, para. 2. The proposed undesirable result condition seems to be arbitrary as there is no rationale or explanation for the proposal. There should be a rationale provided for the proposal.

p. 3-15, para. 1. As stated above, groundwater level minimum thresholds used as surrogates for water quality criteria and subsidence criteria have not be directly established, which needs to be done in order to use water levels thresholds as a surrogate threshold.

p. 3-18, para. 2. See comment on p. 3-5, para. 1.

p. 3-21, para. 2. It should be acknowledged that hydraulic gradients are the key driver of groundwater flow and that the intent is to have a balance or slight overbalance, where the magnitude and direction of hydraulic gradients on average favor groundwater flow landward to seaward. It should be acknowledged that water levels from the groundwater model simulations are being used as surrogates for these conditions given the simulated net movement of groundwater along the coast. I think it would be appropriate to identify wells in the OxB for use in monitoring groundwater levels (and calculating gradients in each aquifer) and water quality to confirm that the intended objective is being met.

p. 3-22, para. 3. As stated in this paragraph, progress towards measureable objectives will depend on climate, stream flows, and deliveries from Santa Clara River. None of these variables have been documented in this GSP. See General Comment No. 3 for the need to document the basis of the future scenarios.

p. 3-22, para. 4. I think the process used to assess milestone accomplishments is too simplified. It is good that the GSP acknowledges that actual climate and actual management actions will affect groundwater levels that might result in not achieving proposed milestones. I think there is a better approach. I think that milestones can be set relative to actual climate and actual management actions. I think groundwater model simulations could be used to assess achievement of milestones. You can simulate actual climate and no action and compare to simulations of actual climate and actions taken to show expected progress. Actual groundwater levels can be compared with simulated groundwater levels to see how actual conditions compare, within the uncertainty of the model simulations. As time goes on, the model would presumably also be improved, so that modeled results would become less uncertain. At each 5-year milestone, you would make 50-year projections to show that your management actions, original or modified, will advance you to sustainability. It may be possible to simply explain how this approach is to be used and put a range or band on the milestone plot illustrating that the band accounts for actual climate and management actions, with the goal to get to the end point, even if the path might be highly variable depending on actual climate conditions and actions. This comment applies to all discussions of interim milestones in this section.

The information provided in this GSP, as well as the GSP for the Oxnard Basin, identifies some potential new issues that should be considered in establishing Minimum Thresholds (MTs) and Measurable Objectives (MOs).

1) Some hydrographs of simulated groundwater levels in the Oxnard Forebay area show, a) groundwater levels above observed historical high groundwater levels, which seem unreasonable given the Forebay area was considered "full" during these high groundwater level conditions and, b) groundwater levels are above ground surface in some cases, which is not physically possible. It is likely that too much recharge was forced into the model, above that which is realistic, driving simulated groundwater levels above ground surface. Examples of these conditions are shown in hydrographs for wells 02N21W07L05S and 02N22W23B03S as given in Attachment 2. This issue should be investigated further and corrected given this condition is unrealistic.

2) Groundwater levels in many wells and aquifers appear to be above land surface elevation. This is physically possible and not an unexpected condition for confined aquifers in coastal basins. However, maintaining high groundwater levels may result in flowing wells (artesian conditions) and the potential for liquefaction in urban areas such that groundwater will flow at the surface in nonpumping wells, standby wells and improperly abandoned wells. Flowing wells were found to be a widespread issue on the Oxnard Plain during the mid- to late 1990s, resulting in the GMA and County to implement an aggressive well abandonment program to seal these flowing wells. It is not known if the groundwater model captures this potential wasted water from such flowing wells in the water budgets. However, review of simulated water budgets show that there is significant increases in drain flows for the "sustainable pumping" scenarios, which is water that is otherwise wasted under current operations (e.g., water is discharged to channels that flow to the ocean). Examples of hydrographs showing groundwater levels potentially above land surface include wells 01N21W32Q04S and 01N22W20J05S as attached.

3) As I have mentioned in previous comments to the GMA Board, I am concerned that the simulated pumping of agricultural wells is too simplified. Pumping is simulated in the model as a constant value as opposed to variable pumping, e.g., likely increases in pumping seasonally and in dry periods. Ramp up of pumping seasonally and in dry periods will result in increases in drawdown (lowering of groundwater levels) and greater overall fluctuations in groundwater levels over those levels simulated in the model. As MTs are based on model simulations, these MTs may be set too high and so they may be violated seasonally and in dry periods as a result of the actual increased drawdown. Examples of these issues are shown by hydrographs for wells 01N21W32Q04S and 01N22W20J05S as attached.

I have developed a table included in Attachment 2 that identifies which wells exhibit the potential issues described in Items 1 through 3 above. This table includes the same columns as the MT-MO tables provided by Dudek. I have added 4 columns as follows:

- Google Earth Approximate Land Surface Elevation in feet above mean sea level (ft MSL): This value should be confirmed with other land surface datum information as Google Earth data are approximate and may be in error in some cases.

- High WLs Above LS: If high groundwater levels are above land surface, an “x” is placed in this column. If it is uncertain, then a “?” is placed in the column and if groundwater levels are not above land surface, then it is left blank.

- Historical fluctuations > Future Simulated Fluctuations: Simulated future groundwater-level fluctuations are compared to observed historical groundwater-level fluctuations. This comparison was made to assess the potential that the model under-predicts groundwater-level fluctuations such that MTs may be violated in the future as a result of likely increased seasonally and dry-period pumping, driving groundwater levels lower than those simulated by the models. An “x” is placed in this column if simulated groundwater level fluctuations are significantly less than observed historical fluctuations.

- Potential issues: Color-coded dots are placed in this column to highlight potential issues indicated by the hydrograph of the given well. The potential issues are those described in Items 1 through 3 above. The explanation for the color code is given at the end of the table.

The issues identified herein have not been discussed at TAG given the timing of the availability of the MTs and MOs. In addition, I have asked for groundwater contour maps (for selected high and low groundwater level conditions) and plot of land surface elevation on hydrographs, so we could review these issues, such as identified herein. This commentary adds to the need for documentation of the future scenarios as described as part of my General Comments.

<u>Chapter 4</u>

p. 4-1. This Chapter as written does not provide a clear connection between data gaps identified in Sections 2 and 3 and proposed monitoring. There should be a clear connection between proposed monitoring and how this monitoring addresses data gaps and uncertainties identified in previous sections of the GSP. For example, there was significant time and effort spent on preparing the groundwater level contour maps presented in Section 2. However, there is no discussion of the data gaps identified in preparing these maps and the need for specific monitoring wells to fill these data gaps. A number of data gaps and uncertainties, including needs for additional data/studies have been identified in my comments that should be addressed in this Chapter.

p.4-3, Groundwater Extractions. There needs to be a discussion of under reporting and non-reporting, which has been discussed at numerous FCGMA and TAG meetings. Eta can be generated from satellite images and used to assess potential non-reporting and under reporting. This analysis should be included for consideration. This Eta analysis can be used to address improve estimates of recharge from precipitation and applied water as indicated my comments above in Chapter 2.

p. 4-4, Surface Water. This section describes existing/historical monitoring gages as if all of them still exist and will be monitoring in the future; some of these gages no longer exist. It is not clear what monitoring is proposed going forward. There are needs for additional surface water flow monitoring of the various creeks to better estimate stream losses for groundwater recharge and to assess groundwater/surface water interaction.

p. 4-12, Sections 4.6.1 and 4.6.2. Installation of the number of monitoring wells proposed in this section will be very expensive: hundreds of thousands of dollars for each proposed new well. Each proposed monitoring well should be evaluated as to its specific monitoring objectives and whether its cost is justified by the benefits. This could be done using the UCWD groundwater model, in fact, groundwater model simulations should be used to determine best locations for monitoring wells to fill significant data gaps, to address uncertainties and for threshold level monitoring as described in my General Comments. The groundwater model presumably will be used in the future to interpret between data points (well data), so the model can be used to check whether there are significant differences in water levels between existing data points and the need for additional data points (wells). For example, if water levels are projected to be smooth (no significant ups or downs) between existing monitoring points, then additional data points would not be very useful, however, if there projected to be significant higher or lower water levels between existing data points, then it may be appropriate to install additional wells to monitor those fluctuations if they could be significant.

p. 4-14, Section 4.6.3. It seems that there is a data gap regarding pumping and migration of poor-quality water along faults and from deeper aquifer zones. A data collection, monitoring, and study should be considered to further evaluate sustainability criteria for degraded water quality associate with this issue.

p. 4-14, Section 4.6.4. Consideration should be given to further monitoring subsidence until is can be shown that there is not a potential for significant adverse subsidence conditions to develop. The State should be contacted to determine their plans for further statewide monitoring as reported in Farr (2017). If the State does not plan to continue statewide monitoring, then the FCGMA should consider retaining a firm like Neva Ridge (mentioned in comments above) to apply InSAR techniques to monitor subsidence.

Chapter 5

It does not appear that this chapter meets the requirements of DWR to demonstrate how the FCGMA will bring the Pleasant Valley Basin to 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 seems as though much of these requirements are left to later determinations; however, it is clear that 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.

Appendix A GSA Formation Documentation – no comment.

Appendix B Public Outreach – no comment.

Appendix C Water Elevation Hydrographs – no comment.

Appendix D UWCD Model Report

1. Overall UWCD has developed a useful tool to assess sustainable yield of the OxB-PVB-WLP basins. Overall, I think the conceptual and numerical model represents groundwater flow conditions in the basins. I do have technical issues in a few areas which I think can be resolved through future refinements and analysis of the model and as additional data are gathered to address data gaps.

2. I think both the United and Calleguas models in the Las Posas Basin need to better account for recharge through a deep unsaturated zone. I think Calleguas has accounted for this process in an indirect way, as they simply apply recharge without large annual variability. However, they indicate, as I understand it, that deep percolation of applied water is assumed to be negligible, which I think is incorrect; in my opinion, it is just delayed in its arrival to the deep water table. I have done some simulations of unsaturated flow using the USGS VS2DI model. In my view, these simulations show that: 1) unsaturated flow is very likely an important mechanism of long-term deep percolation of water infiltrating at the surface, especially applied water; 2) water applied at the surface can reach several hundred to a few hundred feet in a few decades, such that irrigation water applied during development of the basin is likely recharging the basin today; and 3) large annual fluctuations in infiltration can be significantly dampened compared to actual fluctuations observed as recharge at a deep water table, due to the long unsaturated flow path, where saturation varies over time to dampen the infiltration pulses. You can see the large swings in United's simulated water levels in the shallow aquifer wells (likely due to assumed instantaneous recharge of precipitation and applied water) compared to the flatter actual observed water levels, which are more likely the result of a more continuous dampened recharge rate that actually takes place at the water table. I plan to talk about this at the next TAG meeting.

3. **Water budget tables ES-1, Table 2-2, and Table 3-3** do not include recharge from Conejo Creek and Calleguas Creek that occurs in the Pleasant Valley and Oxnard Plain Basins. These simulated recharge values need to be added to the tables.

4. Detailed water use estimates (similar to Tables 2-4 through 2-10 in the PV GSP, for example) are not provided anywhere in the report, so it is not possible to assess the basis of the model simulated water budget values. It was clear that there were discrepancies between United's water use values and Dudek's GSP data summaries for water uses in the various basins. As Dudek (and GSI earlier) completed a detailed canvassing of water use from various users, it seems like the Dudek estimates may be more valid. There needs to be a comparison and reconciliation of the water use estimates. For example, Camrosa provided detailed water use (including sources of water) data for the Pleasant Valley Basin, which shows higher applied water than the use that United shows (based on earlier data tables). Also, United does not account for diversions from Conejo Creek that took place prior to 2002; these diversions, which occurred throughout the 1985 to 2015 simulation period were provided to the Dudek team. These water uses need to be accounted for.

5. There seems to be an underlying theme that recharge at the surface does not affect groundwater conditions in deeper aquifers. However, inspection of Tables 4-2, 4-3 and 4-5 does show significant vertical downward flow. For example, Table 4-2 shows that on average 9,124 AFY flows from the Shallow Aquifer to the UAS and that 19,091 AFY flows from the UAS into the LAS, which shows significant and important vertical movement of water. Table 4-3 shows on average 11,763 AFY flows from the Shallow Aquifer to the UAS and that 10,005 AFY

flows from the UAS into the LAS in the Pleasant Valley Basin. Note that in the PV Basin these flows are approximately equal to the pumping in these units. In Table 4-5, 8,431 flows from the Shallow Aquifer to the UAS, but oddly enough, there is essentially no flow from the UAS to the LAS in the West Las Posas Basin. I question that this is the case, that there is no flow. I suspect that the other recharge components may be overstated and the vertical flow understated. The distribution of this vertical flow should be evaluated to: 1) assess where the exchange is occurring; 2) assess the reasonableness of the magnitude; and 3) its sensitivity on model results, especially as it may affect seawater intrusion (that is, coast to landward flow of groundwater).

6. **On page 34, Section 2.7**, it is suggested that because recharge at the spreading grounds is so large, that other components are less important. This is simply not true. If the hypothetical error of 4,500 AFY existed, then this error would be propagated through the model simulation and result in an error of about 140,000 AF over the 31-year simulation period. Such an error would significantly impact the estimate of sustainable yield: i.e., it would underpredict if simulated recharge is low by 4,500 AFY and over predict if it is too high by 4,500 AFY. Also, mis-identifying the actual contribution from each item may greatly impact future simulation results. For example, if deep percolation from rainfall is overestimated compared to deep percolation of applied water, then future simulations will show higher sustainability than might actually exist because the contribution of applied water is actually more important. This is why there needs to be a qualification of each component of the water budget's contribution to the overall water balance and characterization of its changes into the future. As written, I think the write-up on this page is not properly informing the reader about the various components of the water budget.

7. It seems that there could be merit in assessing the model simulated drain flows with measured Revlon Slough flows as presented in Figure 2-6. Presumably, most (or all) of the flow during dry-weather periods in Revlon Slough is drain discharge water, so there may be some meaningful comparisons with the flows at 776 and 776A. Also, there should be an explanation of the 10,410 AFY decrease in drain flows in the Oxnard Plain Basin and the increase of 2,420 AFY in drain flows in the Pleasant Valley Basin compared to the values reported in the draft GSPs.

8. **Page 39, Section 2.7.1.3. and 2.7.1.4.** These sections seem to bias toward recharge from precipitation and applied water in agricultural areas based on assumptions and relations used to derive deep percolation from these sources. I think this needs to be assessed and the DBS&A work could aid greatly in this assessment. It is not clear why DBS&A's values were not used as a test of the model. Based on the sensitivity analysis, the DBS&A estimates may work well based on the latest revised estimates of recharge from these two sources. I think the deep percolation of applied water in M&I areas is understated and recharge improperly attributed. United appears to have accounted for only distribution system losses (and this is likely too low, as these losses are likely 6% or larger), so deep percolation of applied water is not accounted for.

9. **On page 34, Section 2.7, last sentence.** See Comment 5 above. I think the significance of vertical flow between aquifers in the basins is understated.

10. **On page 38, Section 2.7.1.2.** There is no discussion of the Conejo Creek and Calleguas Creek. These creeks provide significant recharge.

11. **Page 40, second paragraph.** See Comment 5 above.

12. **Page 39, Section 2.7.1.3. and 2.7.1.4.** These sections seem to bias recharge from precipitation and applied water to agricultural areas based on assumptions and relations used to derive deep

percolation from these sources. I think this needs to be assessed and the DBS&A work could aid greatly in this assessment. It is not clear why DBS&A's values were not used as a test of the model. I think the deep percolation of applied water in M&I areas is understated and recharge improperly attributed (see Comment 8 about attribution). United appears to have accounted for only distribution system losses (and this is likely too low, as these losses are likely 6% or larger), so in effect, deep percolation of applied water is not accounted for.

13. **Page 49.** The discussion on this page indicates that groundwater pumping is a significant contributor to high chlorides in the basin due to drawdown and upwelling of poor-quality water. This needs to be further addressed in the GSP as part of the water quality criteria.

14. As seawater intrusion in the Oxnard Plain Basin is a key issue, I would expect that model would be more rigorously assessed relative to flow and hydraulic gradients along the coastal area. Two observations suggest that more should be done to assess the veracity of the model to simulate movement of groundwater along the coast. I think a good first step has been taken by dividing the coast line into segments. However, there is little analysis/discussion of the veracity of the model simulation. The sensitivity analysis suggest that vertical hydraulic conductivity is an important parameter. Coastal gradients drive the rate of inflow, so it would be instructive to develop cross sections showing observed versus simulated groundwater levels in order to compare simulated versus observed gradients. It seems on visual inspection of Figures 4-1 through Figure 4-21, that the simulated gradients may be higher than the data-contoured water levels. I noticed this in the Dudek groundwater level contour maps, which to me seem to suggest possibly more flow vertically. I suspect that vertical flow may be affected by abandoned wells to some extent; that could be significant in some areas. In addition, further work using pathline analysis is warranted to assess movement of flow along the coastline. These analyses would be helpful in assessing the model simulation of groundwater flow along the coastline.

15. The groundwater models for the East and West Las Posas Basin should address the lag between infiltration at the surface and recharge at depth. See my presentation dated September 6, 2018 regarding this issue (provided at September TAG meeting).

16. The model should be used to assess data gaps and future monitoring programs. I am sure that the United modeling staff (as well as the Calleguas modeling staff) can identify key data gaps to be addressed in future data collection and monitoring programs, including those described in the draft GSPs. For example, groundwater levels can be retrieved from the models and used to construct hydrographs. These hydrographs can be compared to available hydrographs to judge the potential added value of proposed new monitoring locations in the draft GSPs or other proposed monitoring locations.

17. Application of uncertainty analysis as described in, ***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, would be useful in assessing model uncertainty and data gaps. Model uncertainty should be assessed relative to more than just seawater intrusion. TAG could be consulted to identify key model outputs that need to be analyzed.

Appendix E Water Quality Hydrographs – no comment

Appendix F FCGMA Water Quality Statistics – no comment

Appendix G Pleasant Valley Basin 303(d) List Reaches – no comment

Appendix H GeoTracker Open Sites – no comment

Appendix I Model Peer Review

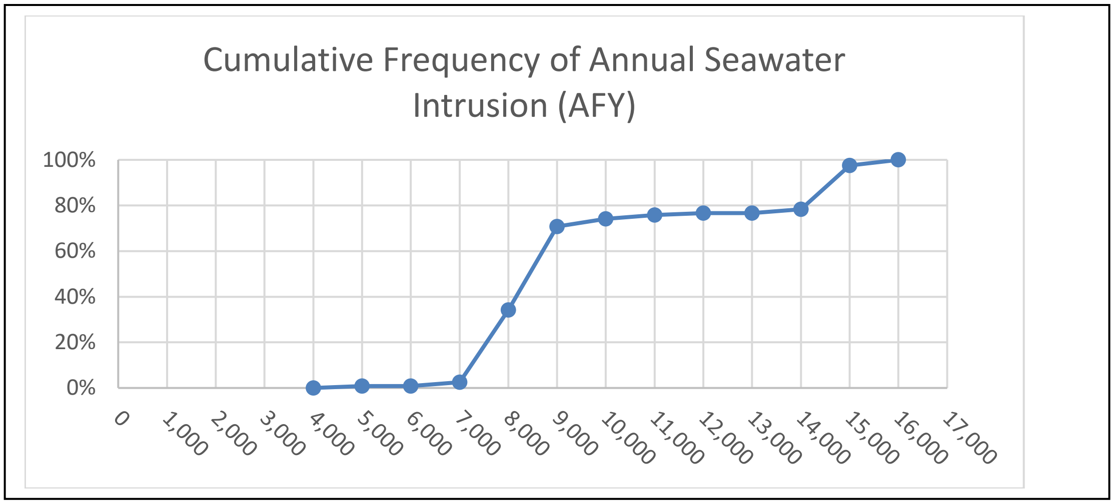
1. The uncertainty analysis approach used in the Peer review is not the conventional approach used in the groundwater community. The uncertainty analysis presented is, at best, a gross approximation, which may change significantly using more conventional approaches. The UWCD and CMWD models peer review 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 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).

2. Not all Type IV parameters are included in the analysis and some non-type IV parameters are included, only 20 of 35 listed by UWCD are examined in this peer review. Also, about one third of the parameters are from the WLP basin. Please explain how the subset was selected. It seems some of these parameters, e.g., L6Kh and L6Kz zone values could be significant. Also, Type II parameters did show significant sensitivity to water budget (>1,000 AFY), so why were these parameters not considered in the analysis as water budget components are significant relative to seawater intrusion?

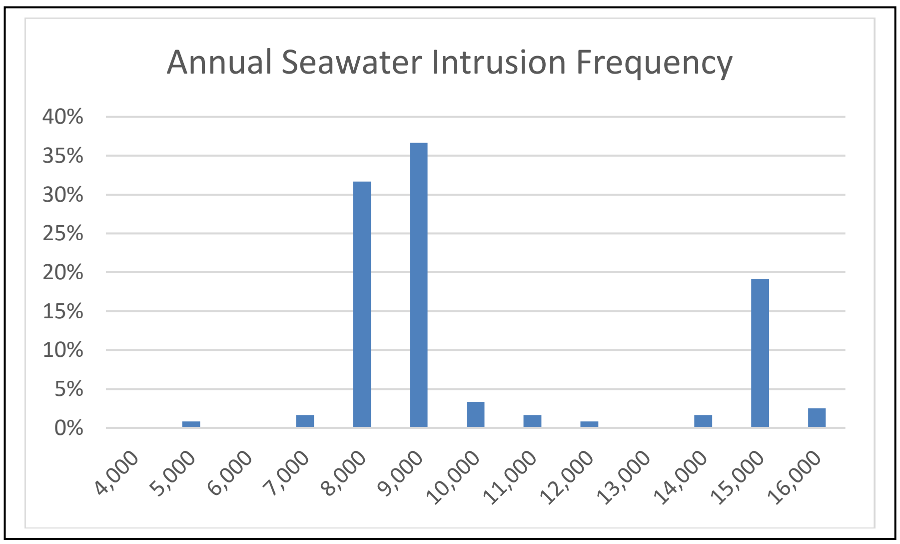
3. RMSE and ARM values are degraded from the original calibrated groundwater model value. What efforts were undertaken to assess which, if any, of the model simulations of the 120 realizations continue to represent the observed groundwater levels in the basins? Were hydrographs constructed to see how groundwater levels changed between realizations? The advantage of conducting uncertainty analyses using the conventional approach described in

Comment No. 1 is that the groundwater model is required to maintain its calibration, while assessing changes in parameter values and combination of parameters, which does not appear to be the case in this GSA-type uncertainty analysis.

4. The last sentence of paragraph 3 on page 6 is very important. Only a small subset of parameters and variances of those parameters were assessed. The conventional approach to uncertainty analysis as described in Comment No. 1 would assess a much larger suite of parameters and variances, using Bayesian analysis to examine the uncertainty of model outputs to inputs. Using a sensitivity analysis to select parameters for a more limited GSA analysis may eliminate some important combinations of parameters that may significantly impact uncertainty, particularly posterior estimates.
5. This GSA analysis was focused on seawater intrusion, however, there are other uncertainties that are important to SY analysis, including interbasin flows, basin storage, and recharge from the different surface waters.
6. The commentary/recommendations on page 7, paragraph 5 seem highly important and throw some doubt/questions about the current analysis. ARM and RMSE is highly dependent on the Forebay such that the analysis is less sensitive to heads and gradients near the coast. It would be important to weight the coastal heads and gradients. Also, you need to look at vertical gradients across aquitards, which is not considered in this analysis.
7. It is not clear that the analysis presented in Section 2.3.2.1 is a valid analysis of seawater flux differences based on differences between modeled and observed water levels. Obviously, groundwater (seawater) flux is based on hydraulic gradients, not water levels. It is not clear how comparing groundwater level residuals will relate to any meaningful relation to hydraulic gradients. It would be interesting to see a comparison between the results obtained in Section 2.3.2.2 for each segment of the coastline analyzed in this section. In Section 2.3.2.2, the conclusion is that the uncertainty calculated between the 2 methods is comparable, but it this simply a coincidence? A more direct comparison would show how the two methods are similar or different.
8. The stated mean seawater flux from the 120 realizations is 312,064 AF on page 9, paragraph 3. I get a mean value of 299,880 AF (9,674 AFY) based on the values reported in Table 2. Also, the median calculated from Table 2 is 258,977 AF (8,354 AFY), half the values are lower and half are higher. Nearly 75% of the values are lower than 10,000 AFY (approximate value estimated by UWCD). The cumulative frequency plot of the annual seawater values does not follow a classic cumulative probability curve as shown in the following plot.



A histogram of annual seawater intrusion frequency shows a bi-model distribution as shown in the following plot.



9. The standard deviation, or uncertainty, of the combined UAS+LAS seawater intrusion is given as 2,994 AFY on page 9, paragraph 3. However, the standard deviation of the seawater intrusion values in Table 2 is calculated as 2,847 AFY.

10. I submitted a memorandum dated March 3, 2019, to TAG in review of Section 2.3.2.2 Sustainable Yield. I asked for this memorandum to be agendized at a future TAG meeting but it was not agendized for discussion so I am including this memorandum as Attachment 3, as part of my comments on the Peer Review report.

[END COMMENTS]

Attachment 1

Memo

To: Kim Loeb, TAG Members and Dudek

From: Terry Foreman

Date: February 11, 2019

Re: Sustainable Yield Analysis

This memorandum is a follow-up to my comments at the February 6th TAG meeting. The sustainable yield values presented in Dudek's January 31, 2019 Memorandum do not represent the sustainable yield of the basins. In fact, the sustainable yield values presented in the memo are simply pumping rates over a 30-year period for one set of alternatives (two) to attempt to achieve sustainability. Dudek's proposed pumping rates are those rates believed necessary to offset higher pumping rates in the first 20 years of a 50-year simulation period, to minimize the potential for seawater intrusion. As will be shown herein, the sustainable yield could be as much as 40 percent higher than the values proposed by Dudek. In fact, the simulated pumping and resulting yield values have an implicit assumption that the basins require in-lieu replenishment (pumping below the sustainable yield) to refill basin depleted storage, resulting in substantially lower sustainable yield values are than necessary. The discussion of replenishment of depleted storage should be provided more explicitly for stakeholder understanding and input.

What is Sustainable Yield?

In order to assess sustainable yield, it is important to review the definition as intended by the State legislature. One has to go to the definitions given in the Sustainable Groundwater Management Act (Act) of 2014 to find the definition of sustainable yield as there is no explicit definition provided in the regulations, except to refer to the Act itself and Bulletin 118. Sustainable yield as defined in the Act is as follows:

"*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 effect.*"

This definition is commonly used in literature, groundwater basin adjudications, and is also the definition used for safe yield in early editions of Bulletin 118 (more recent versions refer to overdraft, which essentially is the resulting condition when safe yield is exceeded).

So, the key points are, 1) maximum quantity of water that can be withdrawn annually, 2) over a base period representative of long-term conditions (land use, pumping patterns, hydrology, and other water supply uses) and 3) without causing undesirable results (e.g., seawater intrusion, water quality degradation, chronic lowering of groundwater levels, depletion of storage and land subsidence). Dudek's assessment of sustainable yield are not consistent with key points 1 and 2 of the definition. Key points 1 and 2 are addressed below, key point 2 first, then key point 1. There is more stakeholder discussion required relative to key point 3, so it is not addressed in any substantive fashion as a part of this Memo.

Base Period Representative of Long-Term Conditions

TAG had a number of discussions about the base period and selected two time frames as representative of long-term hydrologic conditions: 1930-1979 and 1940-1989. In addition, existing land use and recent pumping pattern distributions were assumed to be representative of land use and water uses going forward. As there was agreement that these two 50-year periods are representative of long-term hydrologic conditions based on cumulative departure from average precipitation I will not discuss the selection of the base period further.

Dudek's assessment of sustainable yield departs from using the 50-year base periods as representative of long-term conditions, as selected by TAG. Instead, Dudek divides the 50-year period into 2 periods: a 20-year implementation period, which is the period in which a GSA has to achieve sustainability, and a 30-year sustaining period to show sustainability (I do not believe these terms are specifically defined by DWR, but instead used by Dudek for discussion purposes). This division was done presumably in response to DWR's draft Sustainable Management Criteria BMP (DWR, November 2017), which indicates that violation of Minimum Thresholds and Measurable Objectives are acceptable during the implementation period, whereas violation of them is not acceptable during the sustaining period. Dudek assesses that the sustainable yield of the basins is the pumping rate that precludes undesirable results (largely based on limiting the potential for seawater intrusion in the case of West Las Posas, Pleasant Valley and Oxnard Basins) during the 30-year sustaining period. This is simply incorrect.

The sustainable yield should be based on the entire 50-year base period as selected by TAG. Use of any sub period of the base period risks not being representative of long-term conditions. For example, Figure 1 shows the cumulative departure from average precipitation of a precipitation station located at Oxnard's Water Department. The long-term average precipitation from 1930 to 1979 at this station is 14.39 inches. The average precipitation from 1930 to 1949 is 15.02 inches and from 1950 to 1979 is 13.97 inches. Figure 2 shows the volume of precipitation simulated in UWCD's groundwater model for the period 1930-1979, 1930-1949 and 1950-1979 over the 3 basins: West Las Posas, Oxnard and Pleasant Valley Basins. Both charts show that the implementation period and sustainability periods are not representative of long-term conditions in the basins and therefore cannot be used to assess sustainable yield over these periods. The correct period for assessing sustainable yield, as selected by TAG, is the full 50-year representative period.

Maximum Quantity Of Water That Can Be Withdrawn Annually

The maximum quantity of water that can be withdrawn annually over the representative base period will satisfy the following water balance equation:

$$\sum R - \sum D = \Delta S, \text{ where } \Delta S=0 \qquad 1$$

and, $\sum$ is the summation operator, R is recharge components (precipitation, streamflow leakage, applied water, interbasin flows, etc.), D is discharge components (pumping, evapotranspiration, discharge to streams, interbasin flow, etc.) and ΔS is change in groundwater storage. This equation states that the sum of recharge components and sum of discharge components are in balance over the long-term base period such that the long-term cumulative change in storage is unchanged (0) by the end of the base period. So, the long-term average pumping rate that makes the D, discharge term in Equation 1 balance the recharge terms, and make $\Delta S=0$, is the sustainable yield pumping rate. There are specific local conditions that may limit pumping to lower values, however, discussion of those conditions is beyond the scope of this Memo.

Based on Equation 1, the average pumping rate over the 50-year simulation period, simulated in UWCD's groundwater model, is the sustainable yield of the basin, not the pumping rate over the 30-year non-representative "sustaining" period. The error in the analysis can be demonstrated by substituting the various pumping rates (50-year average versus 30-year sustaining period average) into UWCD's groundwater model and rerunning the model over the 50-year base period. However, we can also do a simplified model, using Excel and the annual water budget components simulated in UWCD's groundwater model, to show that the sustainable yield of a basin is not the pumping rate over the 30-year sustaining period. While this more simplified analysis demonstrates the actual likely sustainable yield, it would be advised to use UWCD's groundwater model to more fully validate the sustainable yield values.

I have selected the 35Ox20PVWLP scenario model simulation results for the Pleasant Valley Basin to demonstrate that Dudek's assessment of sustainable yield is incorrect. I created a table of annual water budget components, recharge and discharge, and simply changed the pumping rates, recomputed the annual ΔS in accordance with Equation 1, and then plotted cumulative change in storage to show the ending change in storage compared to the beginning basin storage. While some groundwater budget components might change with these changed pumping rates, I think the changes would not significantly change the principal critique presented in this Memo.

Based on UWCD's groundwater model, the average pumping in the Pleasant Valley Basin over the 50-year base period is approximately 9,800 AFY. The average pumping over the 30-year sustaining period is 7,600 AFY. Note this 7,600 AFY value is 600 AFY higher than presented in Dudek's Memo, this is likely due to boundary edge effects that incorporates pumping outside the true basin in model cells that approximate the Pleasant Valley Basin. This difference does not affect the analysis here, but the pumping rates might be slightly off from the actual values within the actual basin boundary (i.e., the pumping outside the basin would need to be excluded from the yield as it is yield in another adjacent basin).

Figure 3 shows the cumulative change in storage for the Original Model simulation results, substitution of Dudek's 7,600 AFY pumping as the sustainable yield and substitution of 9,800 AFY for pumping as the sustainable yield. It is important to note that the Original Model pumping rate averaged 9,800 AFY over the 50-year simulation period, but pumping in the first 20 years averaged 13,100 AFY, representing the assumed ramp down from the basin average 2015-2017 pumping rate over the first 20 years.

Figure 3 shows that pumping at an average of 7,600 AFY over the 50-year representative base period is significantly lower than that required to balance Equation 1. In fact, storage in the basin increases by more than 150,000 AF over the beginning storage in the basin. Using an average of 9,800 AFY over the 50-year representative base period results in an ending storage that is equal to the ending storage condition simulated in the Original Model simulation, which is expected. However, the path in the change is storage is different as a result of average pumping as opposed to high pumping in early years and lower pumping in later years. It is clear from this analysis that the sustainable yield of the basin should be assessed as the average pumping over the 50-year base period and not the pumping rate over the 30-year sustaining period.

Dudek's Assessment Implicitly Assumes An In-Lieu Replenishment Requirement

Figure 3 shows that the cumulative change in storage is +48,870 AF over the 50-year period for the Original Model and for the case using a constant 9,800 AFY sustainable yield. In effect, the ΔS is +48,870 AF, not 0, which indicates a surplus of recharge relative to discharge. In actuality, the sustainable yield is defined as the maximum quantity of water that can be extracted annually without undesirable results, which is assumed to be the case when ΔS is 0 (i.e., water budget is balanced). In order for the water budget to be balanced, pumping can be increased to approximately 10,800 AFY as shown in Figure 4. This value is 3,200 AFY, about 40%, greater than the sustainable yield assessed by Dudek. The difference in the sustainable yield value of 10,800 and 9,800 AFY indicates that there is a need to increase storage in the Pleasant Valley Basin by about 1,000 AFY over the 50-year base period, otherwise, 10,800 AFY would be the sustainable yield supported by Equation 1. This 1,000 AFY implies an in-lieu replenishment (recharge by reduction of pumping) rate requirement to raise storage in the basin. If this replenishment is required to address historical storage depletion in the basin, then it should be explicitly acknowledged, so it can be understood and subject to discussion by stakeholders.

It is beyond the scope of this Memo to comment on the need for in-lieu replenishment, so this issue is not discussed further in this Memo.

Discussion

This Memo demonstrates that the sustainable yield assessed by Dudek's January 31st Memo is not correct. The correct sustainable yield is determined from the full 50-year representative base period. Dudek simply mistook the average pumping rate over the 30-year sustaining period as the sustainable yield of each basin, which is incorrect. In fact, Dudek has presented only one set of alternatives for extracting the sustainable yield over the representative base period, which involves higher pumping in the early years and lower pumping in later years. Alternatively, pumping could immediately be reduced to 10,800 AFY on average, which may not be preferred but it is another option that could be further evaluated with other alternatives. Clearly, there are other alternatives for reaching sustainability. In addition, Dudek implicitly assumes that there is a requirement to replace depleted storage in the basins: such requirement should be identified explicitly and explained for transparency to all stakeholders.

It is clear from Figures 3 and 4 that groundwater levels will be different for various alternatives to achieve sustainability. Groundwater levels will be defined by the scenario simulated, so this fact needs to be clearly understood and addressed in setting Minimum Thresholds and Measurable Objectives. It is certain that actual groundwater levels in the future will be different than those simulated, with the water-level differences depending on departures of actual hydrology, pumping and management actions from those simulated with the groundwater model.

It is important to accurately state the sustainable yield of the basins (as best as we can estimate it, given with any uncertainty about these best estimates), so that all stakeholders are working from the same basic understanding. This will allow all interested parties to identify and propose alternative approaches to achieve sustainability as the process moves forward.

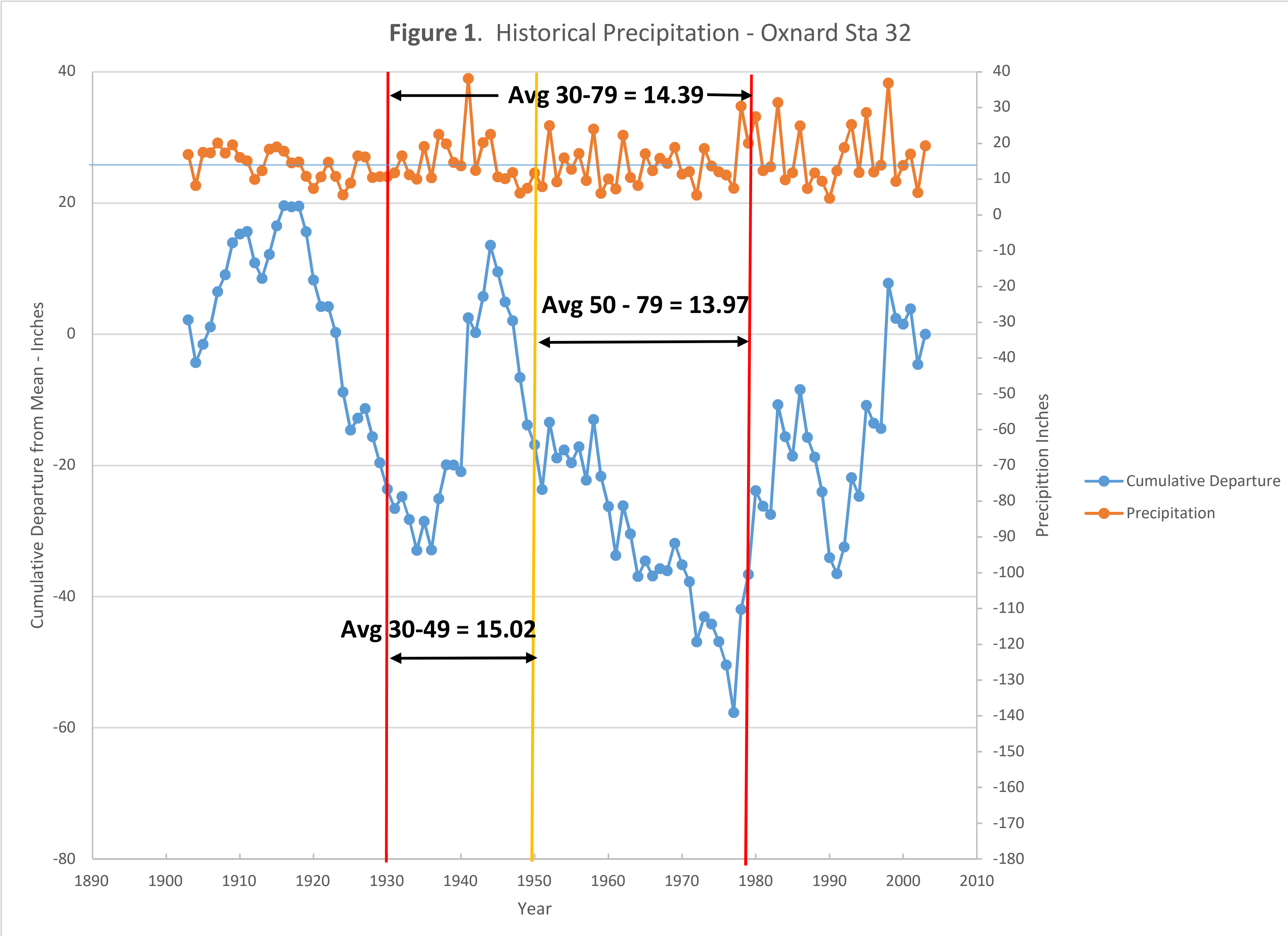


Figure 1. Historical Precipitation - Oxnard Sta 32
Avg 30-79 = 14.39
Avg 50 - 79 = 13.97
Avg 30-49 = 15.02
Cumulative Departure from Mean - Inches
Precipitition Inches
Year
Cumulative Departure
Precipitation
40
20
0
-20
-40
-60
-80
30
10
-10
-30
-50
-70
-90
-100
-110
-120
-130
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1970
1980
1990
2000
2010

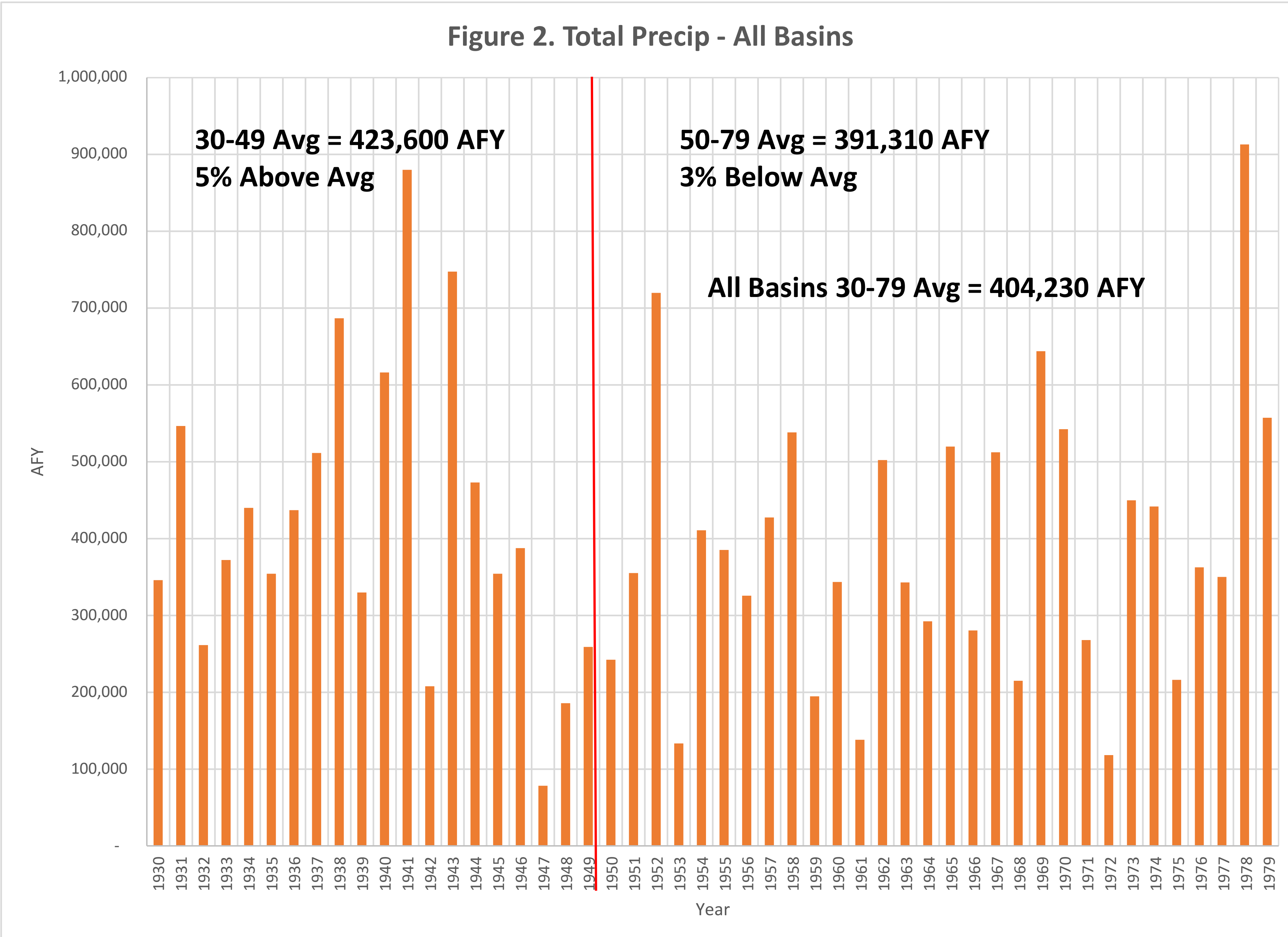


Figure 2. Total Precip - All Basins
30-49 Avg = 423,600 AFY
5% Above Avg
50-79 Avg = 391,310 AFY
3% Below Avg
All Basins 30-79 Avg = 404,230 AFY
AFY
Year
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979

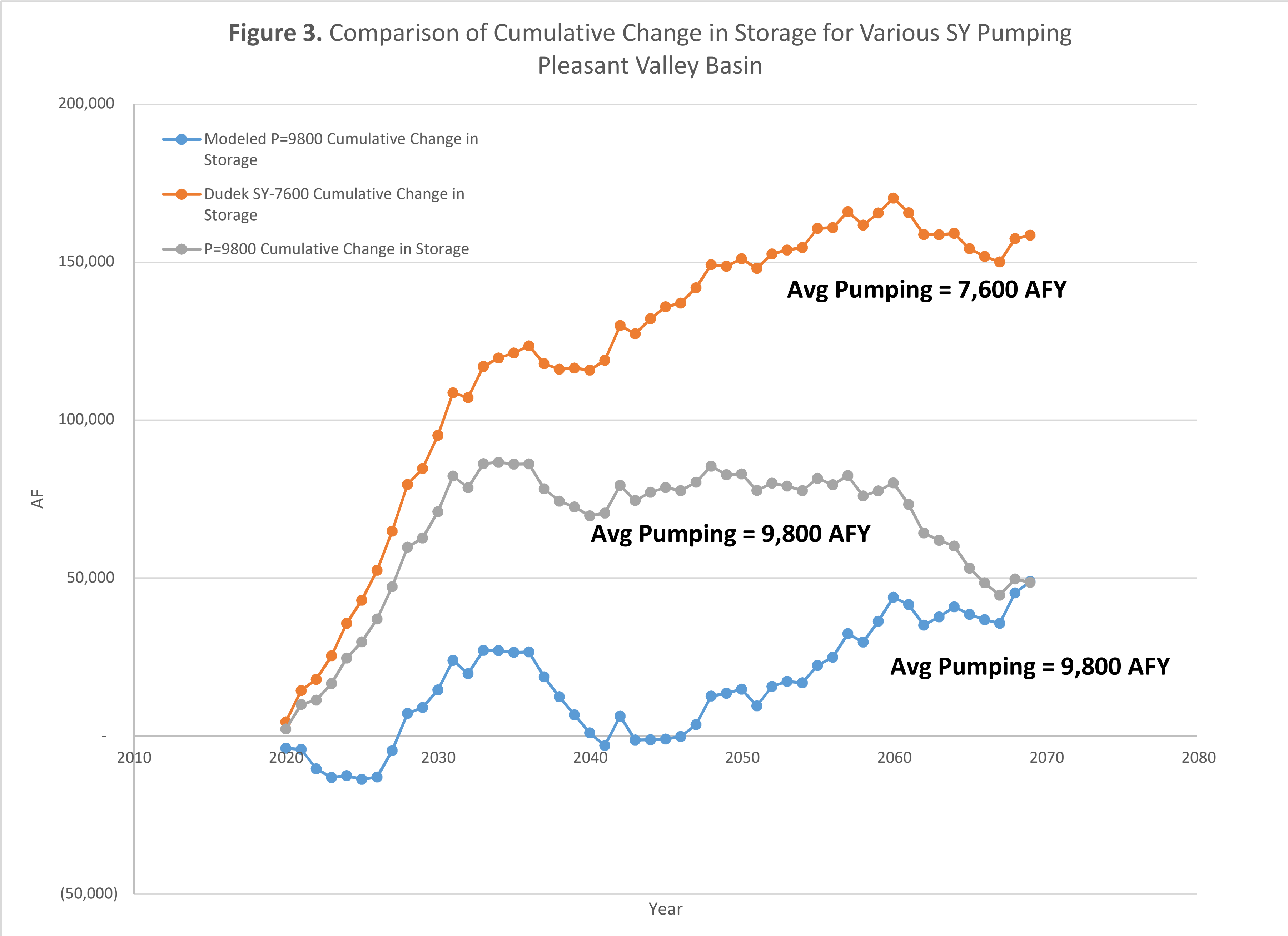
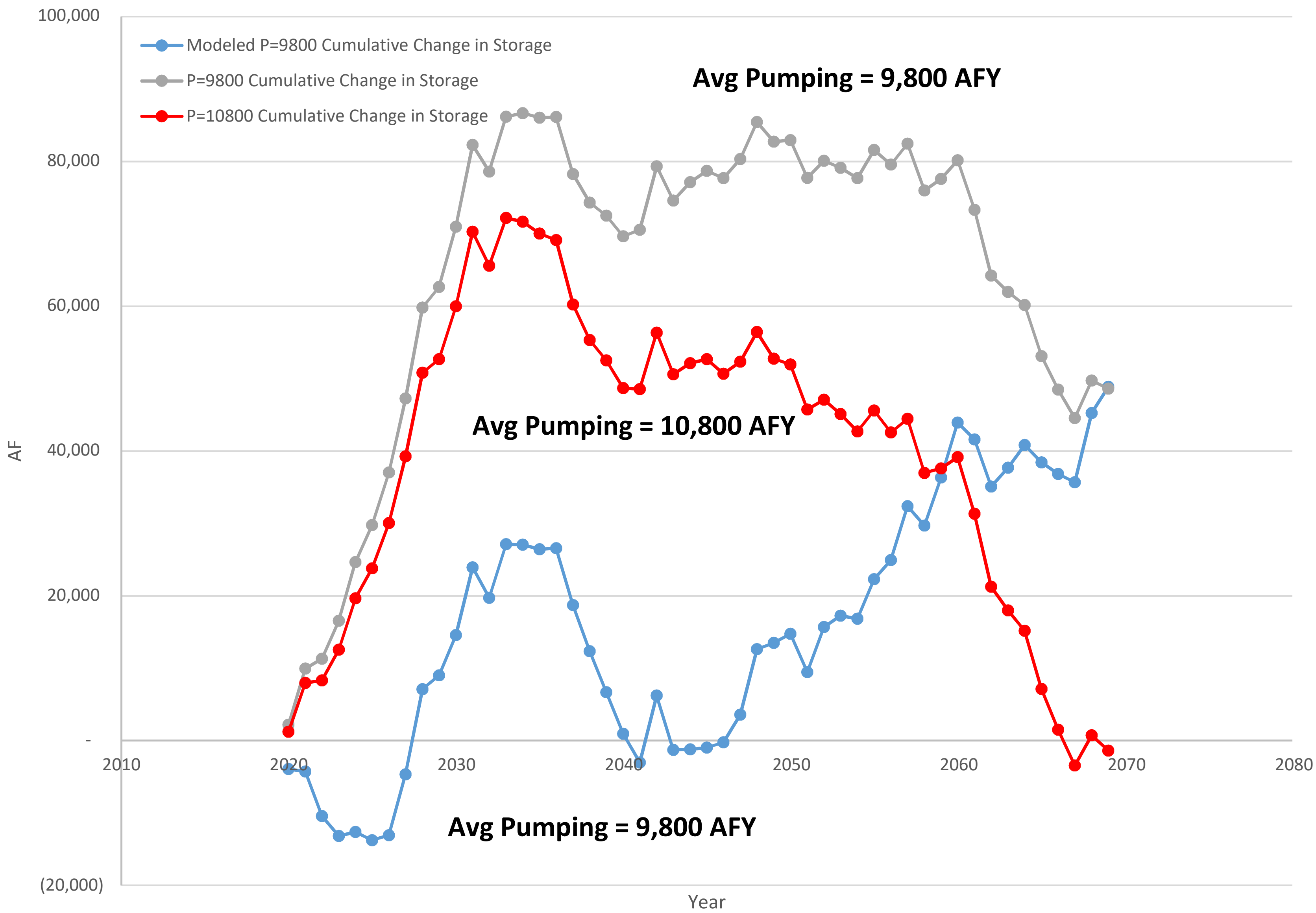


Figure 3. Comparison of Cumulative Change in Storage for Various SY Pumping
Pleasant Valley Basin
200,000
150,000
100,000
50,000
-
(50,000)
AF
2010
2020
2030
2040
2050
2060
2070
2080
Year
Modeled P=9800 Cumulative Change in Storage
Dudek SY-7600 Cumulative Change in Storage
P=9800 Cumulative Change in Storage
Avg Pumping = 7,600 AFY
Avg Pumping = 9,800 AFY
Avg Pumping = 9,800 AFY

Figure 4. Comparison of Cumulative Change in Storage for Various SY Pumping Values
Pleasant Valley Basin

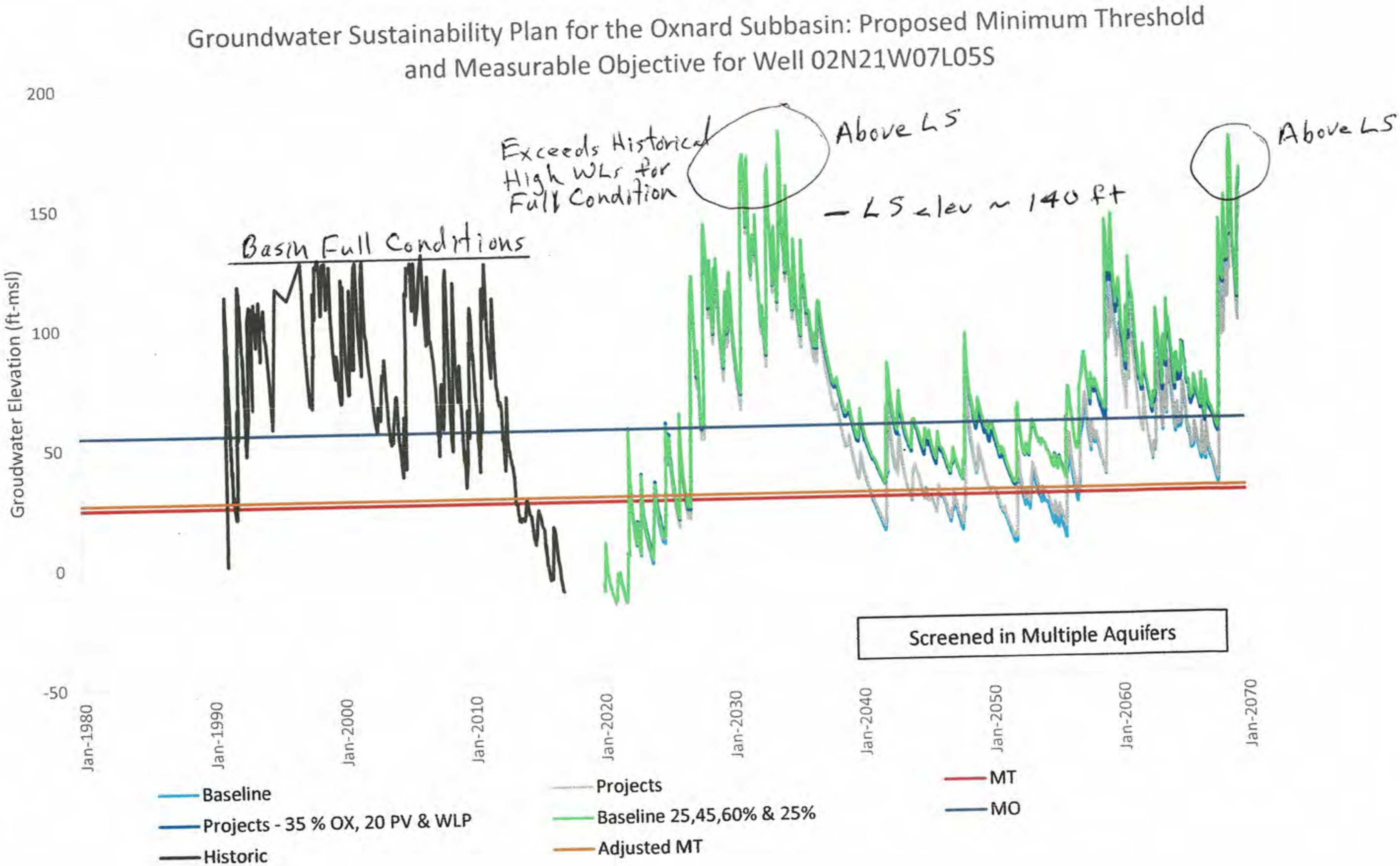


Attachment 2

Well/Basin	Aquifer	Minimum Threshold (ft MSL)	Adjusted Minimum Threshold (ft MSL)	Measurable Objective (ft MSL)	Historic Minimum (ft MSL)	Historic Maximum (ft MSL)	Google Earth Approximate Land Surface Elev. (ft MSL)	High WLs Above LS	Historical Fluctuations > Future Simulated Fluctuations	Potential Issues
Oxnard Basin										
01N21W32Q06S	Oxnard	0	2	15	-25.84	5.23	5	x	x	🔵 🟢 🔴
01N22W20J08S	Oxnard	5	7	15	-18.01	26.21	23	x	x	🔵 🟢 🔴
01N22W26J04S	Oxnard	0	2	15	-28.32	20.39	5	x	x	🔵 🟢 🔴
01N22W27C03S	Oxnard	5	7	15	-18.64	22.31	5	x	x	🔵 🟢 🔴
01N23W01C05S	Oxnard	5	7	15	-6.85	23.85	23	x		🔵
02N22W36E06S	Oxnard	10	12	35	-30.18	42.61	62	x		🔵
01N21W32Q05S	Mugu	0	2	15	-111.58	-17.45	10	x	x	🔵 🟢 🔴
01N21W32Q07S	Mugu	0	2	15	-75.31	-8.52	10	x	x	🔵 🟢 🔴
01N22W20J07S	Mugu	5	7	15	-19.87	24.36	23	x	x	🔵 🟢 🔴
01N22W26J03S	Mugu	0	2	15	-52.64	10.55	12	x	x	🔵 🟢 🔴
01N22W27C02S	Mugu	5	7	15	-27.25	21.38	5	x	x	🔵 🟢 🔴
02N21W07L06S	Mugu	25	27	60	-12.21	133.27	132	x		🟠
02N22W23B07S	Mugu	15	17	45	-40.91	83.04	100	?		🟠
02N22W36E05S	Mugu	10	12	35	-22.41	64.49	57	x		🔵
01N22W20J05S	Hueneme	0	2	15	-35.73	23.96	20	x	x	🔵 🟢 🔴
01N23W01C03S	Hueneme	5	7	20	-38.67	26.43	23	x		🔵
01N23W01C04S	Hueneme	5	7	20	-35.16	32.53	23	x	x	🔵 🟢 🔴
02N22W23B04S	Hueneme	-5	-3	15	-147.08	92.97	100			🟠 🟢 🔴
02N22W23B05S	Hueneme	-5	-3	15	-121.01	16.85	100			🟠
02N22W23B06S	Hueneme	15	17	45	-45.7	74.3	100	?		🟠
02N22W36E03S	Hueneme	10	12	35	-51.77	63.53	70	?		🔵
02N22W36E04S	Hueneme	10	12	35	-32.12	63.08	70	?		🔵
01N21W32Q04S	Fox	-25	-23	0	-120.74	-19.46	5	x	x	🔵 🟢 🔴
01N22W20J04S	Fox	0	2	15	-47.19	17.91	23	x	x	🔵 🟢 🔴
01N22W26K03S	Fox	-20	-18	0	-105.69	-21.84	8	x		🔵
01N23W01C02S	Fox	5	7	20	-48.3	17.27	23	x	x	🔵 🟢 🔴
02N21W07L04S	Fox	15	17	40	-32.02	102.76	121			
02N22W23B03S	Fox	-5	-3	15	-128.69	16.52	103		x	🟢 🔴
01N21W32Q02S	Grimes	-25	-23	0	-118.83	-21.21	5	x	x	🔵 🟢 🔴
01N21W32Q03S	Grimes	-25	-23	0	-129.7	-20.56	5	x	x	🔵 🟢 🔴
01N21W07J02S	Multiple	-40	-38	0	-213.41	-15.5	131		x	🟠
01N21W21H02S	Multiple	-70	-68	-10	-171.23	-19.09	5	x	x	🔵 🟢 🔴
02N21W07L03S	Multiple	15	17	35	-24.59	99.16	139	x		🟠
02N21W07L05S	Multiple	25	27	55	-12.22	129.35	139	x		🟠

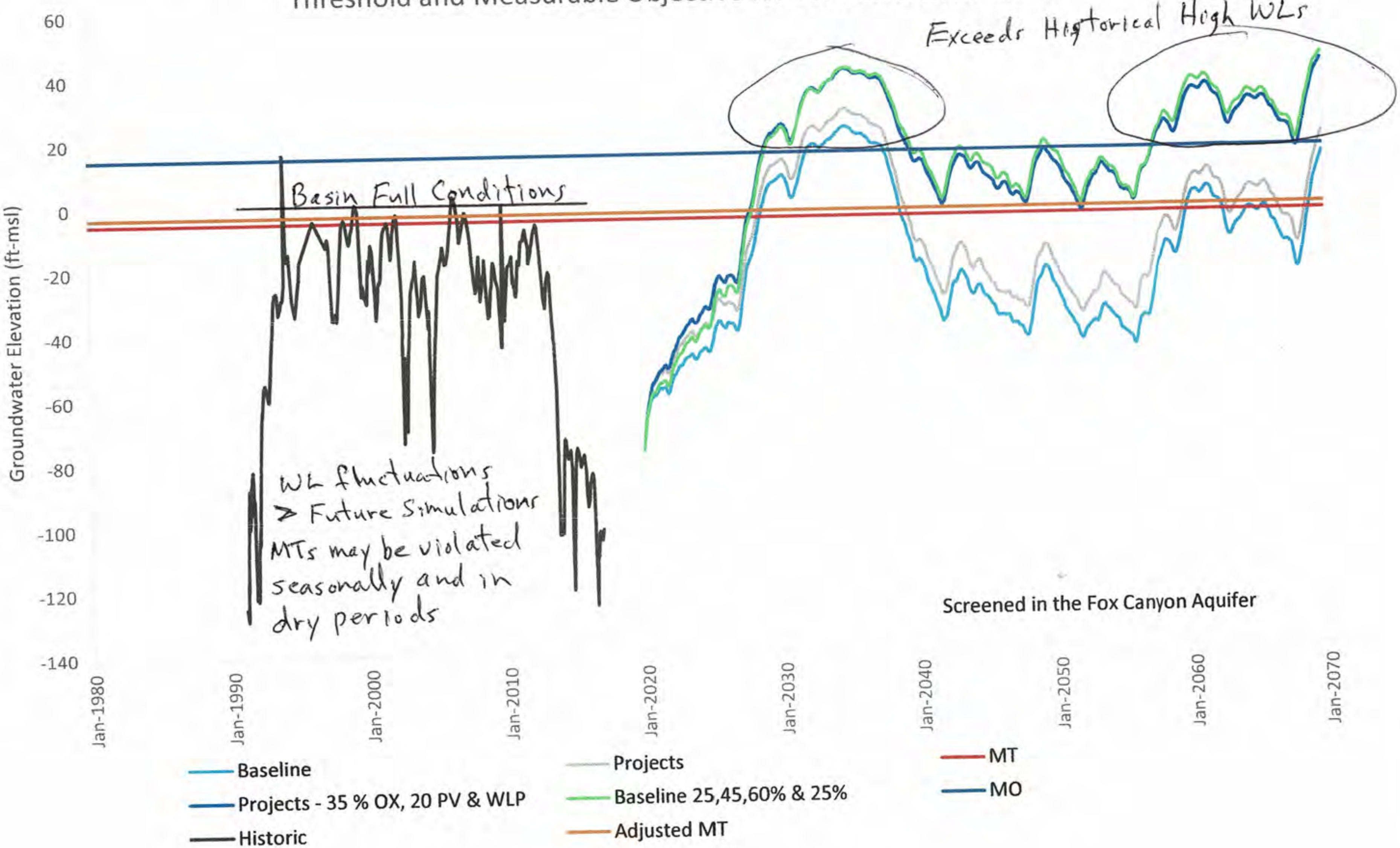
Well/Basin	Aquifer	Minimum Threshold (ft MSL)	Adjusted Minimum Threshold (ft MSL)	Measurable Objective (ft MSL)	Historic Minimum (ft MSL)	Historic Maximum (ft MSL)	Google Earth Approximate Land Surface Elev. (ft MSL)	High WLs Above LS	Historical Fluctuations > Future Simulated Fluctuations	Potential Issues
Pleasant Valley										
02N21W34G05S	Older Alluvium (Oxnard	30	32	40	-69	43.94	86		x	🟢 🔴
01N21W03K01S	Older Alluvium (Mugu)	-55	-53	5	-113.98	-3.98	54		x	🟢 🔴
02N21W34G04S	Older Alluvium (Mugu)	-50	-48	5	-131.5	-2.568	86		x	🟢 🔴
01N21W03C01S	Fox	-50	-48	0	-181.6	-15.2	70		x	🟢 🔴
02N20W19M05S	Fox	-135	--	65	3.47	103.3	200			
02N21W34G02S	Fox	-55	-53	0	-172.8	-10.61	86			
02N21W34G03S	Fox	-55	-53	0	-173.7	-10.92	86		x	🟢 🔴
01N21W02P01S	Multiple	-45	-43	5	-120.42	4.18	54		x	🟢 🔴
01N21W04K01S	Multiple	-50	-48	0	-145.48	-18.48	54		x	🟢 🔴

🟠 Simulated highs above historic high WLs in Forebay- simulated WLs may not be realistic
🔵 Potential for flowing wells
🟢 Historical WL fluctuations greater than future simulated fluctuations
🔴 MTs may be violated due to seasonal and dry-period amplifications
WL - groundwater levels
LS - land surface
MSL - mean sea level

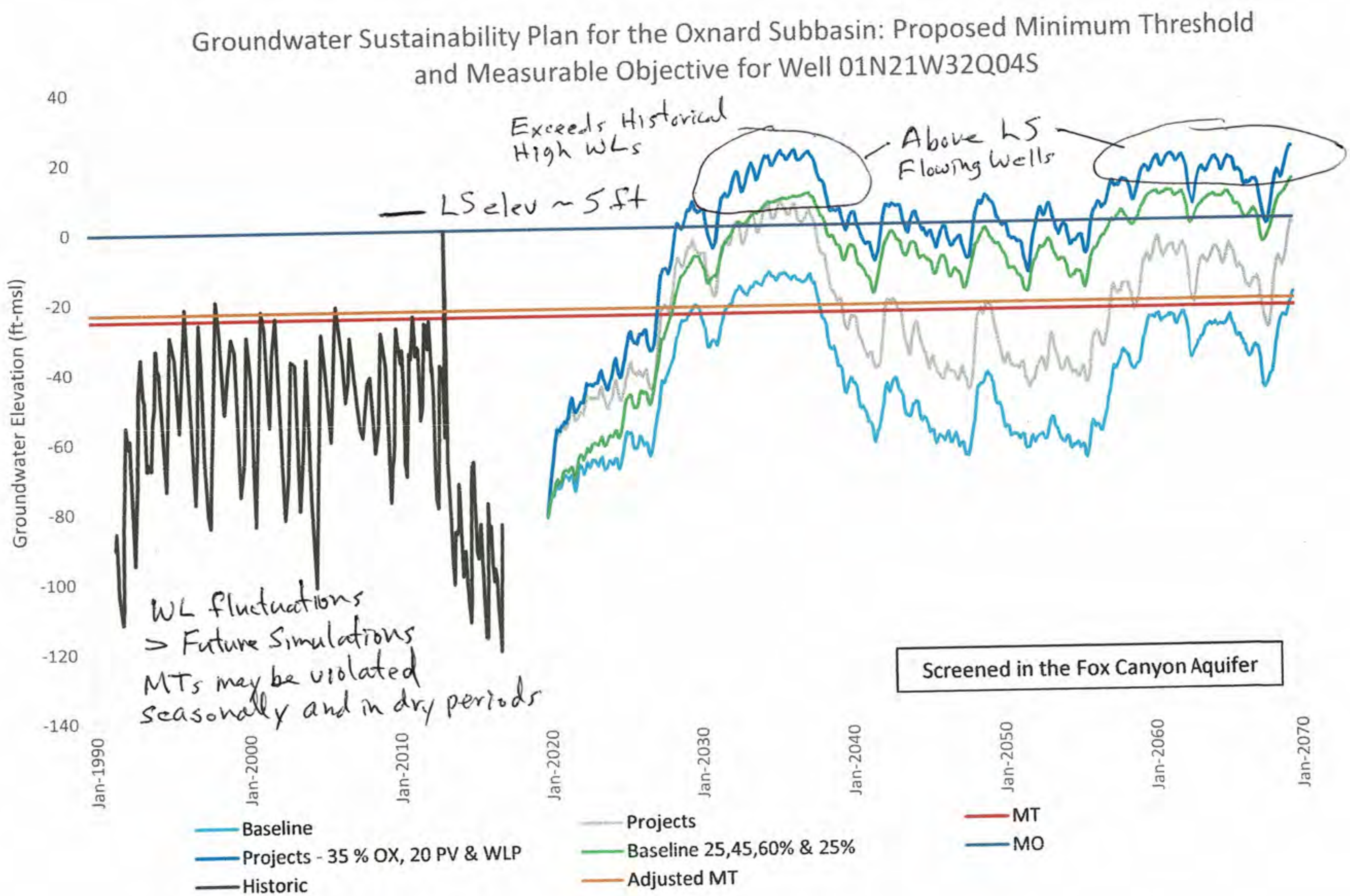


Prepared on 3/6/2019

Groundwater Sustainability Plan for the Oxnard Subbasin: Proposed Minimum Threshold and Measurable Objective for Well 02N22W23B03S

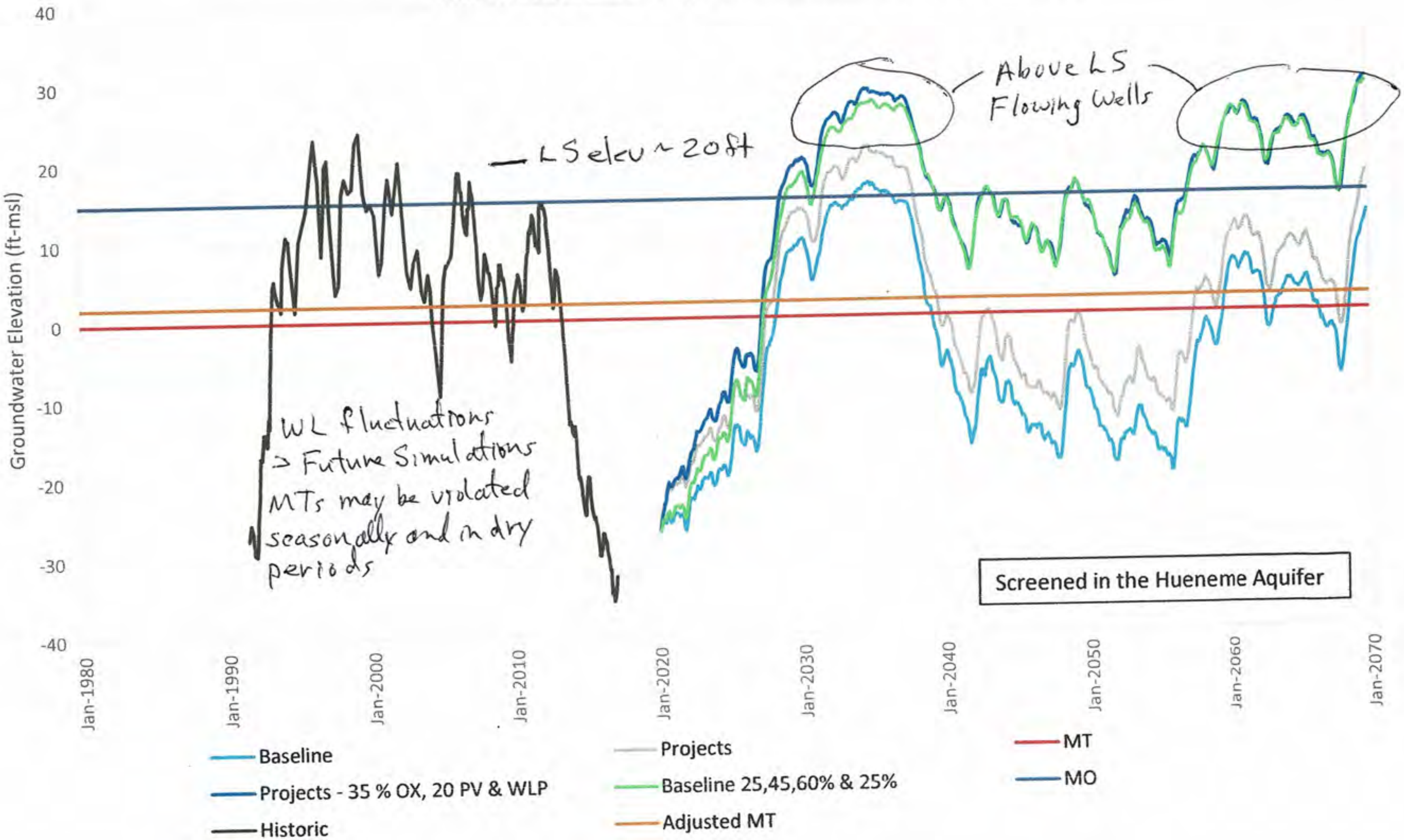


Prepared on 3/6/2019



Prepared on 3/6/2019

Groundwater Sustainability Plan for the Oxnard Subbasin: Proposed Minimum Threshold and Measurable Objective for Well 01N22W20J05S



Prepared on 3/6/2019

Attachment 3

Memo

To: TAG Members
Kim Loeb/GMA
Peter Quinlan/Dudek

From: Terry Foreman

Date: March 1, 2019

Re: Pumping Versus Seawater Intrusion Relations

This Memo is a follow-up to our discussion at the February 19th TAG meeting. I expressed concern about the relations between pumping and seawater intrusion as shown in Figures 4 through 7 of your Peer Review report dated February 2019, which are based on the last 30 years of groundwater model simulation results for future scenarios of pumping in the Oxnard-Pleasant Valley-West Las Posas areas. You agreed to redo the plots using all 50 years of simulation. I expressed concern that the relation between pumping and seawater intrusion is more complex than defined by a simple linear relationship between pumping and seawater intrusion, even though the groundwater equations are linear. I will show in this Memo the basis of my concerns. However, I do agree that the linear analysis that you are using is a reasonable first approximation of allowable pumping to limit seawater intrusion, provided the estimates are caveated as described in this Memo. However, relations of pumping versus seawater intrusion should be used as a tool, not as a solution, to iterate to possible maximum sustainable yield values using groundwater model simulations. Groundwater model simulations should be conducted to assess actual sustainable yield of groundwater basins given the complex nature of groundwater flow conditions and effects of pumping on other water budget items in the basin.

I have divided my comments and assessments presented in this Memo into the following areas:

- Pumping Versus Seawater Intrusion Is Linear For Steady-State Conditions
- Real Groundwater Basins Conditions Complicate the Application of The Linear Relation Between Pumping and Seawater Intrusion
- Use of Pumping Versus SWI Plots to Assess Sustainable Yield – Oxnard Basin
- Use of Pumping Versus SWI Plots to Assess Sustainable Yield – Oxnard-PV-WLP
- Discussion

Pumping Versus Seawater Intrusion Is Linear For Steady-State Conditions

The following equation describes the water balance for a groundwater basin.

$$\sum R - \sum D = \Delta S \qquad 1$$

Where a basin is in a steady-state condition, $\Delta S = 0$, i.e., there is no change in basin storage, and recharge is equal to discharge. We can expand Equation 1 for steady-state conditions as follows:

$$R - SWI - P = 0 \qquad 2$$

By rearranging terms, we can show the following:

$$R - P = SWI \qquad 3$$

Where, for $R>P$, SWI is positive, meaning outflow of groundwater to the ocean and for $R<P$, SWI is negative, meaning inflow from the ocean.

Clearly, Equations 3 is linear, so that any change in pumping (or recharge) results in a linear change in SWI (note that SWI is used to represent both inflow from the seaward direction and outflow from the basin to the sea as opposed to only "intrusion"). This linear assumption is the underpinning for Figures 4 through 7 of the Peer Review Report. However, as shown next, the application of this relationship is more complicated in actual groundwater basins.

Real Groundwater Basins Conditions Complicate the Application of Linear Relation Between Pumping and Seawater Intrusion

The application of the relation between pumping and seawater intrusion in real groundwater basins is complicated by the fact that groundwater flow generally is not steady-state, distribution of pumping can change transient responses of other terms in Equation 1. For short-time periods, changes in storage can dampen changes in SWI with changes in P. I think the steady-state issue can be somewhat overcome if the analysis is completed for a long enough period such that transient effects are largely overcome. I will not dwell on this issue here and assume that the 50-year period is sufficient for the purposes of analysis, however, this should be confirmed in future follow-up analyses.

The principal issues of concern as I see them for the OPV-WLP area are the effects of changes in distribution of pumping on the other R terms (such as stream leakage and interbasin flow) and resulting change in SWI. So, in effect, SWI is not only dependent on changes in P, but it is also similarly dependent on changes in other terms that make up R in Equation 1, which occur with changes in P distribution and timing.

There are several situations where changes in pumping distribution and timing can effect recharge. For example, if pumping is reduced near streams, groundwater levels can build up and cause rejection of stream leakage during wet periods. As recharge from stream leakage is reduced, then there would need to be an increase in seawater intrusion to balance Equation 1. However, alternatively, if pumping is increased near a stream to induce more stream leakage during wet periods, then seawater intrusion would decrease as pumping is balanced by stream leakage as opposed to seawater intrusion. Another example is where pumping is distributed inland, further from the coastline. Pumping far inland requires longer times to induce a gradient from the ocean toward inland areas of pumping. During dry periods, hydraulic gradients continue to increase from the coast toward inland pumping; however, recharge occurring during wet periods can interrupt this gradient formation before significant seawater intrusion take place. On the other hand, pumping near the coast can immediately induce seawater intrusion and may not be mitigated by recharge during wet periods. Obviously, there are many variations on these themes that can affect the terms in Equation 1, which then will affect the relation between pumping and seawater intrusion.

Figure 4 in the Peer Review Report illustrates the above points. As can be seen in Figure 4, the points do not fall on a straight line. I have recreated a plot similar to Figure 4, using the 50-year simulation results, instead of only the last 30-years of the 50-year simulation period, for each of the surrogate models. The surrogate models are the future scenario models used in the Sustainability Assessments discussed at the last few TAG meetings, as follows:

- Baseline – Future Baseline Simulation (2015-2017 average production rates; existing projects; 2070 DWR climate change)
- Projects - Future Baseline Simulation with Projects (2015-2017 average production rates; existing projects; 2070 DWR climate change; potential future projects that met the DWR conditions for incorporation in the GSP)
- Ox35PVWLP20 - Reduction With Projects (35% reduction of 2015-2017 average production rates for the upper aquifer system (UAS) and lower aquifer system (LAS) in the Oxnard Subbasin, 20% reduction for the UAS and LAS in PVB; and 20% in the LAS in WLPMA; existing projects, 2070 DWR climate change; potential future projects that met the DWR conditions for incorporation in the GSP)
- Ox45PVWLP25 - Reduction Without Projects (Reduction of 2015-2017 average production rates by 25% in the UAS, 60% in the LAS and 45% for wells screened in both aquifer systems in the Oxnard Subbasin; 25% reduction for the UAS and LAS in PVB; and 25% in the LAS in WLPMA; existing projects, 2070 DWR climate change)
- Ox55PVWLP0 - Reduction Without Projects (Reduction of 2015-2017 average production rates by 55% for wells Oxnard Subbasin; no pumping reduction PVB or WLP, 2070 DWR climate change)
- Ox55PVWLP20 - Reduction Without Projects (Reduction of 2015-2017 average production rates by 55% for wells Oxnard Subbasin; 20% pumping reduction in PVB and WLP, 2070 DWR climate change)

The relation between pumping and seawater intrusion for the UAS in the Oxnard Basin is shown in Figure A of this Memo (comparable to Figure 4 of the Peer Review Report). I have also labelled several of the points with the modeled scenario name and plotted a blue line to show the path of changes in pumping (lowest to highest) and resulting changes to SWI. As shown in Figure A, the path from the least pumping to the most pumping simulated is not a straight line. The path is affected by the manner of pumping changes as well as the pumping change itself. For example, those scenarios that involve “projects” shift the change relation to the right (i.e., more pumping is allowed, with less seawater intrusion) compared to the baseline scenarios. This change in pumping pattern is significant as shown for the differences in scenarios Baseline OX55PVWLP0 and Projects Ox35PVWLP20, which shows for an increase in pumping of about 7,000 AFY, there is almost no change in SWI. Similarly, the difference in the Baseline and Projects scenarios shows that an increase in pumping resulted in a decrease in SWI, which is the opposite of the overall general relation between pumping and SWI.

The shift in relations between pumping versus seawater intrusion is related to the effects of pumping distribution on other recharge terms in Equation 3, as described above. The changes in R are mostly related to change in interbasin flows if one examines the model water budgets from the simulations (not included here but they are provided by United). Figure A shows two orange lines that bracket the range in relations between pumping and seawater intrusion. The difference in allowable pumping, where the lines cross the "0" SWI line, is about 7,000 AFY. This difference is related to the path one takes to limit seawater intrusion. It turns out that the linear regression on all six scenarios produces a line that crosses the "0" SWI line at the same point as the blue path line shown in Figure A, which is at about 33,000 AFY of pumping.

There are likely other scenarios that may increase the spread of this difference, including scenarios that will allow for a higher level of pumping than shown for the limited number of scenarios examined in the sustainable yield assessments. **It should be stated that the analysis presented here is only for the specific set of modeled scenarios**. Clearly, there is uncertainty in the simulated seawater intrusion as described in the Peer Review Report. Those uncertainties in seawater intrusion are in addition to the variations resulting from pumping distribution and timing.

Based on the assessments for this Memo, the relation of pumping versus SWI appears to be a reasonable first approximation of allowable pumping in the UAS of the Oxnard Basin, however, the caveats described in this Memo should be provided along with the estimate of allowable pumping: that is, allowable pumping is estimated for specific assumed pumping, where the basin is assumed to be in equilibrium over the long-term, and for the assumed hydrologic and land use conditions.

Use of Pumping Versus SWI Plots to Assess Sustainable Yield – Oxnard Basin

The Sustainable Yield for the UAS of the Oxnard Basin is reported as about 27,000 AFY as described in Dudek's January 31, 2019 Memorandum titled Assessing the Sustainable Yield of the Oxnard Subbasin, Pleasant Valley Basin and Las Posas Valley. Based on the analysis using the relation between pumping and SWI, the sustainable yield is approximately 33,000 AFY. This is the mid-range of the potential allowable pumping, so it could be a few thousand AFY higher. This 33,000 AFY value is about 6,000 AFY higher compared to the Dudek January 31, 2019 value. The 33,000 AFY value accounts for averaging over the entire 50-year representative hydrologic period as proposed in my February 11, 2019 Memo to TAG.

The Peer Review Report provided Figure 6, showing the relation between pumping and SWI for the combined UAS and LAS. As shown in Figure 5 of the Peer Report, there is not as much "wondering" in the path for changes in pumping versus SWI, which suggests there is less sensitivity between pumping and other components of R terms of Equation 1, resulting in a more straight line relation. Similar to Figure 6, I plotted pumping versus SWI for the LAS for the full 50-year simulation period of the six modeled scenarios. Figure B, shows the plot. Again, the relation presents more of a straight line, so that using a linear regression on the six scenarios seems reasonable in this case. Projection of the line to "0" SWI results in an allowable pumping value of about 7,300 AFY.

Using combined UAS and LAS pumping and SWI and plotting relations between pumping and SWI to find a pumping value that results in "0" SWI is not technically valid. There is an Equation 1 for the LAS and a different Equation 1 for UAS, so technically, each term of Equation 1 should have subscripts of "LAS" or "UAS" as appropriate. For example, R includes stream leakage for the UAS, which may not apply to the LAS. Similarly, R for the LAS includes leakage across specific aquitards that are not applicable to the UAS. The uniqueness of the relationship is shown by the slope of the regression lines for the UAS and LAS. The slope for the UAS is 0.3153 whereas the slope for the LAS is 0.2257, so there are differential reductions in SWI for the same change in pumping. It is clear from these slopes, that for a 10,000 AFY reduction in pumping, we would see a 3,153 AFY reduction of SWI in the UAS and a 2,257 AFY reduction of SWI in the LAS, a nearly 900 AFY difference. So, using the results of Figure A and Figure B, where SWI=0, we get approximately 33,000 AFY for the UAS and 7,300 AFY for the LAS for a sustainable yield of 40,300 AFY. Figure C shows a combined pumping versus SWI plot for the Oxnard UAS+LAS. The slope of this line is 0.2926, which indicates a reduction of 2,926 AFY of SWI for a 10,000 AFY of pumping, which is in between the UAS and LAS pumping versus SWI slopes, but closer to the slope for the UAS. Clearly, where pumping is reduced, areal and aquifer-specific, is critically important, as shown by the current set of simulations, which shows that there is groundwater outflow (land to sea) from the UAS and seawater inflow (sea to land) in the LAS.

The regression line shown in Figure C crosses at about 42,000 AFY, plus or minus several thousand acre feet per year. This plot allows for slightly higher pumping than using pumping versus SWI relations for the separate aquifer systems because it is more strongly influenced by the UAS pumping versus SWI relation. In addition, because the relation for the UAS is affected by the manner in which pumping is changed, the effect on the P v. SWI relation for the whole basin needs to acknowledge that there is a range of allowable pumping, which even exceeds the 42,000 AFY value obtained from Figure C. So, the allowable pumping should be caveated appropriately as described above.

It should be noted that the pumping and SWI numbers do not include pumping or SWI in the Semi-perched Aquifer, so these values should be provided to give the complete picture.

In conclusion, the pumping versus SWI plots should be applied by aquifer as opposed to using such plots as representative for the whole basin's aquifer systems. In addition, these plots should be used as a guide to develop new scenarios, including pumping similar to rates suggested by these plots, that can be tested to iterate towards a maximum sustainable yield for a basin. The plots should not be used by themselves to make conclusions about sustainable yield.

Use of Pumping Versus SWI Plots to Assess Sustainable Yield – Oxnard-PV-WLP

I think there are even greater complications to trying to extend the pumping versus SWI relation to the whole modeled area of the OPV-WLP areas. These complications are related to the same complications described above: the fact that groundwater flow generally is not steady-state and distribution of pumping can change transient responses of other terms in Equation 1.

We can explore the potential impacts of trying to apply the relations of pumping to SWI across all basins by comparing potential pumping reductions to achieve SWI of "0" computed for an individual basin to pumping reductions required considering pumping in all basins. Figure B shows pumping reductions required to reduce SWI to "0" for the LAS in the Oxnard Basin, based only on pumping in the Oxnard Basin. Figure D shows the same plot except that pumping is included for all basins. Notice again that the path of pumping to reduce SWI is not a simple straight line, which indicates other terms in Equation 1 are changing in addition to pumping. Figure B shows that pumping needs to be reduced by about 7,500 AFY to bring SWI to "0" whereas Figure D shows pumping is required to be reduced by about 9,500 AFY, using a linear regression line based on all six future scenarios. So, there is a difference in indicated pumping reductions of about 2,000 AFY. Significant observations that can be made from this comparison: 1) it is likely more efficient to make pumping reductions in the Oxnard Plain to effect reductions in SWI than uniform reductions in pumping across all basins and, 2) applying the pumping versus SWI analysis to all basins at once may overestimate the required pumping reductions to bring SWI to "0".

Similar to the Oxnard Basin analysis above, I plotted pumping versus SWI for each of the UAS and LAS aquifers for pumping in Oxnard-PV-WLP. The slopes of the regression lines are very different: 0.3098 for the UAS and 0.1771 for the LAS. These plots indicate allowable pumping, where SWI=0, of about 37,000 AFY for the UAS and 23,000 AFY for the LAS, for a total of 60,000 AFY. Figure E shows the plot for all basins combined pumping versus SWI. This plot shows that the allowable pumping is approximately 66,000 AFY on average, which is 6,000 AFY higher than the value obtained using the separate plots, showing that plots for combined aquifer system analysis should be used with caution.

Based on these pumping versus SWI analysis, the sustainable yield values are about 3,000 to 9,000 AFY higher than the sustainable yield value reported in the Dudek January 31, 2019 Memorandum (summing for all basin areas). However, these graphical analyses include elimination of SWI in the LAS, so the sustainable yield from this analysis is significantly higher, by as much as 16,000 AFY than stated in the January 31, 2019 Memorandum (because the January 31st Memorandum has an implicit requirement for about 7,500 AFY of additional pumping reductions in the LAS, which further lowers that reported sustainable yield value).

In conclusion, the pumping for SWI plots should be used by aquifer as opposed to using such plots as representative for the whole basin's combined aquifer systems. In addition, these plots should be used as a guide only to develop new scenarios, including pumping similar to rates suggested by these plots, that can be tested to iterate towards a maximum sustainable yield for a basin.

Discussion

The relation between pumping and SWI (positive or negative) is somewhat complicated in that pumping changes may also affect other terms of Equation 1, so that the relation of pumping to seawater intrusion may not be a straight line relation over the range of pumping changes. More likely, the relation between pumping and seawater intrusion will be a range of values as shown herein due to interactions of pumping and other water budget terms, in addition to seawater intrusion. Relations between pumping and seawater intrusion should be applied to individual aquifer systems as the relations are different (as shown by slopes of linear regressions) for each aquifer system. However, linear analysis of pumping and seawater intrusion results from long-term simulations periods may be used with caution, as long as the results of this analysis are caveated as described herein, namely, that allowable pumping is estimated for specific assumed pumping distributions, where the basin is assumed to be in equilibrium over the long-term, and for the assumed hydrologic and land use conditions.

Further caution should be when using pumping versus SWI relations over large multiple basin areas as the relation between pumping and SWI is further complicated by pumping changes that likely affects other terms of Equation 1. If such an analysis is used, it should be similarly caveated as described above.

Relations of pumping versus seawater intrusion should be used as a tool to iterate to possible maximum sustainable yield values using groundwater model simulations. Groundwater model simulations should be conducted to assess actual sustainable yield of groundwater basins given the complex nature of groundwater flow conditions and effects of pumping on other water budget items in the basin.

The analysis contained herein does not account for uncertainty in seawater intrusion simulation results due to uncertainties in model input parameters, so further caveat of the results should be provided relative to these uncertainties.

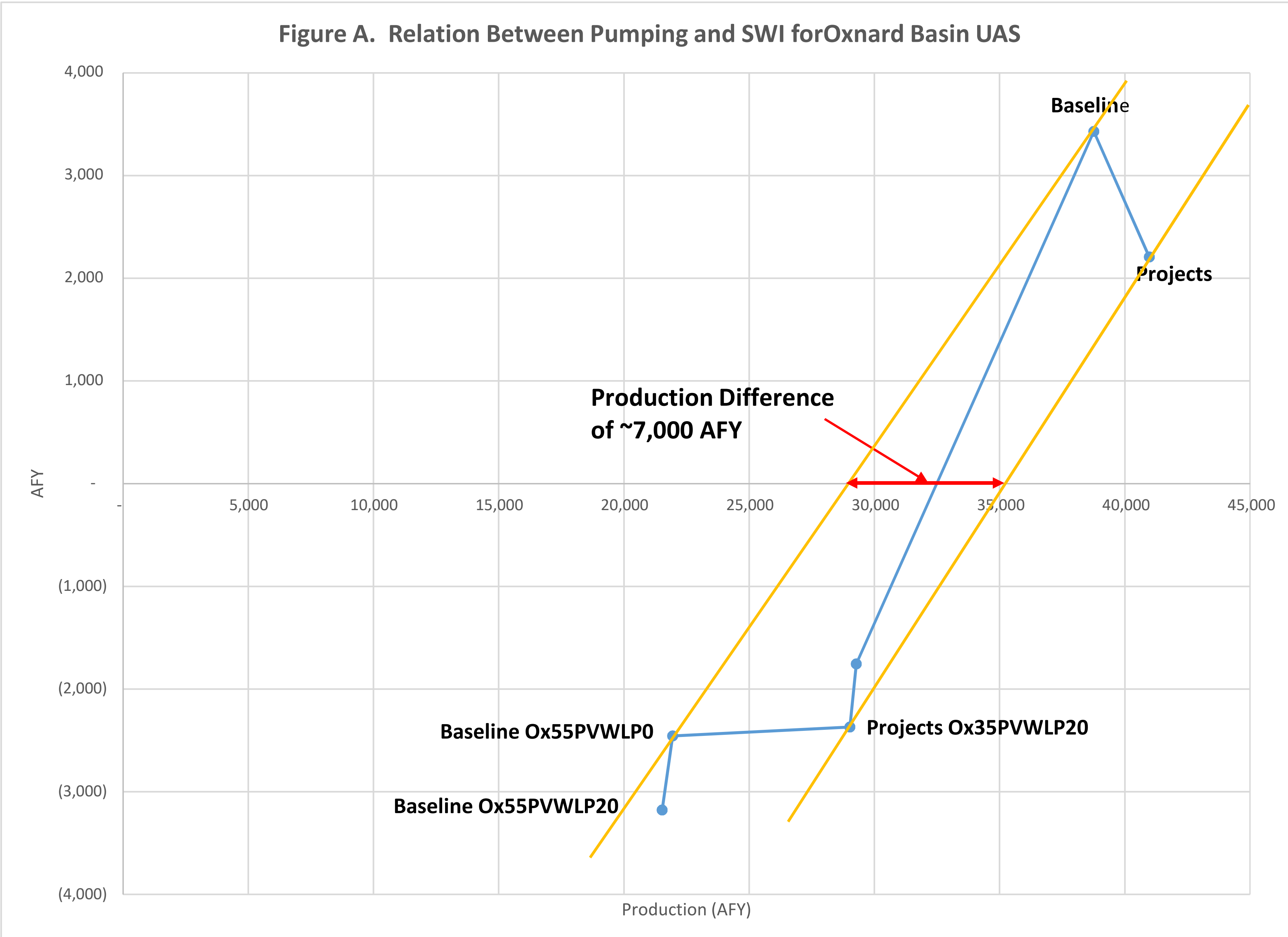


Figure A. Relation Between Pumping and SWI forOxnard Basin UAS
4,000
3,000
2,000
1,000
-
(1,000)
(2,000)
(3,000)
(4,000)
AFY
-
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
Production (AFY)
Baseline
Projects
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Baseline Ox55PVWLP0
Projects Ox35PVWLP20
Baseline Ox55PVWLP20

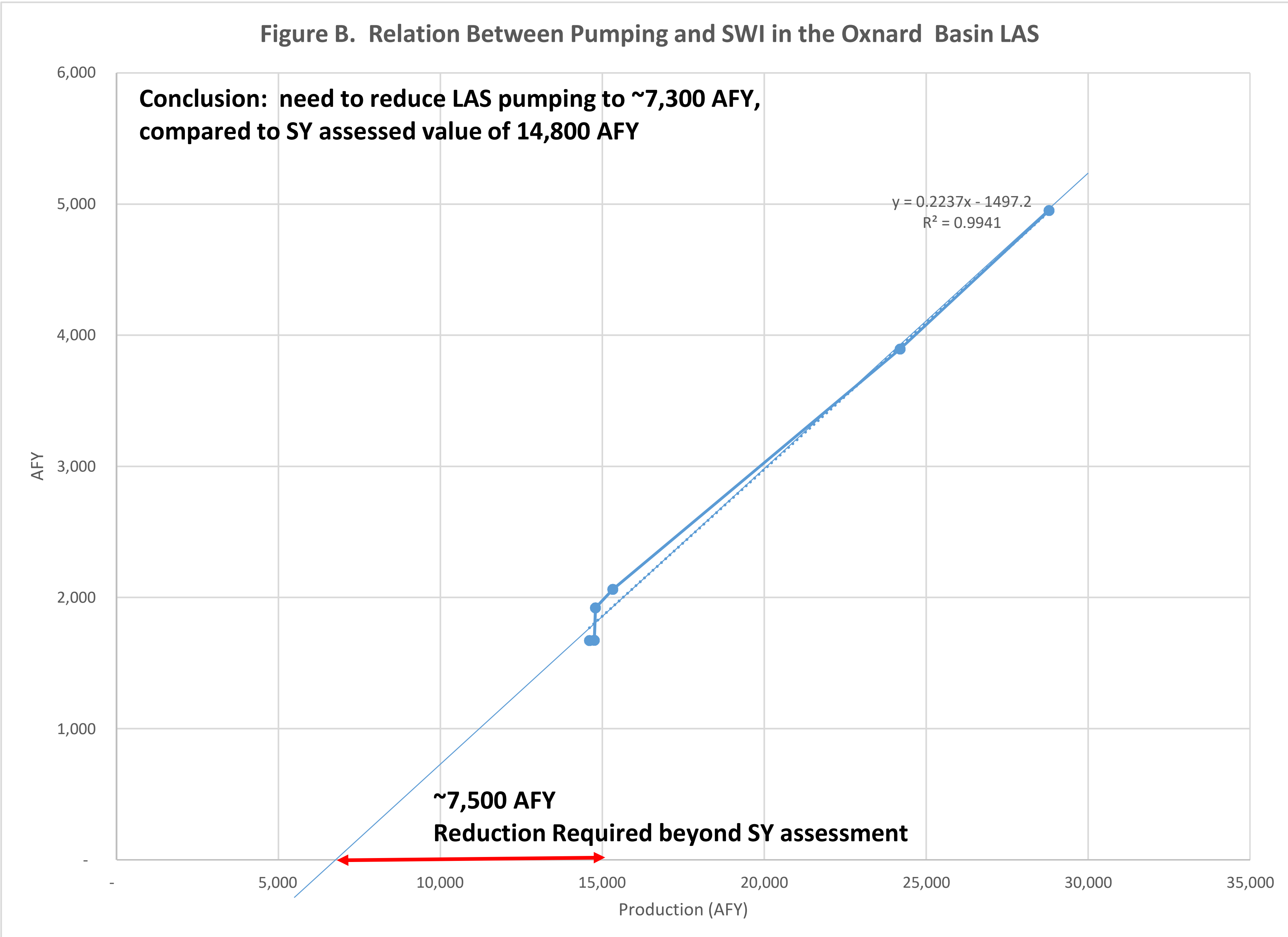

Figure B. Relation Between Pumping and SWI in the Oxnard Basin LAS
Conclusion: need to reduce LAS pumping to ~7,300 AFY,
compared to SY assessed value of 14,800 AFY
y = 0.2237x - 1497.2
R² = 0.9941
~7,500 AFY
Reduction Required beyond SY assessment
AFY
6,000
5,000
4,000
3,000
2,000
1,000
-
-
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Production (AFY)

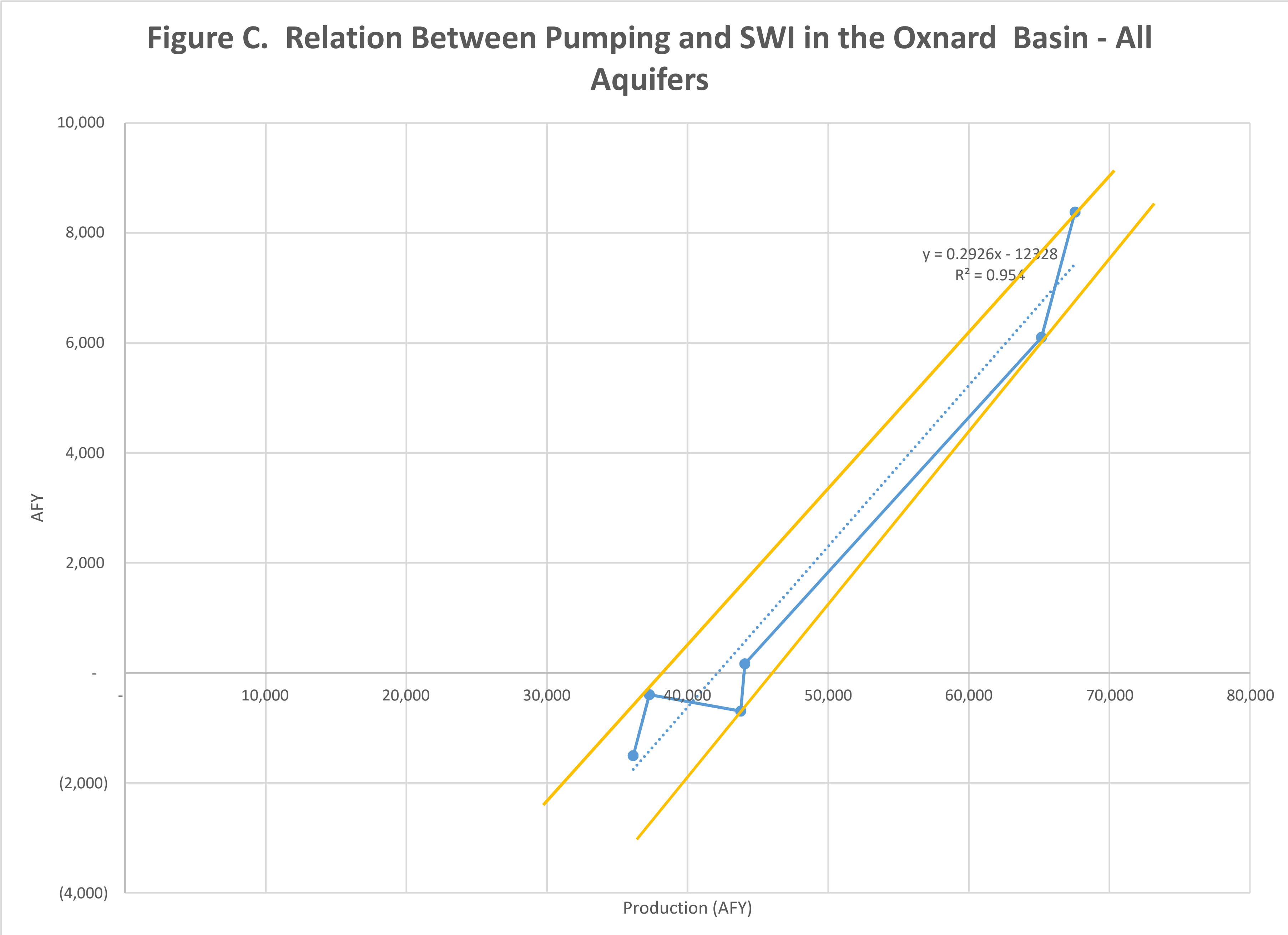

Figure C. Relation Between Pumping and SWI in the Oxnard Basin - All Aquifers
10,000
8,000
6,000
4,000
2,000
-
(2,000)
(4,000)
AFY
-
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
Production (AFY)
y = 0.2926x - 12328
R² = 0.954

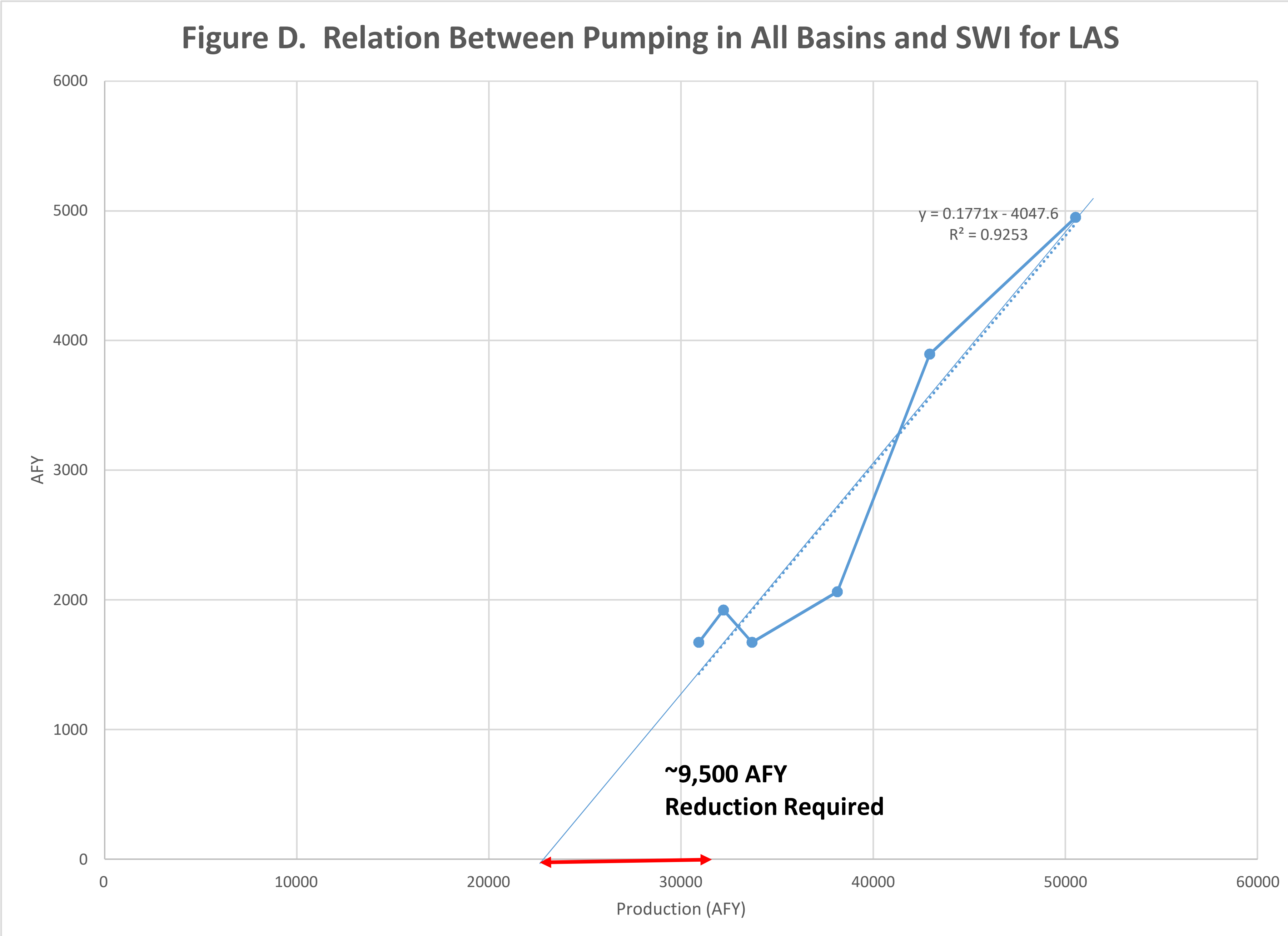

Figure D. Relation Between Pumping in All Basins and SWI for LAS
6000
5000
4000
3000
2000
1000
0
AFY
0
10000
20000
30000
40000
50000
60000
Production (AFY)
y = 0.1771x - 4047.6
R² = 0.9253
~9,500 AFY
Reduction Required

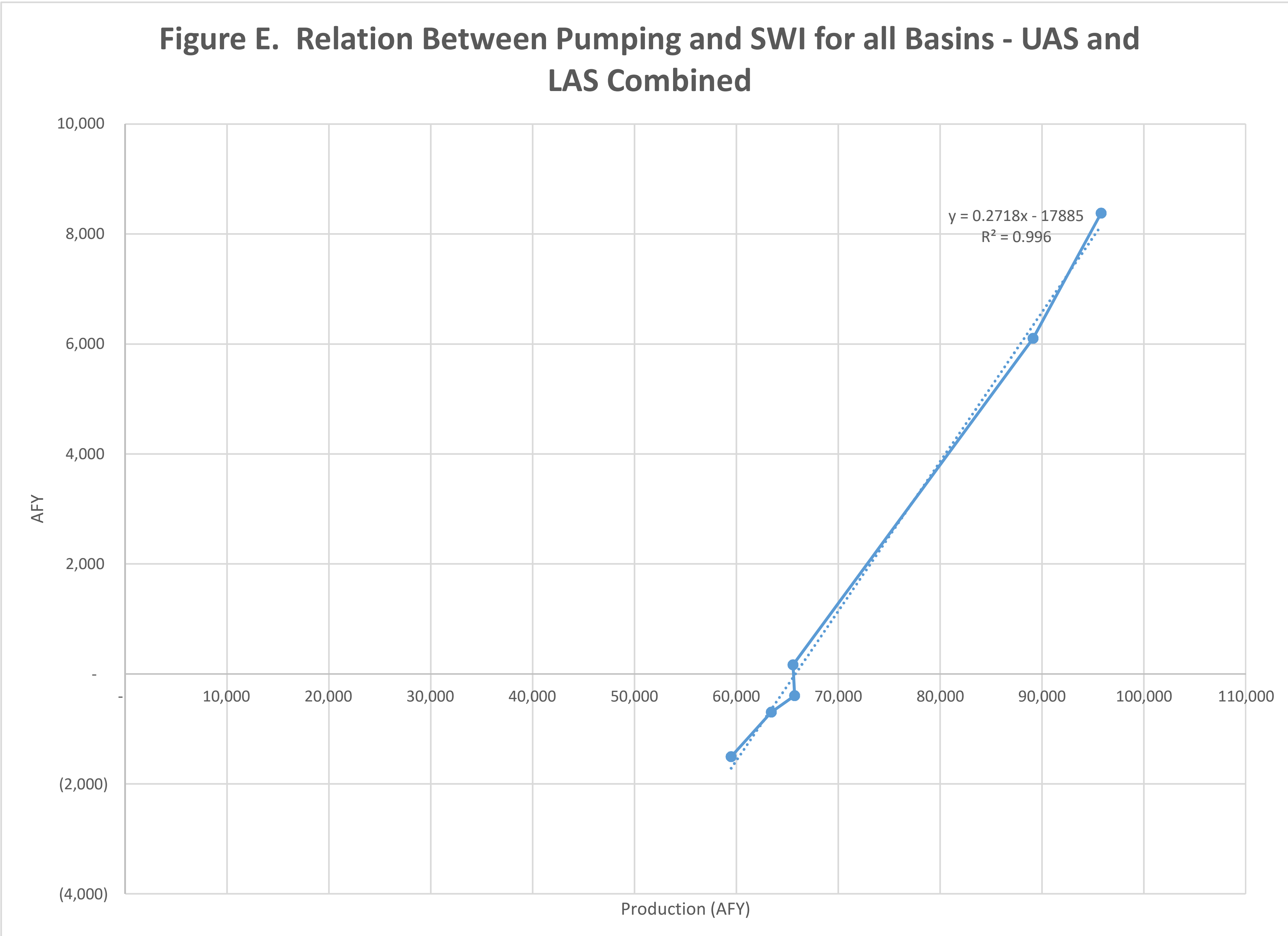
Figure E. Relation Between Pumping and SWI for all Basins - UAS and LAS Combined
10,000
8,000
6,000
4,000
2,000
-
(2,000)
(4,000)
AFY
-
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
110,000
Production (AFY)
y = 0.2718x - 17885
R² = 0.996

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

September 23, 2019

Via Electronic Mail and Online Submission

Mr. Arne Anselm
Deputy Director
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009-1610
FCGMA@ventura.org

Dear Mr. Arne Anselm:

Subject: COMMENTS ON THE PLEASANT VALLEY BASIN DRAFT GROUNDWATER SUSTAINABILITY PLAN

The California Department of Fish and Wildlife (Department) Region 5 South Coast Region is providing comments on the Fox Canyon Groundwater Management Agency's (GSA) Pleasant Valley Basin (PVB) Draft Groundwater Sustainability Plan (GSP) prepared pursuant to the Sustainable Groundwater Management Act (SGMA). As trustee agency for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802).

Development and implementation of GSPs under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems and species depend on groundwater and interconnected surface waters. SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to Groundwater Sustainability Plans:

- Groundwater Sustainability Plans must **identify and consider impacts to groundwater dependent ecosystems** [23 CCR § 354.16(g) and Water Code § 10727.4(l)];
- Groundwater Sustainability Agencies must **consider all beneficial uses and users of groundwater**, including environmental users of groundwater [Water Code §10723.2 (e)]; and Groundwater Sustainability Plans must **identify and consider potential effects on all beneficial uses and users of groundwater** [23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3)];
- Groundwater Sustainability Plans must **establish sustainable management criteria that avoid undesirable results** within 20 years of the applicable

statutory deadline, including **depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water** [23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b)] and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters [23 CCR § 354.34(c)(6)(D)]; and

- Groundwater Sustainability Plans must **account for groundwater extraction for all Water Use Sectors** including managed wetlands, managed recharge, and native vegetation [23 CCR §§ 351(al) and 354.18(b)(3)].

Accordingly, the Department values SGMA groundwater planning that carefully considers and protects groundwater dependent ecosystems and fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.

COMMENT OVERVIEW

The Department is writing to support ecosystem preservation in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science.

The Department believes the GSP does not adequately demonstrate consideration of environmental beneficial uses and users of groundwater in its sustainability management criteria nor does it adequately characterize or consider surface water-groundwater connectivity. Under *Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844, the state and subdivisions of the state must consider public trust uses when permitting extractions of groundwater hydrologically connected to navigable waterways, including those authorized under SGMA GSPs. Accordingly, the Department recommends that the GSA address these deficiencies before submitting the GSP to the Department of Water Resources (DWR).

COMMENTS AND RECOMMENDATIONS

The Department comments are as follows:

1. **Comment #1** (Basin Setting, Interconnected Surface Water Systems, starting pp E-6): The method identifying and the narrative describing the basin's interconnected surface water conditions lack specifics.
    a. *Issue*: According to the GSP, "depletion of interconnected surface water is also not occurring within the PVB, where surface water bodies are ephemeral, losing streams, with groundwater elevations below the bottom of stream channels" (pp ES-6). Yet, the GSP also states that "depletions of interconnected surface water may have occurred historically in the PVB, although there is little data in the vicinity of the primary surface water courses in the LVB to document historical or current interactions between

surface water and groundwater" (pp 1-2). 'Losing Streams' may still be 'interconnected,' even if the groundwater elevation is below the streambed, if there is a continuous saturated zone connecting the aquifer and the stream [23 CCR § 351(o)].The interconnected surface water conditions modeling/narrative excludes interconnected losing streams and lacks estimations of the quantity and timing of streamflow depletions as specified in 23 CCR § 354.16(f).

   b. *Recommendation*: The Department recommends identifying the estimated quantity and timing of streamflow depletions in the PVB. If this information is not available, identify an expeditious path to estimating these values.

2. **Comment #2** (Basin Setting, 2.3.7 Groundwater-Dependent Ecosystems, starting pp 2-25): Groundwater-dependent ecosystems (GDE) identification, required by 23 CCR § 354.16(g), is based on methods that risk exclusion of ecosystems that may depend on groundwater.
   a. *Issue*: The GSP states that "as the depths to groundwater in the Shallow Alluvial Aquifer increase to greater than 30 feet, the riparian vegetation is unlikely to use groundwater to sustain growth during the dry season (Stromberg 2013) (pp 2-27)." This depth-to-groundwater method applied to the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset to eliminate potential GDEs is fallible. The removal of potential GDEs with a depth to groundwater greater than 30 feet during (an unspecified season) of 2015 relies on a single-point-in-time baseline hydrology. Specifically, this 2015 baseline (starting pp 2-12) falls several years into a historic drought when groundwater levels throughout the PVB were trending lower than usual due to reduced surface water availability. As such, this snapshot of groundwater elevations during a historic drought does not consider representative climate conditions or account for GDEs that can survive a finite period of time without groundwater access (Naumburg et al. 2005). Naumburg et al. (2005) presents several models that evaluate how GDEs rely on fluctuating groundwater water elevations for long-term survival.
   b. *Recommendation*: The Department recommends developing a hydrologically robust baseline that considers the groundwater elevation fluctuations associated with climate conditions. This approach would also account for the inter-seasonal and inter-annual variability of GDE water demand.

3. **Comment #3** (2.3.7 Groundwater-Dependent Ecosystems, starting pp 2-25; 4.2.1 Network for Monitoring Groundwater, starting pp 4-1): Shallow groundwater monitoring wells are lacking.
   a. *Issue*: The current monitoring network lacks a sufficient number and representative distribution of shallow groundwater monitoring wells to

monitor impacts to environmental beneficial uses, users of groundwater, and interconnected surface waters [23 CCR § 354.34(2)]. The Nature Conservancy (TNC 2017) identifies potential GDEs in the following drainages: Calleguas Creek, the lower reach of Arroyo Las Posas, and Conejo Creek. Few wells are near interconnected surface waters or concentrations of GDEs; therefore, there are few data points on shallow groundwater level trends. These data are critical to understanding groundwater management impacts on fish and wildlife beneficial uses and users of groundwater, including GDEs and interconnected surface water habitats, that are impacted disproportionately by shallow groundwater trends.

b. *Recommendation*: The Department recommends designing groundwater monitoring criteria that reflect a 'Critically Overdrafted' subbasin (DWR 2016) designation. The criteria must seek to improve current groundwater conditions rather than allowing for aquifer depletions to sustain over the next two decades. The Department recommends the installation of shallow groundwater monitoring wells near potential GDEs and interconnected surface waters, potentially pairing multiple-completion wells with additional streamflow gauges. This will facilitate an improved understanding of surface water-groundwater interconnectivity and subsurface recharge channels.

CONCLUSION

In conclusion, the PVB GSP does not comply with all aspects of SGMA statutes and regulations. The Department deems the GSP insufficient in its consideration of fish and wildlife beneficial uses and users of groundwater and interconnected surface waters. The Department recommends that PVB's Fox Canyon Groundwater Management Agency address the above comments before GSP submission to DWR. If these comments are not integrated, the Department may recommend to DWR an 'incomplete' or 'inadequate' plan determination based on the following regulatory criteria for plan evaluations:

1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [23 CCR § 355.4(b)(1)] (See Comment #2, 3)
2. The GSP does not identify reasonable measures and schedules to eliminate data gaps. [23 CCR § 355.4(b)(2)] (See Comment #1, 2, 3)

The Department appreciates the opportunity to provide comments on the PVB Draft GSP. Please contact Mary Ngo, Senior Environmental Scientist (Specialist), at (562) 342-2140 or Mary.Ngo@wildlife.ca.gov with any questions.

Sincerely,

FOR Erinn Wilson
Environmental Program Manager, South Coast Region 5

Enclosures (Literature Cited)

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Literature Cited

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TNC (The Nature Conservancy). 2017. *Technical Memorandum: Assessment of Groundwater Dependent Ecosystems for the Oxnard Subbasin Groundwater Sustainability Plan*

CALLEGUAS MUNICIPAL WATER DISTRICT

web site: www.calleguas.com

2100 OLSEN ROAD • THOUSAND OAKS, CALIFORNIA 91360-6800 805/526-9323 • FAX: 805/522-5730

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 Oxnard Subbasin and Pleasant 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 Oxnard Subbasin (Oxnard GSP) and Pleasant Valley Basin (PV GSP). Calleguas thanks Agency staff for their efforts in preparing those GSPs. Incorporated in this letter is Calleguas' comment letter submitted previously to the Agency on April 2, 2018.

After reviewing the most recent draft GSPs, Calleguas' concern continues to be the lack of consideration and analysis as to how the Agency intends to protect Calleguas' water stored in the Oxnard Subbasin and Pleasant Valley Basin pursuant to Agency-approved in-lieu credit programs. 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' imported water in any GSP water calculation is incorrect because only Calleguas has the right to its stored water, whether Calleguas stored that water through direct injection or in accordance with the Agency-approved in-lieu credit programs. The Agency has recognized the importance of Calleguas storing imported water in the basins 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 calculation or analysis related to the sustainable yield, sustainable goal, water budget, minimum thresholds, and measurable objectives in the Oxnard GSP and PV GSP that includes Calleguas' stored water is not consistent with SGMA, California water rights law, or Agency adopted action.

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

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ANDY WATERS, SECRETARY
DIVISION 3

STEVE BLOIS, DIRECTOR
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April 2, 2018

Keely Royas, Clerk of the Board
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009

Subject: Comments on November 2017 Preliminary Draft Groundwater Sustainability Plans for the Oxnard Subbasin and Pleasant Valley Basin

Dear Ms. Royas:

Calleguas Municipal Water District (Calleguas) appreciates this opportunity to provide comments to the Fox Canyon Groundwater Management Agency (FCGMA) on the Preliminary Draft Groundwater Sustainability Plans for the Oxnard Subbasin and Pleasant Valley Basin, dated November 2017 (Oxnard PDGSP and PV PDGSP). The importance of developing GSPs that are based on best available science, address existing rights, incorporate existing FCGMA policies, approvals, and agreements, and seek to address stakeholder concerns cannot be overstated.

As the FCGMA is aware, Calleguas has participated in various FCGMA-approved storage programs in the Oxnard Subbasin and Pleasant Valley Basin. These storage programs are summarized below.

In-Lieu Storage Programs

These storage programs stored water through in-lieu methods by delivering imported water to pumpers for use instead of pumping. The FCGMA approved participation in the in-lieu water storage and associated credit and exchange programs between Calleguas and each of following pumpers on the dates listed below.

Basin	Pumper	FCGMA Board Approval
Pleasant Valley	Pleasant Valley Mutual Water Company	March 26, 1997
Pleasant Valley	City of Camarillo	July 24, 1996
Oxnard	Port Hueneme Water Agency	September 25, 1996
Oxnard	City of Oxnard	September 25, 1996

For each acre-foot of imported water delivered, an acre-foot of storage credit was transferred from the pumper to Calleguas. The FCGMA Board required that the extraction rate and location of pumping of storage credits earned pursuant to these programs be subject to approval of the Agency Coordinator or Agency Executive Officer.

Calleguas stored water under these programs between 1995 and 1997. To date, Calleguas has not extracted any of the water stored in the Oxnard Subbasin and Pleasant Valley Basin. The volume of water stored under these programs is 16,260 acre-feet. This storage remains part of Calleguas' long-term emergency water supply portfolio and may be pumped in the future.

Supplemental M&I Water Program (also an in-lieu storage program)

The FCGMA approved the Supplemental M&I Water Program on May 28, 2003. This program provided for recycled water produced by the City of Thousand Oaks' Hill Canyon Wastewater Treatment Plant to be diverted at the Conejo Creek Diversion and delivered to Pleasant Valley County Water District (PVCWD) for use in lieu of pumping. For each acre-foot of such recycled water delivered, an acre-foot of storage credits was transferred from PVCWD to Calleguas. Subsequently, Calleguas would transfer storage credits to United Water Conservation District (United) to be pumped in the Forebay area of the Oxnard Subbasin for delivery to customers of United's O-H system.

The rules adopted by the FCGMA Board for redemption of storage credits associated with the Supplemental M&I Water Program specify that the water may only be extracted from the Forebay area when groundwater levels in key wells are above certain minimum elevations. In addition, extraction of this water is set at a lower priority than extraction for certain other purposes.

Calleguas stored water under this program between 2002 and 2014 and transferred storage credits to United between 2004 and 2011. United extracted a portion of the previously stored water between 2005 and 2012. All storage credit transfers were documented by joint request letters to the FCGMA signed by PVCWD, Calleguas, and/or United, as appropriate. Calleguas currently has 33,935.28 acre-feet of credits in storage pursuant to this program. Of the total currently in storage, 10,481.91 acre-feet were transferred to United and remain unpumped and 23,453.37 acre-feet have not yet been transferred to United. This storage remains part of Calleguas' long-term emergency water supply portfolio and may be pumped in the future.

Credit Transfers Associated with the Port Hueneme Water Agency Annexation to Calleguas

On July 24, 1996, the FCGMA approved the transfer of allocations and credits from the City of Port Hueneme, U.S. Naval Construction Battalion Center, Naval Air Weapons Station Point Mugu, and Channel Island Beach Community Services District to the newly formed Port Hueneme Water Agency (PHWA) and then from PHWA to United and Calleguas. The FCGMA approval required that Calleguas obtain pre-approval of the location of point of extraction of credits and rate of extraction from the Agency Coordinator. From 1998 to 2003, PHWA transferred 700 acre-feet of credits to Calleguas annually.

On December 10, 2002, Calleguas, PHWA, and the City of Oxnard entered into an agreement, entitled "Three Party Water Supply Agreement" that provided for Calleguas to transfer 2,400 acre-feet of these credits to the City of Oxnard and that as of 2004, the annual transfer of 700 acre-feet would be from PHWA to the City of Oxnard. As a result, Calleguas retains 1,800 acre-feet of conservation credits pursuant to this program. None of the conservation credits have been extracted by Calleguas. This storage remains part of Calleguas' long-term emergency water supply portfolio and may be pumped in the future.

Current Status

Today, approximately 660,000 people rely on Calleguas for three-quarters of their water supply. Due to the geographic location of its service area, Calleguas typically receives exclusively SWP water, with the ability to receive no more than 15% of its supplies from the Colorado River. The SWP supply flows through over 500 miles of reservoirs, aqueducts, and pumping facilities to Castaic Lake, then through Metropolitan pipelines and a treatment plant to Calleguas' connection in Chatsworth. Calleguas delivers the water through a tunnel in the Santa Susana Pass and pipelines in Simi Valley. There is little redundancy in this supply infrastructure and it traverses many seismically active areas. For this reason, Calleguas must be ready for an unplanned outage that could occur at any time and last several months. Together with Calleguas' Lake Bard and the Las Posas ASR Project, stored water in the Oxnard Subbasin and Pleasant Valley basin is an important emergency water supply for three-quarters of the population of Ventura County.

Oxnard Subbasin and Pleasant Valley Basin PDGSP Comments

Calleguas understands that FCGMA released the PDGSPs to facilitate stakeholder engagement and input into development of a final GSP. Calleguas appreciates FCGMA's effort to facilitate stakeholder engagement at this juncture in the GSP development process. At the time of release, FCGMA emphasized that the PDGSPs are preliminary drafts and that some sections are not complete and the final GSPs that will ultimately be adopted by the Board of Directors may be significantly revised. Later, comments made during the January 3, 2018 FCGMA Board of Directors meeting indicated that FCGMA considers PDGSP Sections 1 and 2.1 through 2.3 to be substantially complete, despite numerous placeholders on key issues. At this time, it was also suggested that the remaining sections are to be considered working drafts, subject to considerable change. Calleguas has chosen not to provide detailed comments on these GSPs at this time but reserves the right to provide comments on future GSP drafts.

Calleguas' high-level comments are provided below. Calleguas strongly encourages the FCGMA to consider the comments provided in this letter as work continues on the GSPs.

1. **The LPVB PDGSP should be updated to comprehensively address Calleguas' FCGMA Board-approved storage programs and associated water rights.** Calleguas' In-Lieu, Supplemental M&I, and PHWA storage programs are FCGMA Board-approved projects that Calleguas has made significant investments to develop and are key elements of the emergency water supply for a majority of Ventura County residents. While Calleguas' storage programs are mentioned in the Oxnard Subbasin and Pleasant Valley Basin PDGSP, the plan does not fully incorporate these programs as existing water resource management programs (Section 1.2.3).

2. **Text concerning Calleguas' Urban Water Management Plan (Section 1.2.6.2) should be revised based on Calleguas' Comments on the LPVB PDGSP.** Please see Comment Nos. 12 and 13 from Calleguas LPVB PDGSP comment letter dated April 2, 2018.

If you have any questions about Calleguas' comments, please contact me at (805) 579-7115 or smulligan@calleguas.com.

Sincerely,

Susan B. Mulligan

Susan B. Mulligan
General Manager

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

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September 23, 2019

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VIA ELECTRONIC MAIL

Board of Directors
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c/o Mr. Jeff Pratt - Executive Officer
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Email: fcgma-gsp@ventura.org

Re: Groundwater Sustainability Plans for the Oxnard Subbasin and Pleasant Valley Basin

Dear Chair West and Members of the Board:

The OPV Coalition and Oxnard/PV Ag Owners, Inc. (together, "OPV") have engaged O'Melveny & Myers LLP to provide comments on the Fox Canyon Groundwater Management Agency's ("GMA") Groundwater Sustainability Plan for the Oxnard Subbasin and Groundwater Sustainability Plan for the Pleasant Valley Basin released in July 2019 (individually, "Oxnard Plan" and "Pleasant Valley Plan"; together, "Plans"). Please accept this consolidated comment letter for both Plans.

OPV has two fundamental concerns respecting the Plans. The first is that the sustainable management criteria set forth in Section 3 of both Plans improperly and unnecessarily limits the sustainable yield of the Oxnard Subbasin and Pleasant Valley Basin (together, "the Basins"), and as a consequence, will unnecessarily restrict the cumulative quantity of groundwater available to support local water users and the regional economy. OPV's second concern pertains to how the pumping allocations and demand management (rampdown) criteria will be determined. The Plans, of course, do not establish the allocations or the rampdown criteria. We understand the GMA staff intend to present an allocation ordinance to the Board at its October meeting applying substantially the same approach applied in the draft ordinance discussed at its June 26, 2019 board meeting. As discussed further below, we respectfully urge the GMA to postpone such determination and instead embrace a stakeholder-driven process to address these critical issues. Specifically, we recommend that the Plans expressly describe a structured and facilitated process to seek stakeholder consensus on allocations and rampdown before the GMA revisits the issues by ordinance. When convenient, we request a meeting with the GMA's counsel to discuss opportunities to collaboratively resolve the issues presented herein.

I. OPV Represents Growers Committed to Collaborative Solutions in the Basins

The OPV Coalition is an association formed by some of the largest and most long-standing agricultural entities and landowners in the Basins. These include Duda Farm Fresh Foods, Inc.; Gladstone Land; AMS Craig, LLC; Arnold Ranch; and Reiter Affiliated Companies. Oxnard/PV Ag Owners, Inc. is a mutual benefit corporation whose members farm 23,000 acres in the Basins, close to 75 percent of the Basins' irrigable farmland. Together, OPV is responsible for a significant portion of the nation's food production.

OPV and its growers have participated in good faith in the GMA's groundwater management efforts for years. Rather than recounting this history in full, we direct you to the following correspondence to the GMA, incorporated herein by reference:

- David B. Cosgrove of Rutan and Tucker, LLP to GMA Board of Directors and its referenced correspondence (June 26, 2019) ("Cosgrove Letter")
- Craig Parton of Price, Postel & Parma LLP to GMA Board of Directors (March 30, 2018) ("Parton Letter")

OPV representatives have attended stakeholder workshops and GMA board meetings, provided comments on previous drafts of the Plans, and employed Dr. Steven Bachman to participate in the GMA's Technical Advisory Group. Further, at the GMA's request, OPV organized stakeholders to negotiate an allocation and replenishment plan for the Basin, which culminated in a whitepaper issued in February 2018. *See* Groundwater Pumping Allocation and Replenishment Plan Recommendations for the Oxnard Plain and Pleasant Valley Basins, Version 2 (February 7, 2018) ("OPV Allocation Proposal"). The effort took three years, but OPV's program obtained support from approximately 85 percent of the agricultural community as well as the cities of Oxnard and Port Hueneme; the Channel Islands Beach Community District; United Water Conservation District; Pleasant Valley County Water District; the U.S. Navy; and The Nature Conservancy. Notwithstanding these substantial efforts and broad coalition of support, the GMA's allocation proposal, as presented in its June 26, 2019 draft ordinance, starkly deviate from the OPV Allocation Proposal with respect to several critical issues, including how allocations are set.

II. The Plans Improperly Constrain the Sustainable Yield of the Basins and as a Result Are Vulnerable to Legal Challenge

As Dr. Bachman explains in his report ("Bachman Report"), which is attached hereto and incorporated herein by reference, the GMA has selected an improper basis for establishing sustainable management criteria and sustainable yield in the Basins. All agree that seawater intrusion is the primary undesirable result that must be avoided. The GMA, however, has used modeling of its favored strategies to define the scope of the problem rather than using a proper diagnosis of the problem to guide the appropriate strategies. This approach is backward and cannot survive scrutiny.

A rational approach to sustainability criteria for seawater intrusion would start with a determination of groundwater elevations at coastal monitoring wells necessary to prevent seawater intrusion, thereby establishing hydraulic equilibrium (on average) between fresh water and seawater. *See* Bachman Report at 1-3. From that determination, the GMA could establish minimum thresholds and measurable objectives based on those elevations. With such criteria determined, the GMA could then run model simulations to determine which projects and management actions best (and most cost-effectively) achieve those minimum thresholds and measurable objectives.[1] *Id.* Such an approach is consistent with the logical progression of basin activities set forth in the SGMA Best Management Practices, which order planning ahead of identification of management actions. *See* Sustainable Management Criteria BMP, Modeling BMP 10 fig. 1 (2016).

Rather than follow this logical approach, the GMA just simulated how groundwater levels responded to its favored projects and set criteria based on that simulation.[2] Oxnard Plan at 3-13, 3-14. The GMA skipped the planning step and went directly to the project selection step.

This approach produces two critical problems. First, the Plans' strategies, as modeled, fail to stop seawater intrusion within the lower aquifer by 2040. Oxnard Plan at 2-247. Second, the modeled scenarios show a potential annual loss (waste) of more than 4,000 AFY of freshwater into the ocean in the upper aquifer. *Id*. Had the Plans proceeded logically, and first established groundwater levels that would produce necessary hydraulic head at coastal monitoring wells, the Plans could then select projects and management actions that would avoid further seawater intrusion through maintenance of coastal groundwater elevations without wasting thousands of acre-feet from the upper aquifer system. *See* Bachman Report at 1, 3-4.

As an additional error, the Plans set minimum thresholds for seawater intrusion at *inland* wells rather than at existing monitoring wells adjacent to the coast that are the proper locations for monitoring groundwater elevations adequate to prevent seawater intrusion. *Id.* at 3, 6.

Because of this error:

- Minimum thresholds are set at the wrong location and at considerably higher groundwater elevation levels than if they were calculated based on the groundwater elevations at coastal monitoring wells necessary to prevent seawater intrusion. *See id.* Such minimum thresholds set higher than necessary to avoid undesirable results violate the SGMA guidelines. 23 C.C.R. § 354.28(a).

- Measurable objectives are not set to the Plans' own criterion: the "water level at which there is neither seawater flow into nor freshwater flow out of the [aquifers]." Oxnard Plan at 3-20. None of the simulations produce that equilibrium. *Id.* at 2-247. Consequently, if

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[1] The GMA has proposed several groundwater management projects that should have been included in the modeling: installing barrier wells, injecting treated river water into overdrafted basins, increasing diversions from the Santa Clara River, and shifting pumping to the Northwest Oxnard Plain. *See* GMA's 2007 Update to the Fox Canyon Groundwater Management Plan at iv (2007). The City of Oxnard proposed that desalination might become a viable future supply. *See* City of Oxnard Urban Water Management Plan at 41 (2015).

[2] The Plans' modeled projects are demand reductions and recharge and delivery from the City of Oxnard's Groundwater Recovery Enhancement and Treatment program.

the Basins operate as modeled in the Plans, there will be a significant and unreasonable waste of groundwater in contravention of the constitutional requirement that water be put to maximum beneficial use and not wasted. (Cal. Const. Art. X, § 2; *Erickson v. Queen Valley Ranch Co*., 99 Cal. Rptr. 446, 450 (Ct. App. 1971); (Constitutional provision "declares the state's policy to achieve maximum beneficial use of water and prevention of waste, unreasonable use and unreasonable method of use.").

- Sustainable yield cannot be determined from the Plans. The simulations either flush fresh water into the ocean or cause seawater intrusion, whereas sustainable yield requires optimization. Oxnard Plan at 2-247; Bachman Report at 8. In addition, the Plans never articulate or provide supporting documentation as to how the sustainable yield estimate in each Plan is derived from the model simulations, meaning that there is no way for reviewing experts like Dr. Bachman (or a reviewing court) to determine that those estimates are factually supported.

The Plans also fail to comport with other modeling requirements. DWR requires GSP models to "be responsive to changes in agricultural practices" in agricultural basins. Modeling BMP 23 (2016). In addition, models must be capable of capturing groundwater dynamics and must include inputs relevant to aquifer systems. *Id*. at 4, 13. This should logically include capturing reasonable variations in pumping due to precipitation or other factors. The GMA model, however, uses average pumping from 2015 to 2017 to model a static pumping rate of 68,000 acre-feet for both aquifers.[3] Oxnard Plan at 2-62. Consequently, the Plans' minimum thresholds do not reflect actual pumping behavior because the pumping variability is masked by an average number. By failing to account for pumping variability, the Plans' approach introduces the risk that groundwater elevations could drop below minimum thresholds in drought cycles—triggering cutbacks and other management actions—even where those levels are not actually permitting seawater intrusion. Bachman Report at 8-9.

Both TAG and Dr. Bachman previously raised these concerns with the GMA and its consultants. *See* Parton Letter at 4-7 (explaining history of TAG's comments and criticisms of the Plans and their development process); Memorandum from Dr. Steven Bachman to the GMA at 1, 3-4 (February 4, 2019). If left uncorrected, the Plans will be vulnerable to legal challenge pursuant to Water Code section 10726.6(e). *See Cal. Ass'n for Health Servs. at Home v. State Dep't of Health Care*, 138 Cal. Rptr. 3d 889, 899 (Ct. App. 2012) (court must invalidate agency action that is arbitrary or capricious, or where the agency fails to demonstrate a rational connection between evidence and the action chosen). To avoid the prospect of successful legal challenge, the GMA should amend the Plans in accordance with Dr. Bachman's recommendations.

III. The Plans Should Commit the GMA to a Specified Settlement Process for Resolving the Critical Allocation and Rampdown Issues

[3] Although the GMA specifies the 2015-17 time frame, the Plans do not provide actual pumping data. To support the conclusions concerning the sustainable yield and sustainability criteria, this data must be set forth in the Plans.

Both Plans provide that the "primary management action . . . is a Reduction in Groundwater Production." Oxnard Plan at 5-14; Pleasant Valley Plan at 5-4. Although demand management should not be the exclusive tool applied to address seawater intrusion in the Oxnard Basin,[4] OPV agrees that assignment of allocations and rampdown are necessary.[5] The GMA surely appreciates the controversy that these issues entail. It would benefit all parties to settle the allocation/rampdown issue through compromise rather than a comprehensive groundwater adjudication (Code of Civ. Proc. § 830 *et seq.*) like that underway in the neighboring Las Posas Basin.[6] Such a settlement will only occur if the various stakeholders, holding diverse interests and opinions, reach substantial agreement on an allocation plan. For this reason, OPV respectfully urges the GMA to initiate a comprehensive, structured, and facilitated settlement process shortly after adoption of the Plans. We further recommend that the GMA amend the Plans to commit to such a process, specifically including a description of the process, defined scope, and schedule for completion of negotiations.

The retention of a professional facilitator with experience guiding multi-party negotiations over natural resource conflicts could greatly enhance the potential for success. Organizations such as the Consensus Building Institute and Kearnes & West employ facilitators with such requisite expertise. Such a process could build from the substantial consensus reflected in the OPV Allocation Proposal. Emergency Ordinance E would remain in effect throughout negotiations, continuing the demand reduction it has realized year over year since its inception.

IV. The Approach Taken in the GMA Draft Ordinance Is Inconsistent with the Common Law and Is Unacceptable to OPV Members

We are mindful that there remains significant disagreement concerning allocation approaches. Although some support the GMA's prior draft allocation ordinance, its approach—as OPV has already explained, *see* Cosgrove Letter at 1—fails to follow the common law, is unacceptable to OPV members, and risks litigation. We now understand the GMA staff intends to present an allocation ordinance to the Board for consideration at its October meeting, presumptively applying a similar approach to that set forth in the earlier draft ordinance. We respectfully urge the GMA to postpone that ordinance in favor of the facilitated approach described above. If the GMA intends to adopt an allocation ordinance similar to the prior draft, several legal and equitable infirmities will result, which are briefly discussed below.

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[4] GMA, *supra* note 1.

[5] Allocations facilitate demand reduction, groundwater markets, and the assignment of financial burdens for developing new sources of supply.

[6] Although the GMA's enabling act authorizes it to restrict pumping and SGMA authorizes the GMA (as a groundwater sustainability agency) to develop groundwater allocations, allocations and correlated pumping restrictions must adhere to common law water rights principles. *See* Wat. Code §§ 10720.5, 10726.4(a)(2), 10726.8(b); *City of Barstow v. Mojave Water Agency*, 99 Cal. Rptr. 2d 294, 306 (Cal. 2000). Thus, an allocation scheme that does not adhere to common law water-rights principles is likely to be challenged.

The prior draft allocation ordinance's use of a distant historical base period of 2005-2014 produces dramatic windfalls for some users at the expense of others. It particularly disfavors long-time growers of lower-water-demand crops and pumpers who assisted in groundwater management by voluntarily using surface supplies during the base period. In some circumstances, those who have maintained low-use crops, such as citrus, are destined to receive less than half the amount per acre than those with high-use crops, such as turf farms, would receive. Surface-water recipients may receive even less—with no assurance that such supplies will be available in future years, and despite the fact that they paid for those supplies. In addition, surface water recipients still retain common law groundwater rights. *See* Wat. Code § 1005.1 *et seq.* (preserving groundwater rights when an alternative supply is substituted).

Those with windfalls under the regime may even reduce use through conservation or transition to lower-demand crops and sell their surplus water back to those with inadequate supplies. Thus, the allocation approach set forth in the earlier ordinance is, in essence, an unjustified wealth transfer among users.

Such radically disparate, outdated allocations are inequitable and, ultimately, legally infirm. Equity is an important element of any allocation regime—particularly so with respect to allocations among landowners holding correlative overlying rights. Achieving equity requires consideration of a number of factors, including current need; historical use cannot be the sole proxy for allocation. *Tehachapi-Cummings Cty. Water Dist. v. Armstrong*, 122 Cal. Rptr. 918, 924-25 (Ct. App. 1975) (each owner's proportionate share is not predicated on past use over a specified time period); *see also Prather v. Hobe*rg, 24 Cal. 2d 549, 560 (Cal. 1944) (when allocating limited supplies among holders of correlative rights [riparian and overlying rights], "[t]he apportionment should be measured in the 'manner best calculated to a reasonable result,' and the court may adopt any standard of measurement 'that is reasonable on the facts to secure equality'").[7] The exclusive reliance on a historical base period stretching back almost 15 years, which rewards those with historically higher use and prejudices those that conserved water over this period, is also inconsistent with fundamental aspects of water policy that encourage reasonable and beneficial use of water, avoidance of waste, and the preservation of groundwater rights for those that have undertaken efforts to conserve water. (Cal. Const. Art. X, § 2; Wat. Code § 1005.1.).

The OPV Allocation Proposal would be far more equitable and legally supportable. It initially allocates water by each user's relative percentage of recent use. Proposal at B9. The burden of reduction would be shared among all water users and starts from a position of current need. The OPV approach reflects an equitable compromise between the interests of growers of higher- and lower-demand crops, and more accurately reflects current irrigation practices.

While OPV favors the proposal that it developed with broad user support, it appreciates that some disagree with that proposal. In the interest of facilitating dialogue and avoiding premature litigation, OPV urges a return to negotiations with the assistance of a professional facilitator.

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[7] SAMUEL C. WIEL, WATER RIGHTS IN THE WESTERN STATES, Vol. 1 § 751 (3d ed. 1979).

The equitable principles reflected in the OPV proposal are important issues for discussion, but OPV remains willing to discuss additional ideas for a fair resolution of this important issue.

V. Conclusion

OPV has several significant technical, legal, and equitable concerns with the approach taken in the draft Plans and the anticipated allocation ordinance, but wishes to remain a collaborative partner with the GMA and other water users in transitioning the Basins to a more sustainable future. All Basin stakeholders should have the opportunity to work together to achieve that result.

Sincerely,

Russell McGlothlin

O'MELVENY & MYERS LLP

Technical Analysis of
Groundwater Sustainability Plans for the Oxnard Plain and Pleasant Valley Subbasins, July 2019

Steven Bachman, PhD

September, 2019

INTRODUCTION

The primary goal of the GSPs for the Oxnard Plain and Pleasant Valley subbasins is that seawater intrusion be contained to 2015 areas. I agree that prevention of further seawater intrusion is the appropriate goal. The priority of basin pumpers is that this goal be achieved in the most efficient manner and with the least disruption to the agricultural economy of Ventura County. This technical analysis addresses concerns about whether actions considered in the current GSPs actually prevent all seawater intrusion and whether projects and sustainability criteria are appropriate means to efficiently do this.

EXECUTIVE SUMMARY

The GSPs for the Oxnard Plain and Pleasant Valley subbasins are fundamentally flawed in the approach taken to set sustainability criteria and in the management strategies to prevent seawater intrusion. Instead of a typical method of determining conditions that would prevent seawater intrusion, then testing strategies in a groundwater model that would satisfy these conditions, the GSPs have done this backwards. Instead, the GSPs use a small set of management strategies in a groundwater model to determine the conditions necessary to prevent seawater intrusion. These are not the method that have been used historically in the Oxnard Plain, Santa Maria, and Seaside basins. Of additional concern is that the modeled management strategies do not prevent seawater intrusion in all aquifers, a primary goal of the GSPs, but at the same time allow thousands of acre-feet per year of discharge of fresh water to the ocean from other aquifers.

The first significant problem with the backwards approach used in the GSPs is that the sustainability criteria (Minimum Thresholds and Measurable Objectives) are determined by the modeling results from the small number of solutions tested, rather than on well-known criteria to prevent seawater intrusion. The second significant problem is that the solutions used in the modeling are not the same ones that were shown to be the most effective in previous work by United Water Conservation District. The third significant problem is that the solutions do not prevent all seawater intrusion.

The GSP sustainability criteria require high groundwater elevations in interior areas, with an offshore gradient. At the coastline, it is appropriate to require groundwater elevations that prevent further seawater intrusion, but other areas of the State have solved seawater intrusion in other ways than a strong offshore gradient in inland area (Orange and LA counties have solved the problem with barrier projects that do not require offshore gradients in inland areas). If the Measurable Objectives and Minimum Thresholds are set in inland areas rather than at the coast, future projects may be precluded from consideration. The GSP needs this flexibility of meeting coastal standards without precluding other approaches in management.

TECHNICAL ANALYSIS

The Oxnard Plain and Pleasant Valley GSPs are flawed in a number of ways. These flaws are not cosmetic – they result in sustainable yields that are too low and Measurable Objectives and Minimum Thresholds that will be difficult to meet in the future. The added costs and restrictions caused by implementation of the GSPs will be significant and disruptive. The main flaws are outlined below, with a further discussion following.

1. Sustainability criteria should be based on 1) groundwater elevations at the coastline that prevent seawater intrusion and 2) water quality standards near the front edge of the current location of seawater intrusion;
2. The current method of determining sustainability is based on modeling simulations rather than on measured conditions that would prevent undesirable results;
3. Model simulations to determine sustainability have not been optimized, with GSP simulations indicating an average of thousands of acre-feet per year of discharge of fresh water into the ocean;
4. Projects considered in model simulations in the GSPs did not include projects considered by United Water Conservation District in their simulations that resulted in higher sustainable yield and less discharge of fresh water to the ocean;
5. Sustainable yield is based on simulations with these large discharges of fresh water to the ocean in the Upper Aquifer and continued seawater intrusion in the Lower Aquifer;
6. Measurable Objectives are not set according to criteria delineated in GSPs;
7. Model simulations used a single pumping rate for wells, rather than the documented pumping patterns that vary considerably between wet and dry years. This resulted in Minimum Thresholds determined from the model that were unrealistically high in elevation;
8. The recommended ramp-down in pumping over the first five years is based on the flawed sustainable yield discussed above.

1. <u>Sustainability criteria should be based on 1) groundwater elevations at the coastline that prevent seawater intrusion and 2) water quality standards at the front of the current location of seawater intrusion</u>: The common criteria to prevent seawater intrusion is that groundwater elevations at the coastline be at sufficient height to prevent seawater moving from offshore areas on to the land. These groundwater elevations are several feet above sea level, depending

upon the aquifer. These groundwater elevations provide a gradient between the coastal wells and the offshore outcrops of the aquifers that prevent landward movement of seawater. It is when the coastal groundwater elevations drop below these required elevations that seawater intrusion occurs. The Fox Canyon GMA previously used such coastal criteria on the Oxnard Plain[1] as criteria to prevent seawater intrusion.

To ensure that seawater that is already in some coastal areas does not progress farther inland, criteria based on water quality are the most straight-forward approach. In fact, the guidance for seawater intrusion criteria include, "The minimum threshold metric for **seawater intrusion** shall be the location of a chloride isocontour."[2] Thus, we are suggesting that coastal groundwater elevations be paired with water quality criteria to properly assess future sustainability.

2. Method of determining sustainability is based on modeling simulations rather than measured conditions that would prevent undesirable results: The main undesirable result in Oxnard Plain and Pleasant Valley is seawater intrusion. There is a series of nested USGS monitoring wells along the coast that have provided groundwater elevation data since the early 1990s. Historically, the metric to prevent seawater intrusion was to maintain high enough coastal groundwater elevations on average through wet and dry cycles[3]. In the GSP Technical Advisory Group, of which I am a member, there was significant discussion of whether to use groundwater elevations just at coastal wells or instead a coastal groundwater gradient. There was no discussion by TAG members of using modeled groundwater elevations as sustainability criteria. There was never a satisfactory explanation to TAG about why the GSP criteria were based on model results rather than coastal groundwater elevation criteria.

Monitoring wells at the coastline have been used on the Oxnard Plain for years to determine whether conditions exist for seawater intrusion. It is inexplicable that the GSPs do not use this method to set sustainability goals for seawater intrusion. Inland wells are simply not in the appropriate location.

Instead of using groundwater elevations in coastal USGS monitoring wells as sustainability metrics, the GSPs use a more convoluted method. Model simulations were constructed using United Water Conservation District's regional groundwater model, with a small set of projects and pumping reductions implemented. These model simulations were then subjected to second-order processing (particle tracking) to approximate how particles at the landward edge of the current seawater intrusion would move through time. This use of particle tracking assumes that seawater moves only according to groundwater gradients. This assumption is not correct, because other processes, such as dilution, dispersion, and sedimentary patterns, also affect seawater movement. It is not clear what error this assumption introduces into the

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[1] Fox Canyon GMA, 2007, Update to Groundwater Management Plan.

[2] California Department of Water Resources, 2017, Best Management Practices for the Sustainable Management of Groundwater, p. 10.

[3] E.g., Fox Canyon GMA, 2007, Update to Groundwater Management Plan.

sustainability criteria and sustainable yield.

3. Model simulations to determine sustainability have not been optimized, with GSP simulations indicating an average of thousands of acre-feet per year of discharge of fresh water into the ocean: The GSPs considered a few solutions with varying selected projects and pumping reductions. These include use of recycled water and fallowing of agricultural fields. However, there apparently was not an attempt to optimize these projects and pumping reductions that would result in both no net seawater intrusion and no net fresh groundwater lost to the ocean. In fact, as illustrated below (Figure 1), the solutions resulted in continued seawater intrusion in the Lower Aquifer at the same time that there were thousands of acre-feet per year of fresh water discharged into the ocean. Seawater intrusion is not solved for the Lower Aquifer.

The solutions on which GSP results and sustainability criteria are based do not solve the seawater problem, as long as there continues to be seawater intrusion in the Lower Aquifer. These solutions are not sustainable because undesirable results continue to occur in the subbasins. It is thus not possible to determine the sustainable yield of the subbasins when none of the model runs prevent seawater intrusion.

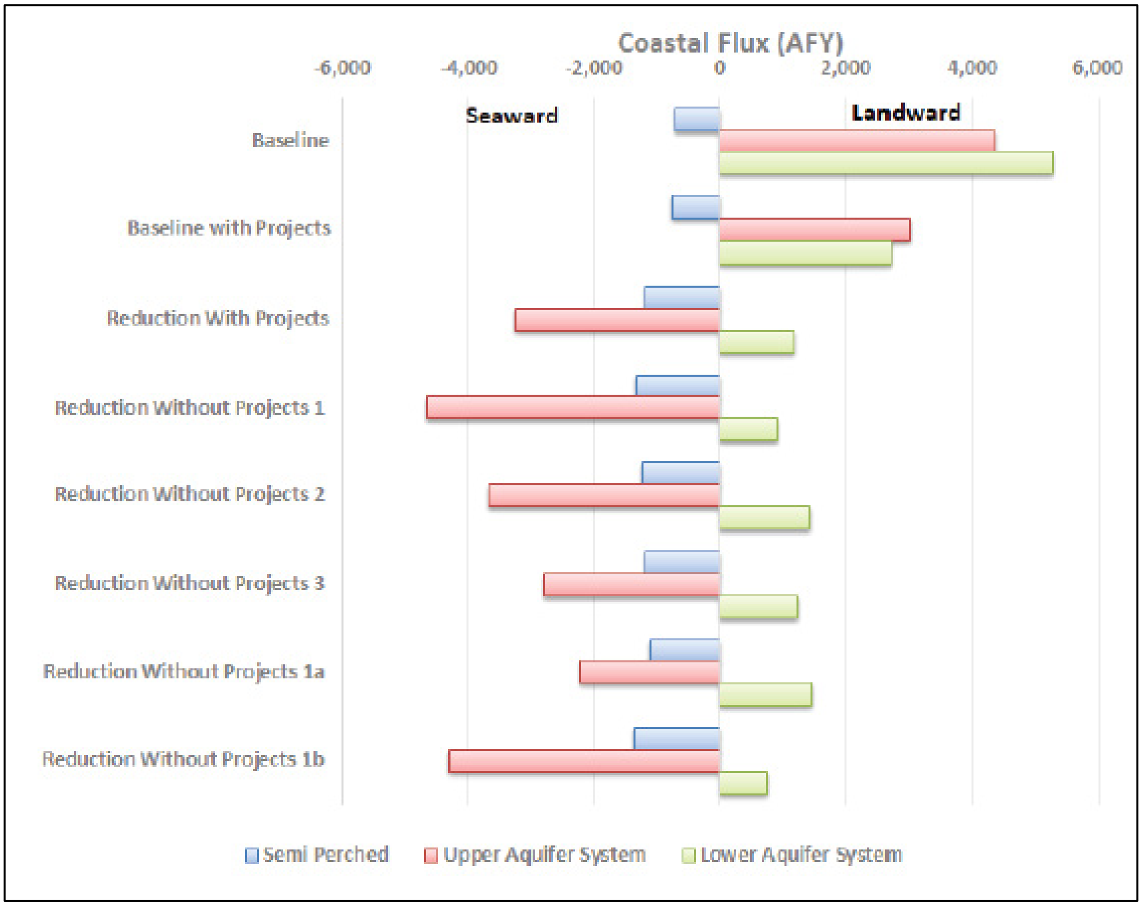

Figure 1. Coastal flux with different projects and pumping reductions (Oxnard Plain GSP, Figure 2-63). Seaward intrusion is towards the right, fresh water to the ocean is towards the left. The red columns are for the Upper Aquifer, indicating discharge of fresh water to the ocean under all solutions with pumping reductions. The green columns are for the Lower Aquifer, indicating continued seawater intrusion under all modeled solutions.

4. <u>Projects considered in model simulations in the GSPs did not include projects considered by United Water Conservation District in their simulations that resulted in higher sustainable yield and less discharge of fresh water to the ocean</u>: With the objective of eliminating seawater intrusion in the most efficient and cost-effective method, it is important that solutions be considered that meet this objective. The solutions used in the GSP modeling require severe pumping reductions, yet do not eliminate the undesirable result of continued seawater intrusion. During the GSP process, United Water Conservation District independently used their groundwater model to perform a number of model simulations to determine the types of projects that could help prevent seawater intrusion[4]. Projects such as a seawater barrier or in-lieu deliveries to pumpers near the coast are not only logical projects used in Ventura County

[4] United Water Conservation District, 2017, Preliminary Evaluation of Impacts of Potential Groundwater Sustainability Indicators on Future Groundwater Extraction Rates – Oxnard Plain and Pleasant Valley Groundwater Basins, Open File Report 2017-2, 68 p.

and elsewhere, but they were more successful in reducing seawater intrusion than the projects included in the GSPs[5].

These United Water model simulations included: 1) Uniform pumping reductions in Oxnard Plain and Pleasant Valley subbasins, 2) pumping reductions largely in the Lower Aquifer, 3) management area at coast with no pumping, 4) no coastal pumping and reduced Pleasant Valley pumping, and 5) no coastal pumping and increased inland pumping. Replacement water for the area with no pumping would come from new wells and infrastructure to move water to where it is needed, a strategy that has been in place on the Oxnard Plain and Pleasant Valley for decades. United Water has also modeled separately a seawater barrier pumping and desalting project[6], which functions similarly to an injection barrier. It is inexplicable why United Water's projects weren't used, especially since the GSP scenarios didn't prevent seawater intrusion and United's did.

An unintended consequence of excluding important projects from the GSP modeling may be the inability to get timely grant funding for these projects in the future.

Other good examples of successful strategies to prevent seawater intrusion are in Orange and LA counties. Injection barriers in those coastal locations prevent seawater intrusion and meet the criteria of coastal groundwater elevations somewhat above sea level. However, interior areas landward of the coast may have groundwater elevations below sea level, as long as coastal groundwater elevations are maintained. Both Figure 2 and Figure 3 are in inland areas of the Oxnard Plain, where groundwater elevations could potentially be much lower with the right projects. Thus, these inland areas are not the correct location to have sustainability criteria for seawater intrusion.

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[5] United Water Conservation District, 2017, ibid.

[6] United Water Conservation District, 2014, South Oxnard Plain Brackish Water Treatment Feasibility Study, 66p.

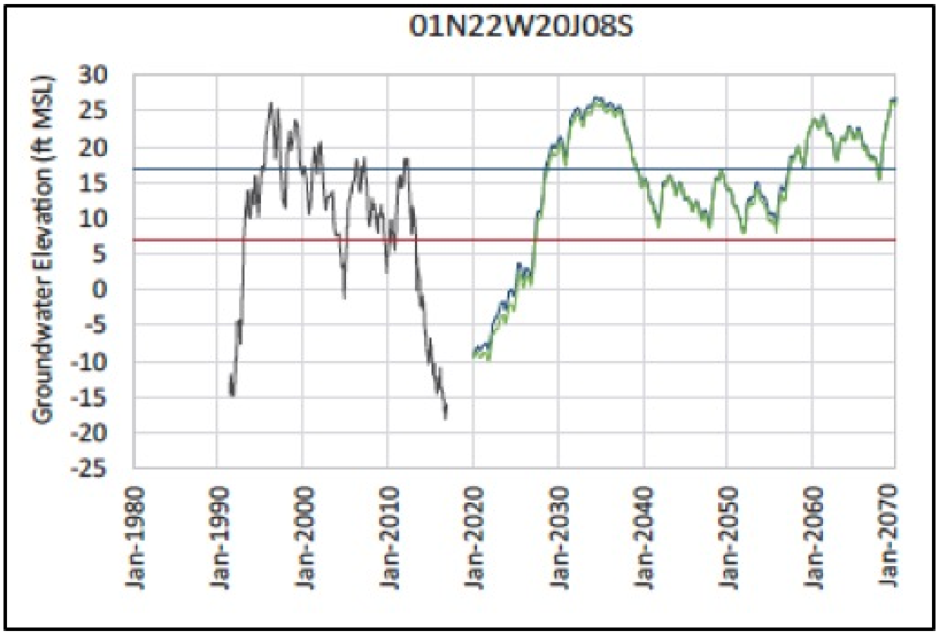

Figure 2. GSP sustainability criteria shown at USGS inland well 20J8 (Oxnard Plain GSP, Figure 3-6a). The left of the chart are measured data, the right indicates modeled data. The lower horizontal line is the Minimum Threshold, the upper horizontal line is the Measurable Objective.

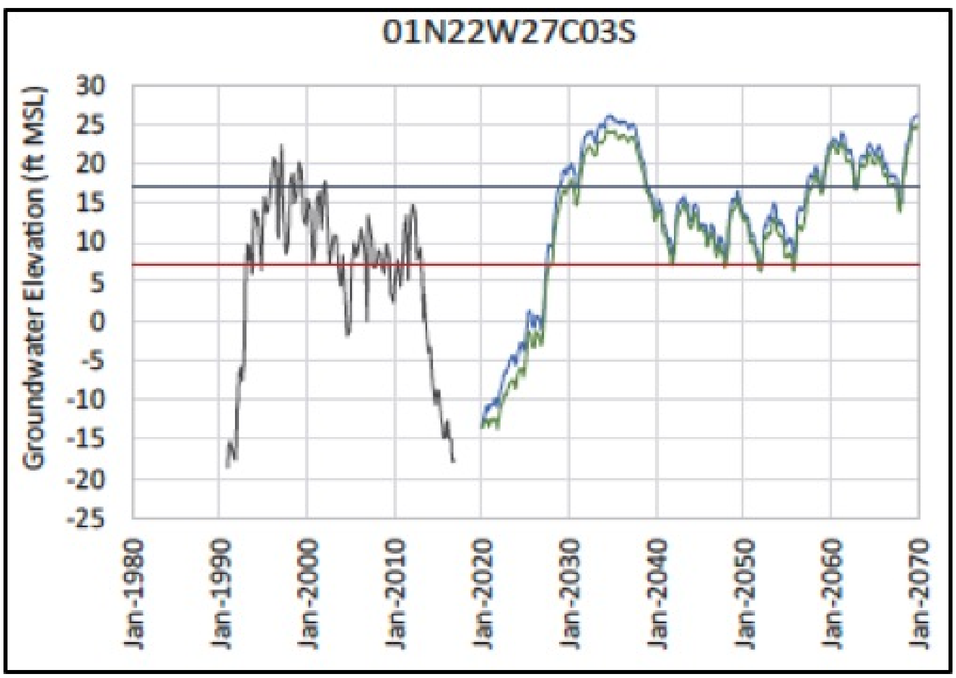

Figure 3. GSP sustainability criteria shown at USGS inland well 27C3 (Oxnard Plain GSP, Figure 3-6b). The left of the chart are measured data, the right indicates modeled data. The lower horizontal line is the Minimum Threshold, the upper horizontal line is the Measurable Objective.

5. Sustainable yield is based on simulations with these large discharges of fresh water to the ocean in the Upper Aquifer and continued seawater intrusion in the Lower Aquifer: The sustainable yield was calculated based on modeling of a small set of solutions involving projects and pumping reductions. As discussed in #3 above, none of these solutions resulted in sustainability because there continued to be seawater intrusion in the Lower Aquifer and large discharges of fresh water to the ocean in the Upper Aquifer.

Calculating a sustainable yield based on solutions that do not meet sustainability criteria is not possible – it just can't be done that way. The GSP appears to extrapolate the unsuccessful strategies to determine sustainable yield. No graph or further explanation of the technique used in the GSP were presented. Because groundwater modeling gives non-linear results from one set of projects/pumping reductions to another, it is not clear how this extrapolation could be accurately accomplished.

As discussed in item #4 above, there is a larger set of projects and management strategies that optimize sustainability against costs and economic disruption. These optimized projects and strategies result in elimination of undesirable results, at the same time increasing the sustainable yield over that proposed by the GSPs. This can be done by focusing on projects and reductions near the coast, where the undesirable results are occurring.

6. Measurable Objectives are not set according to criteria delineated in GSPs: The Oxnard Plain GSP states that "the measurable objective is the water level at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS"[7]. As discussed in #3 above, there were no model simulations that met the criteria so stated. Because none of the modeled solutions met the objectives of preventing seawater intrusion, modeled groundwater elevations cannot then be used to set Measurable Objectives – if those Measurable Objectives were met, there would continue to be seawater intrusion.

7. Model simulations used a single pumping rate for wells, rather than the documented pumping patterns that vary considerably between wet and dry years. This resulted in Minimum Thresholds determined from the model that were unrealistically high in elevation: The previous USGS groundwater model on the Oxnard Plain and Pleasant Valley and the United Water modeling of sustainable strategies discussed in #4 above, varied pumping for wet, average, and dry years. In contrast, the GSP model simulations used to determine sustainability had the same average pumping for all modeled years[8], whether they were wet or dry.

Fox Canyon GMA pumping records indicate that, logically, there is more pumping in dry years and less pumping in wet years. For example, during the period 1990 to 2017, Oxnard Plain pumping totals ranged from a low of 61,400 AFY to a high of 104,800 AFY. The effect of this improper assumption is that there is less of a year-by-year change in modeled groundwater

[7] Oxnard Plain GSP, p. 3-20.
[8] Oxnard Plain GSP, p. 2-63.

elevations than in actual groundwater elevations (the highs and lows are more subdued with no change in pumping).

Because Minimum Thresholds were developed from these subdued model results, these thresholds are set at a higher elevation than they would be if pumping followed climatic cycles and groundwater elevations had more annual swings in amplitude. In practice, future groundwater elevations would be at risk of regularly going below the Minimum Thresholds during dry years even if Measurable Objectives were met. Such violating of Minimum Thresholds would cause unnecessary alarm even though there are no undesirable results, and may lead to further unnecessary reductions in the sustainable yield of the basins. If the pumping is adjusted each year for wet and dry conditions, there would be more-appropriate (and lower elevation) Minimum Thresholds.

It is not clear if the 2015-17 pumping numbers used in the GSP and the modeling runs are correct. The FCGMA provided pumping records by well to the OPV Ag Owners Assoc. for the entire history of reported pumping. Those numbers averaged 74,000 AFY for the Oxnard Plain during 2015-17, rather than the 68,000 AFY used in the GSP.[9] Those numbers also average 16,660 AFY for Pleasant Valley, rather than the 14,000 AFY used in the GSP.[10]

8. <u>The recommended ramp-down in pumping over the first five years is based on the flawed sustainable yield discussed above</u>: The GSPs stated that "the exact reductions that will be implemented in the Subbasin over the next 5 years will be determined by the FCGMA Board based on the data collected and analyzed for this GSP"[11]. The GSP analysis indicated a sustainable yield that is likely to be the basis of calculated the pumping ramp-down for the first 5 years. However, this number is based on an incomplete analysis, with model simulations not optimized to incorporate viable projects, and with significant fresh water flowing to the ocean. Thus, the GSPs may result in an immediate, unnecessary effect on basin pumpers if the ramp-down is calculated from the flawed sustainable yield calculation.

RECOMMENDATIONS

The GSPs should be modified to substitute coastal groundwater elevations that prevent landward movement of seawater for Measurable Objectives and eliminate those inland Objectives that are currently based on incomplete modeling results that did not solve future seawater intrusion. Pumping should be varied by wet, normal, and dry years and Minimum Thresholds should be set accordingly. As required in the DWR BMPs, a chloride isochore should be the Minimum Threshold near the front of the current seawater intrusion. Modeling should only be used to examine the effectiveness of future management strategies in meeting sustainability criteria, and a larger list of management strategies should be used (including those modeled by United Water). Pumping should be varied by wet, average, and dry years

[9] Oxnard Plain GSP, p. 2-63.
[10] Ibid.
[11] Oxnard Plain GSP, p. 5-15.

rather than using the same pumping each year. The sustainable yield should be based on the optimized management strategies from the longer list discussed above. The optimized management strategies should prevent the continued undesirable result of seawater intrusion.

September 23, 2019

Sent via email to *fcgma-gsp@ventura.org* *and submitted via online form at https://www.cognitoforms.com/Fcgma1/groundwatersustainabilityplanforthepleasantvalleybasin*

Re: Comments on Draft Groundwater Sustainability Plan for Pleasant Valley Groundwater Basin

To Whom It May Concern,

On behalf of the above-listed organizations, we would like to offer the attached comments on the draft Groundwater Sustainability Plan for the Pleasant Valley Groundwater Basin. Our organizations are deeply engaged in and committed to the successful implementation of the Sustainable Groundwater Management Act (SGMA) because we understand that groundwater is a critical piece of a resilient California water portfolio, particularly in light of our changing climate. Because California's water and economy are interconnected, the sustainable management of each basin is of interest to both local communities and the state as a whole.

Our organizations have significant expertise in the environmental needs of groundwater and the needs of disadvantaged communities.

- The Nature Conservancy, in collaboration with state agencies, has developed several tools[1] for identifying groundwater dependent ecosystems in every SGMA groundwater basin and has made that tool available to each Groundwater Sustainability Agency.
- Local Government Commission supports leadership development, performs community engagement, and provides technical assistance dealing with groundwater management and other resilience-related topics at the local and regional scales; we provide guidance and resources for statewide applicability to the communities and GSAs we are working with directly in multiple groundwater basins.
- Audubon California is an expert in understanding wetlands and their role in groundwater recharge and applying conservation science to develop multiple-benefit solutions for sustainable groundwater management.
- The Union of Concerned Scientists has been working to ensure that future water supply meets demand and withstands climate change impacts by supporting stakeholder education and integration, and the creation and implementation of science-based Groundwater Sustainability Plans.

[1] https://groundwaterresourcehub.org/

- Clean Water Action and Clean Water Fund are sister organizations that have deep expertise in the provision of safe drinking water, particularly in California's small disadvantaged communities, and co-authored a report on public and stakeholder engagement in SGMA[2].

Because of the number of draft plans being released and our interest in reviewing every plan, we have identified key plan elements that are necessary to ensure that each plan adequately addresses essential requirements of SGMA. A summary review of your plan using our evaluation framework is attached to this letter as Appendix A. Our hope is that you can use our feedback to improve your plan before it is submitted in January 2020.

This review does not look at data quality but instead looks at how data was presented and used to identify and address the needs of disadvantaged communities (DACs), drinking water and the environment. In addition to informing individual groundwater sustainability agencies of our analysis, we plan to aggregate the results of our reviews to identify trends in GSP development, compare plans and determine which basins may require greater attention from our organizations.

Key Indicators

Appendix A provides a list of the questions we posed, how the draft plan responds to those questions and an evaluation by element of major issues with the plan. Below is a summary by element of the questions used to evaluate the plan.

1. Identification of Beneficial Users. This element is meant to ascertain whether and how DACs and groundwater-dependent ecosystems (GDEs) were identified, what standards and guidance were used to determine groundwater quality conditions and establish minimum thresholds for groundwater quality, and how environmental beneficial users and stakeholders were engaged through the development of the draft plan.
2. Communications plan. This element looks at the sufficiency of the communications plan in identifying ongoing stakeholder engagement during plan implementation, explicit information about how DACs were engaged in the planning process and how stakeholder input was incorporated into the GSP process and decision-making.
3. Maps related to Key Beneficial Uses. This element looks for maps related to drinking water users, including the density, location and depths of public supply and domestic wells; maps of GDE and interconnected surface waters with gaining and losing reaches; and monitoring networks.
4. Water Budgets. This element looks at how climate change is explicitly incorporated into current and future water budgets; how demands from urban and domestic water users were incorporated; and whether the historic, current and future water demands of native vegetation and wetlands are included in the budget.
5. Management areas and Monitoring Network. This element looks at where, why and how management areas are established, as well what data gaps have been identified and how the plan addresses those gaps.
6. Measurable Objectives and Undesirable Results. This element evaluates whether the plan explicitly considers the impacts on DACs, GDEs and environmental beneficial users in the development of Undesirable Results and Measurable Objectives. In addition, it examines

[2] https://www.cleanwater.org/publications/collaborating-success-stakeholder-engagement-sustainable-groundwater-management-act

whether stakeholder input was solicited from these beneficial users during the development of those metrics.

7. Management Actions and Costs. This element looks at how identified management actions impact DACs, GDEs and interconnected surface water bodies; whether mitigation for impacts to DACs is discussed or funded; and what efforts will be made to fill identified data gaps in the first five years of the plan. Additionally, this element asks whether any changes to local ordinances or land use plans are included as management actions.

Conclusion

We know that SGMA plan development and implementation is a major undertaking, and we want every basin to be successful. We would be happy to meet with you to discuss our evaluation as you finalize your Plan for submittal to DWR. Feel free to contact Suzannah Sosman at suzannah@aginnovations.org for more information or to schedule a conversation.

Sincerely,

Jennifer Clary
Water Program Manager
Clean Water Action/Clean Water Fund

Samantha Arthur
Working Lands Program Director
Audubon California

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

Danielle V. Dolan
Water Program Director
Local Government Commission

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Appendix A
Review of Public Draft GSP

Groundwater Basin/Subbasin: Pleasant Valley Basin/Subbasin (DWR 4-006)
GSA: Fox Canyon Groundwater Management Agency GSA
GSP Date: July 2019 Public Review Draft

1. Identification of Beneficial Users

Were key beneficial users identified and engaged?

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
(a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.
GSP Element 2.2.2, "Groundwater Conditions" (§354.16):
(d) Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.
(f) Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information.
(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.
GSP Element 3.3, "Minimum Thresholds" (§354.28):
(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
1. Do beneficial users (BUs) identified within the GSP area include:	a. Disadvantaged Communities (DACs)	X			"The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section."	Section 1.8.2 Pg 61
	b. Tribes	X			"According to the U.S. Bureau of Indian Affairs California Tribal Homelands and Trust Land Map, updated in 2011 and available from the DWR website, the entire PVB is within the Chumash Tribal/Cultural area. There are not currently any federally recognized tribes, Indian land currently or historically held in trust by the U.S. government, or smaller Reservation or Rancheria areas in the PVB. FCGMA recognizes that the Chumash culture and associated cultural resources are important in Ventura County. Several active local groups and individuals representing the interests of tribal communities in Ventura County have been added to the list of interested parties, including representatives from the Barbareno/Ventureno Band of Mission Indians (Chumash) and the Wishtoyo Chumash Foundation. FCGMA has reached out to the DWR Southern Region Office Tribal Liaison, Jennifer Wong, and added her to the list of interested parties. The San Gabriel Band of Mission Indians has also shown an interest in the groundwater sustainability planning process and has been added to the list of interested	Section 1.8.2 Pg 61

[1] Page numbers refer to the page of the PDF.

					parties.”	
	c. Small community public water systems (<3,300 connections)	X			“Municipal Well Operators, Public and Private Water Purveyors: All of the purveyors in the PVB, including all municipal well operators, are supplied water by either UWCD or CMWD. Both of these wholesale water districts have been an integral part of the GSP development. Staff from both UWCD and CMWD have provided groundwater monitoring data, participated in public meetings, and regularly collaborate with FCGMA staff. CMWD is an independent special district and a wholesale water provider that supplies eight water purveyors in Pleasant Valley: Zone MWC, Pleasant Valley MWC, Crestview MWC, City of Camarillo, Oxnard Union High School District, Ventura County Waterworks District No. 19, CWD, and Arroyo Las Posas (Figure 1-8). CMWD supplies water for mainly M&I uses. UWCD serves five water purveyors within Pleasant Valley. The City of Camarillo also has direct representation on the FCGMA Board and TAG by the representative appointed to serve on behalf of the five incorporated cities within FCGMA jurisdiction. Some of the smaller water districts and mutuals have also participated in FCGMA public meetings and provided comments throughout the development of the GSP.”	Section 1.8.2 Pg 59
2. What data were used to identify presence or absence of DACs?	a. DWR DAC Mapping Tool[2]	X			“The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section.”	Section 1.8.2 Pg 61
	i. Census Places		X		Not clear which classifications were used.	Section 1.8.2 Pg 61
	ii. Census Block Groups		X		Not clear which classifications were used.	Section 1.8.2 Pg 61
	iii. Census Tracts		X		Not clear which classifications were used.	Section 1.8.2 Pg 61
	b. Other data source		X			
3. Groundwater Conditions section includes discussion of:	a. Drinking Water Quality	X			“The primary water quality concerns in the PVB are inflows of poor-quality water from discharges from the Simi Valley Water Quality Control Plant, dewatering wells operated by the City of Simi Valley, and discharges from the MWTP percolation ponds adjacent to Arroyo Simi–Las Posas, discharges from the Hill Canyon WWTP and the CSD WRP to Conejo Creek, and saline intrusion in the FCA and the GCA from brine migration along the Bailey Fault.” Water quality constituents (i.e., TDS, Chloride, Nitrate, Sulfate, and Boron) are compared to WQOs per the Basin Plan (LARWQCB 2013; Table 2-3). Data are not otherwise compared to drinking water standards.	Section 2.3.4 Pg 117-121
	b. California Maximum Contaminant Levels (CA MCLs)[3] (or Public Health Goals where MCL does not exist, e.g. Chromium VI)		X		WQOs are the only standards used for comparison of water quality constituents.	Section 2.3.4 Pg 117-121
4. What local, state, and	a. Office of Environmental Health		X		Water quality MTs are set as water level elevations and do not take into	Section 2.3.4 Pg

[2] DWR DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/
[3] CA MCLs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html

federal standards or plans were used to assess drinking water BUs in the development of Minimum Thresholds (MTs)?	Hazard Assessment Public Health Goal (OEHHA PHGs)[4]				account standards or plans.	117-121
	b. CA MCLs[3]		X		"Water quality impacts to the aquifers of the PVB are limited to locally high concentrations of nitrate, sulfate, boron, chloride, and TDS (Section 2.3 and Section 3.3.4, Degraded Water Quality). The sources and mechanisms controlling the concentration of these constituents differs throughout the PVB (Section 2.3). The primary water quality concerns in the PVB are inflows of poor quality surface water and saline intrusion in the FCA and the Grimes Canyon Aquifer from brine migration along the Bailey Fault. Distribution of the poor quality water is influenced by groundwater production, although groundwater production is not the cause of the poor-quality water. Groundwater production may exacerbate upward migration of brines from lower aquifers, but a direct correlation between increased brine migration and groundwater elevation has not yet been established. Additionally, the influence of groundwater production on migration of poor quality water is not well understood in the PVB. As a result, the minimum thresholds for groundwater quality are the same as the water level minimum thresholds for chronic lowering of groundwater levels (Section 3.4.1). They are groundwater elevations, rather than groundwater concentrations, that are higher than historical low elevations in the PVPDMA and the western NPVMA."	Section 2.3.4 Pg 117-121
	c. Data Quality Objectives (DQOs) in Regional Water Quality Control Plans		X			Section 2.3.4 Pg 117-121
	d. Sustainable Communities Strategies/ Regional Transportation Plans[5]		X			Section 2.3.4 Pg 117-121
	e. County and/or City General Plans, Zoning Codes and Ordinances[6]		X			Section 2.3.4 Pg 117-121
5. Does the GSP identify how environmental BUs and environmental stakeholders were engaged throughout the development of the GSP?		X			The GSP identifies the primary environmental users in the Pleasant Valley Basin as the willow/mulefat riparian scrub and Arundo vegetation communities found along the banks of Conejo Creek, and Calleguas Creek, lower Arroyo Las Posas and Conejo Creeks. The degree to which these ecosystems use groundwater versus percolating surface water is uncertain. 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.	1.8.2;

Summary / Comments

The water quality conditions assessment was limited to the constituents for which water quality objectives (WQOs) have been set for groundwater in the Basin Plan. The GSP does not explicitly provide an explanation of how the WQOs relate to MCLs and PHGs or articulate whether the WQOs for this particular area are specified as being protective of drinking water users. Additional explanation of the Basin Plan and WQO process would provide more context and understanding to the reader.

The Land Use Category in Table 1-8 should be revised 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. Open space and native habitat should be distinguished from the "vacant" category, as this devalues the environment and its water needs.

[4] OEHHA PHGs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[5] CARB: https://ww2.arb.ca.gov/resources/documents/scs-evaluation-resources
[6] OPR General Plan Guidelines: http://www.opr.ca.gov/planning/general-plan/

2. Communications Plan

How were key beneficial users engaged and how was their input incorporated into the GSP process and decisions?

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:
(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.
(d) A communication section of the Plan that includes the following:
(1) An explanation of the Agency's decision-making process.
(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.
(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.
(4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.

DWR Guidance Document for GSP Stakeholder Communication and Engagement[7]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Is a Stakeholder Communication and Engagement Plan (SCEP) included?	X			Appendix B. SCEP dated November 2017	Appendix B. pg 1 - 26
2. Does the SCEP or GSP identify that ongoing engagement will be conducted during GSP implementation?		X		The GSP and SCEP does not lay out a plan for stakeholder engagement beyond the 60-day DWR public comment period. "The draft GSPs will be brought before the FCGMA Board in December 2017. The Board will consider opening a 120-day public comment period. The draft GSPs will be updated based on comments with subsequent adoption of the final GSPs by the FCGMA Board. After the final GSPs are adopted by the FCGMA Board, DWR will accept public comments in another 60-day public comment period. After the final GSPs are adopted by the FCGMA Board, regular monitoring and reporting will be conducted as required by DWR and outlined in the GSPs. A detailed schedule of the GSP process including stakeholder review opportunities can be found on the FCGMA website and is updated as needed. Below is a summary table of key GSP engagement opportunities for the public (Figure 3)." Table 1-12 FCGMA Public Meetings on the Pleasant Valley Basin GSP	Appendix B. Section 5 Pg 23, Figure 3 Pg 23 Table 1-12 Pg 79
3. Does the SCEP or GSP specifically identify how DAC beneficial users were engaged in the planning process?	X			"4.5 Opportunities for DAC Communities The majority of the Disadvantaged Communities (DACs) within the FCGMA jurisdictional boundary receive water from cities, special district s, or mutual water companies. The FCGMA works closely with these water	Appendix B. Section 4.5 Pg 20-21 Section ES 1, Pg

[7] DWR Guidance Document for GSP Stakeholder Communication and Engagement https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Document-for-Groundwater-Sustainability-Plan---Stakeholder-Communication-and-Engagement.pdf

				agencies and mutual that represent the interests of the DACs. The Watersheds Coalition of Ventura County (WCVC) has established a DAC Involvement Committee to discuss DAC Community needs and project opportunities related to Integrated Regional Water Management (IRWM). FCGMA staff participates in the DAC Committee. The DAC Committee will oversee work conducted through a Proposition 1 IRWM grant to involve DAC members in water resources decision making and identify water resource needs in DAC communities. There are several DACs within the FCGMA jurisdiction, and representatives of those communities will have the opportunity to participate in this process. As part of the grant-funded DAC involvement, process participants will identify their needs and potential projects to improve water resource management in these areas. Some of those projects could be incorporated into the GSPs. Proposition 1 includes grant funding for projects that benefit DACs and these funds may be a resource in implementing key projects identified in the GSPs. FCGMA staff will continue to participate in the WCVC DAC Committee throughout the GSP process. Other members of the WCVC DAC Committee participated in the first FCGMA public stakeholder workshops and subscribe to the stakeholder list." "Public participation and stakeholder feedback have played a critical role in the development of this GSP. The FCGMA maintains a list of stakeholders interested in the GSP process, known as the List of Interested Parties. A monthly newsletter, meeting notices, and notices of GSP documents available for review are sent electronically to those on the List of Interested Parties. Public workshops were held to inform stakeholders and the general public on the contents of the GSP and to solicit feedback on that content. To further facilitate stakeholder understanding, the FCGMA Board of Directors (Board) approved release of a preliminary draft GSP for public comment in November 2017. Additionally, the FCGMA Board formed a Technical Advisory Group, which generally held monthly public meetings throughout the GSP development process, beginning in July 2015 and ending in February 2019. In addition, updates on the development of the GSP were given at meetings of the FCGMA Board, beginning in April 2015. All FCGMA Board meetings, Technical Advisory Group meetings, Board-appointed committee meetings, and Board special workshops are noticed in accordance with the Brown Act, and opportunities for public comment were provided at all FCGMA Board meetings, Technical Advisory Group meetings, Board-appointed committee meetings, and workshops." "FCGMA has provided ongoing and innovative opportunities for stakeholders to engage in the GSP development process. FCGMA has provided regular updates to interested parties through monthly electronic newsletters highlighting monthly progress on the GSP development, upcoming meetings, and opportunities for engagement. Monthly updates and opportunities for public comment were provided at FCGMA Regular Board Meetings, FCGMA Special Board Meetings, and TAG Meetings. Meeting agendas and minutes, as well as video recordings of all FCGMA Board Meetings and Workshops, were made available on the FCGMA website. Additional technical information about the GSP development was made available on the FCGMA website, including the Preliminary Draft GSP, Technical Memoranda, and TAG Meeting Materials.	15 Section 1.8.6 Pg 64 Section 1.2.3 Pg 25 Section 1.8.3 Og 61 Table 1-12 in Pg 79 Section 1.8.2 Pg 59-60

				The Preliminary Draft GSP was available online for more than 120 days, including an official 90-day public comment period. FCGMA encouraged active participation from stakeholders through four public workshops (November 15, 2016; September 20, 2017; February 8, 2019; and March 15, 2019), a survey for input on sustainability indicators, and a public call for project ideas for incorporation into the GSP." Board includes representation for the mutual water companies and the DAC of Camarillo: "FCGMA is governed by five Board of Directors (Board) members who represent the (1) County of Ventura (County), (2) the United Water Conservation District (UWCD), (3) seven mutual water companies and water districts within the Agency (Alta Mutual Water Company, Pleasant Valley County Water District (PVCWD), Berylwood Mutual Water Company, Calleguas Municipal Water District (CMWD), CWD, Zone Mutual Water Company, and Del Norte Mutual Water Company), (4) the five incorporated cities within the Agency (Ventura, Oxnard, Camarillo, Port Hueneme, and Moorpark), and (5) the farmers (FCGMA 2019a). Four of these Board members, representing the County, UWCD, the mutual water companies and water districts, and the incorporated cities, are appointed by their respective organizations or groups. The representative for the farmers is appointed by the other four seated Board members from a list of candidates jointly supplied by the Ventura County Farm Bureau and the Ventura County Agricultural Association." "Table 1-12 lists FCGMA public meetings in which participants discussed or took action on the PVB GSP." "The City of Camarillo also has direct representation on the FCGMA Board and TAG by the representative appointed to serve on behalf of the five incorporated cities within FCGMA jurisdiction. Some of the smaller water districts and mutuals have also participated in FCGMA public meetings and provided comments throughout the development of the GSP." "The majority of domestic groundwater users in the PVB are supplied water by a city, special district, or mutual water company. FCGMA maintains a database of well owners, including domestic well owners. Email addresses within the database have been added to the list of interested parties who receive electronic newsletters regarding the status and development of the PVB GSP."	
4. Does the SCEP or GSP explicitly describe how stakeholder input was incorporated into the GSP process and decisions?	**X**			See response to item 3 above. "A new comprehensive Water Allocation System for groundwater users in the PVB is under development by FCGMA, with ongoing contributions from stakeholder groups. This allocation system will allow for long-term sustainable management of the groundwater resources of the PVB."	ES.5 Pg 21
Summary / Comments					

The GSP and SCEP does not lay out a plan for stakeholder engagement beyond the 60-day DWR public comment period. Ongoing stakeholder engagement and inclusion throughout the GSP implementation process will be crucial to ensuring that the needs of the most vulnerable beneficial users in the basin are met. The GSP does not include detailed information on the membership of the Technical Advisory Group. The number of members and the organizations and interest represented by each member should be identified so that the public may make an assessment as to how well DACs, GDEs, and other BUs were represented in the process. The Notification and Communication Summary section is very general and should include more specific, detailed information as to how input from stakeholders was incorporated into the decision making process and specific management decisions in the GSP.

3. Maps Related to Key Beneficial Uses

Were best available data sources used for information related to key beneficial users?

Selected relevant requirements and guidance:
GSP Element 2.1.4 "Additional GSP Elements" (§354.8):
Each Plan shall include a description of the geographic areas covered, including the following information:
(a) One or more maps of the basin that depict the following, as applicable:
(5) The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.

GSP Element 3.5 Monitoring Network (§354.34)
(b) Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:
(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:
(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:
(A) A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.
(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.
(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:
(A) Flow conditions including surface water discharge, surface water head, and baseflow contribution.
(B) Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.
(C) Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.
(D) Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.
(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:
(3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP Include Maps Related to Drinking Water Users?	a. Well Density		X			
	b. Domestic and Public Supply Well Locations & Depths		X			
	i. Based on DWR Well Completion Report Map Application[8]?		X			
	ii. Based on Other Source(s)?		X			

[8] DWR Well Completion Report Map Application: https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37

2. Does the GSP include maps related to Groundwater Dependent Ecosystem (GDE) locations?	a. Map of GDE Locations	X			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). In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the potential GDEs. Given the uncertainty regarding the depths to groundwater within these areas, the ecosystems are appropriately considered potential GDEs, with future monitoring needs identified to assess the degree to which existing habitat is reliant on groundwater.	2.3.7
	b. Map of Interconnected Surface Waters (ISWs)	X			Arroyo Las Posas, Conejo Creek, and Calleguas Creek have all been identified as surface water bodies that may have a connection to the Shallow Alluvial Aquifer in the Pleasant Valley Basin. Arroyo Las Posas is ephemeral in the Pleasant Valley Basin and is likely to be a disconnected losing stream. Conejo Creek and Calleguas Creek, which are perennial due to wastewater treatment discharges. Numerical modeling estimates of annual quantification of recharge to groundwater from Arroyo Las Posas, Conejo Creek, and Calleguas Creek are provided in Section 2.3.6. However, while the model results list net recharge to groundwater via stream loss, the discussion in Sections 2.3.6 and 2.3.7 indicates there is insufficient knowledge to build a conceptual model of the extend of losing and gaining reaches.	1.3.2.1; 2.3.6; 2.3.7; 2.4.1.1
	i. Does it identify which reaches are gaining and which are losing?	X				
	ii. Depletions to ISWs are quantified by stream segments.		X			
	iii. Depletions to ISWs are quantified seasonally.		X			
3. Does the GSP include maps of monitoring networks?	a. Existing Monitoring Wells	X			Figure 4-1 and Figure 4-2. Surface monitoring is shown on Figure 4-3.	Figures 4-1 and 4-2 in Pg 343 and Pg 345 Figure 4-3 in Pg 347
	b. Data sources:					
	i. California Statewide Groundwater Elevation Monitoring (CASGEM)		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	ii. Water Board Regulated monitoring sites		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	iii. Department of Pesticide Regulation (DPR) monitoring wells		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	c. Future SGMA Compliance-Monitoring Well Network	X			Figures 4-1, 4-2, and 4-5	Figures 4-1, 4-2, and 4-5 in Pg 343, 345, and 351.
	i. SGMA Monitoring Network map includes identified DACs?		X			
	ii. SGMA Monitoring Network map includes identified GDEs?		X			

Summary / Comments

The draft GSP does not include the maps required per 23 CCR § 354.8. (a)(5): "The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information."

The monitoring network figures presented are somewhat ambiguous. It is not entirely clear if Figures 4-1 through 4-5 reflect all existing monitoring wells and points in the basin. It is also not clearly stated in the document which wells will be monitored for compliance with MOs/MTs. It is recommended that additional clarifying language be added. In addition, it is not clear if these figures are inclusive of all CASGEM, Water Board, and DPR sites. If these figures are not inclusive of all wells being monitored under the various regulatory programs, then such figures should be added.

Detailed information regarding the number, location, and depths of domestic wells in the basin is currently lacking in the GSP. Without this information, the public cannot evaluate whether the proposed sustainable management criteria are appropriately protective of domestic well users.

Providing maps of the monitoring network overlaid with location of DACs, domestic wells, community water systems, GDEs, and any other sensitive beneficial users will allow the reader to evaluate the adequacy of the network to monitor conditions near these beneficial users.

It is recommended that remote sensing vegetative indices be included 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), a satellite-derived index that represents water content in vegetation.

GDEs and ISWs are identified and mapped. However, it is not clear if the model estimating the stream depletion analyzed data seasonally. Please quantify the depletion to ISWs by stream segments and seasonally.

4. Water Budgets

How were climate change projections incorporated into projected/future water budget and how were key beneficial users addressed?

Selected relevant requirements and guidance:
GSP Element 2.2.3 "Water Budget Information" (Reg. § 354.18)
Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.

Projected water budgets shall be used to estimate future baseline conditions of supply, ***demand****, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:*
(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:
(5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.
(6) The water year type associated with the annual supply, demand, and change in groundwater stored.
(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:
(1) Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, ***water demand****, and land use information.*

DWR Water Budget BMP[9]
DWR Guidance for Climate Change Data Use During GSP Development and Resource Guide[10]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are climate change projections explicitly incorporated in future/ projected water budget scenario(s)?	X			"An initial set of four modeling simulations were conducted using the future baseline conditions with two 50-year average climate cycles (1930–1979 and 1940–1989), and two DWR climate-change factors (2030 and 2070) applied to each of the 50-year periods. The 1930–1979 50-year period with the 2070 DWR climate-change factor was found to be the most conservative and was used for the comparison with the other modeling simulations conducted. Additional details about the selection of the two 50-year average climate cycles is provided in Section 2.4.5.7, Alternative Climate and Rainfall Patterns."	Section 2.4.5 Pg 142-143
2. Is there a description of the methodology used to include climate change?	X			"2.4.5.7 Alternative Climate and Rainfall Patterns To begin to assess the potential impacts on model predictions from alternate climate change assumptions and precipitation patterns, two additional simulations were conducted using the Reduction Without	Section 2.4.5.7 Pg 151

[9] DWR BMP for the Sustainable <management of Groundwater Water Budget: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget.pdf

[10] DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf

					Projects Scenario 1. These additional simulations changed the scenario assumptions in two ways. First, the Reduction Without Projects Scenario 1 was simulated using the DWR 2030 climate-change factors, rather than the more conservative 2070 climate-change factors. This revised scenario is referred to as the Reduction Without Project Scenario 1a. Second, the Reduction Without Projects Scenario 1 was simulated with the DWR 2030 climate-change factors applied to the historical precipitation and hydrology period from 1940 to 1989, rather than the original period from 1930–1979. This revised scenario is referred to as the Reduction Without Projects Scenario 1b. The 50-year periods from 1930 to 1979 and 1940 to 1989 were selected because they were the two periods from the entire historical record with the closest mean, or average, precipitation to the mean precipitation for the entire historical record of 14.4 inches. The mean precipitation for the historical period from 1930 to 1979 is also 14.4 inches and the mean precipitation from the historical period from 1940 to 1979 is 14.6 inches. These periods also have a similar distribution of precipitation years to the historical record and a similar average drought length to the average drought length in the historical record. The primary difference between the two periods is the timing of the dry periods in the records. The period from 1930 to 1979 begins with a 7-year dry period from 1930 to 1936 (model years 2020–2026), while the period from 1940 to 1989 begins with a 5-year wetter-than-average period (model years 2020–2024). The differences between these scenarios are discussed below."	
3. What is used as the basis for climate change assumptions?	a. DWR-Provided Climate Change Data and Guidance[11]	X			"An initial set of four modeling simulations were conducted using the future baseline conditions with two 50-year average climate cycles (1930–1979 and 1940–1989), and two DWR climate-change factors (2030 and 2070) applied to each of the 50-year periods. The 1930–1979 50-year period with the 2070 DWR climate-change factor was found to be the most conservative and was used for the comparison with the other modeling simulations conducted. Additional details about the selection of the two 50-year average climate cycles is provided in Section 2.4.5.7, Alternative Climate and Rainfall Patterns."	Section 2.4.5 Pg 142-143
	b. Other		X			
4. Does the GSP use multiple climate scenarios?		X			"2.4.5.7 Alternative Climate and Rainfall Patterns To begin to assess the potential impacts on model predictions from alternate climate change assumptions and precipitation patterns, two additional simulations were conducted using the Reduction Without Projects Scenario 1. These additional simulations changed the scenario assumptions in two ways. First, the Reduction Without Projects Scenario 1 was simulated using the DWR 2030 climate-change factors, rather than the	Section 2.4.5.7 Pg 151

[11] DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf
DWR Resource Guide DWR-Provided Climate Change Data and Guidance for Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance_v8.pdf

					more conservative 2070 climate-change factors. This revised scenario is referred to as the Reduction Without Project Scenario 1a. Second, the Reduction Without Projects Scenario 1 was simulated with the DWR 2030 climate-change factors applied to the historical precipitation and hydrology period from 1940 to 1989, rather than the original period from 1930–1979. This revised scenario is referred to as the Reduction Without Projects Scenario 1b. The 50-year periods from 1930 to 1979 and 1940 to 1989 were selected because they were the two periods from the entire historical record with the closest mean, or average, precipitation to the mean precipitation for the entire historical record of 14.4 inches. The mean precipitation for the historical period from 1930 to 1979 is also 14.4 inches and the mean precipitation from the historical period from 1940 to 1979 is 14.6 inches. These periods also have a similar distribution of precipitation years to the historical record and a similar average drought length to the average drought length in the historical record. The primary difference between the two periods is the timing of the dry periods in the records. The period from 1930 to 1979 begins with a 7-year dry period from 1930 to 1936 (model years 2020–2026), while the period from 1940 to 1989 begins with a 5-year wetter-than-average period (model years 2020–2024). The differences between these scenarios are discussed below.”	
5. Does the GSP quantitatively incorporate climate change projections?			X			Table 2-11 UWCD Model Scenario Results (AFY) Section 2.4.5 Projected Water Budget and Sustainable Yield	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
6. Does the GSP explicitly account for climate change in the following elements of the future/projected water budget?	a. Inflows:	i. Precipitation		X		The draft GSP does not provide a detailed accounting of the components included in the projected/future water balance. Only total groundwater extractions and project water are identified. More discrete information is provided for the historical water budget.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
		ii. Surface Water		X			
		iii. Imported Water		X			
		iv. Subsurface Inflow		X			
	b. Outflows:	i. Evapotranspiration		X			
		ii. Surface Water Outflows (incl. Exports)		X			
		iii. Groundwater Outflows (incl. Exports)		X			
7. Are demands by these sectors (drinking water users) explicitly included in the future/projected water budget?	a.	Domestic Well users (<5 connections)		X		The draft GSP does not provide a detailed accounting of the components included in the projected/future water balance. Only total groundwater extractions and project water are identified. More discrete information is provided for the historical water budget, including domestic pumpage and municipal and industrial (M&I) pumping. This pumping is not broken down by water system, however.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
	b.	State Small Water systems (5-14 connections)		X			
	c.	Small community water systems (<3,300 connections)		X			
	d.	Medium and Large community water systems (> 3,300 connections)		X			
	e.	Non-community water systems		X			
8. Are water uses for native vegetation and/or wetlands explicitly included in the current and historical water budgets?			X			The water budget includes the natural system surface hydrology components including the surface water recharge from the Arroyo Las Posas, Conejo Creek, and Calleguas Creek and natural vegetation evapotranspiration (ET) along these riparian systems. These have been	2.4

				modeled using the UWCD numerical model.	
9. Are water uses for native vegetation and/or wetlands explicitly included in the projected/future water budget?		**X**		The GSP does not document how they account for the demands of various water users.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155

Summary / Comments

Based on the data presented, it is not clear how climate change is expected to affect specific elements of the water budget (i.e., imported water, subsurface flows, surface water and groundwater outflows, including exports).

The GSP also does not provide specifics on drinking water demands included for large urban water systems, domestic well users, or community water systems in the historical, current or future water budgets. This information should be provided and broken out by each individual water system for full transparency of the assumptions, data, and results of the water budgets.

It is also not clear based on the information presented how climate change is anticipated to change the demands of domestic users and public water systems and how these demands were accounted for in the projected water budget.

5. Management Areas and Monitoring Network

How were key beneficial users considered in the selection and monitoring of Management Areas and was the monitoring network designed appropriately to identify impacts on DACs and GDEs?

Selected relevant requirements and guidance: GSP Element 3.3, "Management Areas" (§354.20): *(b) A basin that includes one or more management areas shall describe the following in the Plan:* *(2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.* *(3) The level of monitoring and analysis appropriate for each management area.* *(4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.* *(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.* **CWC Guide to Protecting Drinking Water Quality under the SGMA**[12] **TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs**[13]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP define one or more Management Area?	X			"the PVB has been divided into three management zones: the North Pleasant Valley Management Area (NPVMA), the Pleasant Valley Pumping Depression Management Area (PVPDMA), and the East Pleasant Valley Management Area (EPVMA; Figure 2-46, Pleasant Valley Basin Management Areas)."	Section 2.5, Pg 155 Figure 2-46, Pg 271
2. Were the management areas defined specifically to manage GDEs?		X		"The NPVMA lies within the PVB northern boundary, the Bailey Fault, and the PVPDMA, which were defined by the lateral extent of the FCA in the PVB." "The PVPDMA is west of the NPVMA and north of the EPVMA (Figure 2-46). The boundaries of the PVPDMA include the Bailey Fault, the Oxnard Subbasin, and a northwest-trending line starting at the intersection of Lewis Road and the Bailey Fault." "The EPVMA lies to the east of the Bailey Fault and is predominantly within the jurisdiction of CWD."	Section 2.5, Pg 155 Figure 2-46, Pg 271
3. Were the management areas defined specifically to manage DACs?		X			
a. If yes, are the Measurable Objectives (MOs) and MTs for GDE/DAC management areas more restrictive than for the basin as a whole?			X	The management areas were not defined specifically to manage GDEs or DACs.	
b. If yes, are the proposed management actions for GDE/DAC management areas more restrictive/ aggressive than for the basin as a whole?			X	The management areas were not defined specifically to manage GDEs or DACs.	

[12] CWC Guide to Protecting Drinking Water Quality under the SGMA: https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858

[13] TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs: https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf

4. Does the GSP include maps or descriptions indicating what DACs are located in each Management Area(s)?		X		"The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section." The City of Camarillo boundaries are not clearly shown on any figures depicting the different management areas.	Section 1.8.2 Pg 61
5. Does the GSP include maps or descriptions indicating what GDEs are located in each Management Area(s)?	X			"Calleguas Creek, Conejo Creek, and the lower reach of Arroyo Las Posas were identified as potential groundwater-dependent ecosystems (GDEs) on the statewide potential GDE map (TNC 2017). Of these potential GDEs, only lower Arroyo Las Posas north of Pleasant Valley Road lies within FCGMA jurisdiction. All three watercourses are connected to the Shallow Alluvial Aquifer, although the extent of gaining or losing reaches for these streams is not clear in the PVB (see Section 2.2.4)." No figures depict identified GDEs relative to the 3 Management Areas.	Section 2.3.7 Pg 123-125 Figure 2-32 -2-34 Pg 243-247
6. Does the plan identify gaps in the monitoring network for DACs and/or GDEs?	X			"In general, the connection between surface water and groundwater along Conejo Creek and Calleguas Creek is not well characterized. There was one well screened solely in the Shallow Alluvial Aquifer adjacent to the GDEs (Figure 2-34, Water Level Record for Well Locations Adjacent to Arroyo Las Posas). This well, which was destroyed in 2011, was adjacent to lower Arroyo Las Posas. There are no existing wells screened solely in the Shallow Alluvial Aquifer adjacent to Conejo Creek or Calleguas Creek, and none of the wells are screened shallower than 50 feet bgs." "The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat."	Section 2.3.7, Pg 124; 3.3.6
a. If yes, are plans included to address the identified deficiencies?		X		"As described above, the ecohydrology of the lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek potential GDEs is complex, and the connection between these potential GDEs and groundwater in the PVB is not well characterized. The degree to which the vegetation is reliant on groundwater versus unsaturated soil water is unknown. Better understanding of the hydrology along lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek would aid in determining the impacts of decreasing groundwater levels on the riparian habitat. Until this connection between groundwater and the potential GDEs is established, lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek cannot be conclusively determined to be GDEs. The future monitoring network would be improved by including wells dedicated to monitoring water levels in the potential GDEs to assess the degree to which existing habitat is reliant on groundwater." "In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water."	Section 2.3.7 Pg 125 Section 4.6.1 Pg 335

Summary / Comments

For transparency, the GSP should explicitly identify (preferably via maps) the extents of identified DACs and potential GDEs located within each separate Management Area.

The GSP identifies deficiencies in monitoring network for GDEs, and discusses what changes would improve the network, but does not include any concrete plans, costs, or funding sources to implement the filling of this data gap.

6. Measurable Objectives and Undesirable Results

How were DAC and GDE beneficial uses and users considered in the establishment of Sustainable Management Criteria?

<u>Selected relevant requirements and guidance:</u>
GSP Element 3.4 "Undesirable Results" (§ 354.26):
(b) The description of undesirable results shall include the following:
(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results

GSP Element 3.2 "Measurable Objectives" (§ 354.30)
(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are DAC impacts considered in the development of Undesirable Results (URs), MOs and MTs for groundwater levels and groundwater quality?		X		The Section on Sustainable Management Criteria includes very limited explicit consideration of DAC impacts under water quality, and no discussion under water levels. WQ UR: "Degradation of groundwater quality from increased concentrations of chloride and TDS has the potential to impact the beneficial uses and users of groundwater in the PVB by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015)." "Degradation of groundwater quality from increased concentrations of nitrate, sulfate, and boron has the potential to impact the beneficial uses and users of groundwater in the basin by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the northern part of the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015)." WL MT: "These minimum thresholds are water levels that were selected based on future groundwater model simulations that allow groundwater elevations to recover during multi-year cycles of drought and recovery, and limit migration of the 2015 saline water impact front in the Oxnard Subbasin, after 2040. Numerical groundwater model simulations indicate that, under the conditions modeled, declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall throughout all of the management areas of the PVB." WQ MT: "As a result, the minimum thresholds for groundwater quality are the same as the water level minimum thresholds for chronic lowering of groundwater levels (Section 3.4.1). They are groundwater elevations, rather	Section 3.3, 3.4, and 3.5 Pg 275-297

				than groundwater concentrations, that are higher than historical low elevations in the PVPDMA and the western NPVMA."	
2. Does the GSP explicitly discuss how stakeholder input from DAC community members was considered in the development of URs, MOs and MTs?		**X**		The Section on Sustainable Management Criteria does not mention or discuss DACs, the City of Camarillo, or the Technical Advisory Group (TAG). This connection is discussed under Section 1.8 Notification and Communication either.	Section 3.3, 3.4, and 3.5 Pg 275-297
3. Does the GSP explicitly consider impacts to GDEs and environmental BUs of surface water in the development of MOs and MTs for groundwater levels and depletions of ISWs?		**X**		The GSP does not explicitly list the potential impacts to GDEs and Environmental BUs. "3.5.6 Depletions of Interconnected Surface Water No measurable objectives or minimum thresholds specific to the depletion of interconnected surface water are proposed at this time. Because lower Arroyo Simi–Las Posas, Calleguas Creek, and Conejo Creek are ephemeral streams; groundwater elevations in this aquifer, where known, are deeper than 30 feet below land surface; and the Shallow Alluvial Aquifer is not used for groundwater production within the boundaries of the PVB, depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future."	Section 3.5.6 Pg 297
4. Does the GSP explicitly consider impacts to GDEs and environmental BUs of surface water and recreational lands in the discussion and development of Undesirable Results?	**X**			"The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat."	3.3.6

Summary / Comments

Based on the information presented in the GSP, it is not clear how stakeholder input from DAC community members was considered in the establishment of water quality URs.

Water quality assessment in the document appears to have been limited to just the constituents for which WQOs have been established in the Basin Plan. It is recommended that a discussion be added whether any of the water systems in the basin (including small community water systems and mutual water companies) have had detections of water quality constituents above PHGs or MCLs. For any compounds detected above these levels, include a full assessment of relevant data in the basin, its potential impacts on drinking water BUs, and how the proposed water quality MOs/MTs are protective of drinking water BUs (including domestic well users).

The discussion of impacts to DACs, domestic well users, and small community water systems with respect to URs, MOs, and MTs is very limited. It is recommended that additional information be provided to clarify how URs are defined relative to these sensitive BUs and how their use of groundwater resources may be affected.

We agree that no minimum thresholds for ISW need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams should be corrected as they are perennial within PBV. Statements like "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" should be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds should be reevaluated" is recommended.

The recognition of GDEs as an important beneficial use that must be protected is clear. Further statements are needed that 1) undesirable results are not currently occurring, 2) linkage between groundwater and the potential GDEs must be established and 3) if future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."

7. Management Actions and Costs

What does the GSP identify as specific actions to achieve the MOs, particularly those that affect the key BUs, including actions triggered by failure to meet MOs? What funding mechanisms and processes are identified that will ensure that the proposed projects and management actions are achievable and implementable?

<u>Selected relevant requirements and guidance</u>
GSP Element 4.0 Projects and Management Actions to Achieve Sustainability Goal (§ 354.44)
(a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.
(b) Each Plan shall include a description of the projects and management actions that include the following:
(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP identify benefits or impacts to DACs as a result of identified management actions?		X		Neither benefits or impacts to DAC members, City of Camarillo, or domestic well users are explicitly discussed relative to the projects and management actions. Benefits to reducing seawater intrusion are discussed.	Section 5 Pg 353-360
2. If yes: b. Is a plan to mitigate impacts on DAC drinking water users included in the proposed Projects and Management Actions?		X		DACs and domestic well users are not discussed. No well impact mitigation program is discussed. It should be noted that the MOs and MTs are generally set higher than current/recent water levels (Figure 3-6 – 3-8).	Section 5 Pg 353-360
c. Does the GSP identify costs to fund a mitigation program?		X			
d. Does the GSP include a funding mechanism to support the mitigation program?		X			
2. Does the GSP identify specific management actions and funding mechanisms to meet the identified MOs for groundwater quality and groundwater levels?	X			"5.2.6 Economic Factors and Funding Sources for Project No. 1 The funding source for this project is anticipated to be replenishment fees collected by FCGMA. The cost of the water is estimated to be $1,200 to $1,800 per acre-foot. Any action taken by the FCGMA Board, acting as the GSA for the portion of the PVB in its jurisdiction, to impose or increase a fee shall be taken by ordinance or resolution. Should the FCGMA Board decide to fund a project through imposition of a replenishment fee, the FCGMA will hold at least one public meeting, at which oral or written presentations may be made. Notice of the meeting will include an explanation of the fee to be considered and the notice shall be provided by publication pursuant to Section 6066 of the California Government Code.1 At least 20 days prior to the meeting, the GSA will make the data on which the proposed fee is based available to the public."	Section 5.2.6 Pg 356
3. Does the GSP include plans to fill identified data gaps by the first five-year report?		X		Spatial Data Gaps: "Additional monitoring wells could be used to improve spatial coverage for groundwater elevation measurements in all three management areas of the PVB. Wells that are added to the network should be dedicated monitoring well clusters, with individual wells in the cluster screened in a single aquifer. The	Section 4.6 Pg 334-336

				potential improvements to the monitoring network in each aquifer are shown on Figure 4-5, Approximate Locations and Screened Aquifers for Proposed New Monitoring Wells in the Pleasant Valley Basin. In the PVPDMA, the groundwater monitoring network in the PVB could be improved by adding a monitoring well or wells to the south of 5th Street (Figure 4-5). An additional well, or wells, in this area would provide aquifer specific groundwater elevations in an area that does not have a well screened in any of the primary aquifers in the PVB that is suitable for inclusion in the monitoring network. Groundwater elevation measurements in this area would help constrain groundwater gradients across the boundary between the PVB and the Oxnard Subbasin. FCGMA has applied for funding through a DWR Technical Support Services (TSS) monitor well funding grant to add a monitoring well in the PVPDMA. In the NPVMA, the groundwater monitoring network could be improved by adding a monitoring well or wells. Currently, there are no dedicated monitoring wells screened in any of the primary aquifers in this NPVMA. Adding a monitoring well would provide for aquifer-specific water levels that would improve the understanding of groundwater gradients between the PVPDMA and the NPVMA. There are no monitoring wells in the East Pleasant Valley Management Area (Figures 4-1 and 4-2). Addition of a monitoring well in the vicinity of Calleguas Creek, downstream of the junction between Lower Arroyo Las Posas and Conejo Creek, would improve understanding of groundwater conditions in this management area. It would also provide data to help constrain the relationship between groundwater elevations in the East Pleasant Valley Management Area and groundwater conditions in the adjacent PVPDMA. In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water. New wells will be constructed to applicable well installation standards set in California DWR Bulletin 74-81 and 74-90, or as updated (DWR 2016b). It is recommended that, where feasible, new wells be subjected to pumping tests in order to collect additional information about aquifer properties in the vicinity of new monitoring locations. Proposed locations are approximate and subject to feasibility review (accounting for infrastructure, site acquisition, and site access among other factors), after GSP submittal. The schedule for new well installation will be developed in conjunction with feasibility review." Temporal Data Gap:	

				"Currently, groundwater elevation measurements are not scheduled according to these criteria. To minimize the effects of this type of temporal data gap in the future, it will be necessary to coordinate the collection of groundwater elevation data so it occurs within a 2-week window during the key reporting periods of mid-March and mid-October. The recommended collection windows are October 9–22 in the fall and March 9–22 in the spring (see Section 4.4). Additionally, as funding becomes available, pressure transducers should be added to wells in the groundwater monitoring network. Pressure transducer records provide the high-temporal-resolution data that allows for a better understanding of water level dynamics in the wells related to groundwater production, groundwater management activities, and climatic influence."	
4. Do proposed management actions include any changes to local ordinances or land use planning?		X		No ordinances or actions by an entity with land use authority are included.	Section 5.2 Pg 354
5. Does the GSP identify additional/contingent actions and funding mechanisms in the event that MOs/MTs are not met by the identified actions?		X		The GSP does not discuss actions that will result in the event that MOs/MTs are not met.	Section 5 Pg 353-360
6. Does the GSP provide a plan to study the interconnectedness of surface water bodies?		X		"In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water. New wells will be constructed to applicable well installation standards set in California DWR Bulletin 74-81 and 74-90, or as updated (DWR 2016b). It is recommended that, where feasible, new wells be subjected to pumping tests in order to collect additional information about aquifer properties in the vicinity of new monitoring locations. Proposed locations are approximate and subject to feasibility review (accounting for infrastructure, site acquisition, and site access among other factors), after GSP submittal. The schedule for new well installation will be developed in conjunction with feasibility review." "As discussed in Section 4.6.1 (Water Level Measurements: Spatial Data Gaps), there are no dedicated monitoring wells that can be used to monitor shallow groundwater that may be interconnected with surface water bodies, or sustain potential GDEs in the PVB. Additionally, historical records of shallow groundwater elevations are limited. Water level records in the younger alluvium are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker. Because these shallow wells were installed for specific remediation cases and are not controlled by FCGMA or its partner agencies, these wells may be destroyed after the cases are closed. Therefore, the possibility of using them for future monitoring is uncertain. To fill the existing data gap and to assist with understanding the potential connectivity between shallow groundwater and potential GDEs, shallow dedicated monitoring wells can be added within the boundaries of the	Section 4.6.1 Pg 335Section 4.6.5 Pg 337

					potential GDE along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek."	
7. If yes: a. Does the GSP identify costs to study the interconnectedness of surface water bodies?		X			See response above.	Section 4.6.1 Pg 335
b. Does the GSP include a funding mechanism to support the study of interconnectedness surface water bodies?		X			See response above.	Section 4.6.1 Pg 335
8. Does the GSP explicitly evaluate potential impacts of projects and management actions on groundwater levels near surface water bodies?		X			The GSP does not discuss groundwater levels near surface water bodies explicitly.	Section 5 Pg 353-360

Summary / Comments

The likely benefits and impacts to DAC members by the proposed projects and management actions are not clearly identified in the GSP. A discussion should be added for each project to clearly identify the benefits to DAC drinking water users and potential impacts to the water supply. For all potential impacts, the project/management action should include a clear plan to monitor for, prevent, and/or mitigate against such impacts.

Very limited information is included in the GSP regarding domestic wells. The GSP should provide more information on this as well as the potential impacts to these users by the proposed MOs/MTs and management actions.

The draft GSP describes the need for additional monitoring wells, but does not lay out a clear plan to fund and install these wells. It is also not clear if these wells will be installed, and if data will be available for inclusion, in the 5-year update. The draft GSP notes that the GSA has applied for grant funding to install some of the proposed new wells. However, receipt of grant funds are not certain and thus the GSP should provide an alternate funding mechanism in the event that grant funds are not received.

The GSP identifies deficiencies in the monitoring network for GDEs/ISW, and discusses what changes would improve the network, but does not include any concrete plans, costs, or funding sources to implement the filling of this data gap.

If future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."

Inclusion of remote sensing vegetative indices as a low cost approach to monitor baseline conditions of GDEs is recommended. 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), a satellite-derived index that represents water content in vegetation.

The GSP notes the lack of shallow groundwater monitoring wells in the Shallow Alluvial aquifer that can be used to monitor interconnected surface water bodies/GDEs along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. It is not necessary for the Arroyo Las Posas.

Further investigation of the water level records in the younger alluvium that are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker is recommended. If these water level records can demonstrate the groundwater connection, or lack thereof, then the data gap regarding connectivity can be closed. This could be very useful given that there is limited funding available to install new monitoring wells, and this is currently a low priority given that the Shallow Alluvial Aquifer is not a principal aquifer.

It is also suggested to survey the water surface elevation in the drains, as they should provide easy to measure, calibration head values for the numerical model and good indication of the semi-perched aquifer elevations.

CLEAN WATER ACTION | CLEAN WATER FUND

Union of Concerned Scientists
Science for a healthy planet and safer world

Local Government Commission
Leaders for Livable Communities

Audubon | CALIFORNIA

The Nature Conservancy
Protecting nature. Preserving life.™

September 23, 2019

Sent via email to fcgma-gsp@ventura.org and submitted via online form at https://www.cognitoforms.com/Fcgma1/groundwatersustainabilityplanforthepleasantvalleybasin

Re: Comments on Draft Groundwater Sustainability Plan for Pleasant Valley Groundwater Basin

To Whom It May Concern,

On behalf of the above-listed organizations, we would like to offer the attached comments on the draft Groundwater Sustainability Plan for the Pleasant Valley Groundwater Basin. Our organizations are deeply engaged in and committed to the successful implementation of the Sustainable Groundwater Management Act (SGMA) because we understand that groundwater is a critical piece of a resilient California water portfolio, particularly in light of our changing climate. Because California's water and economy are interconnected, the sustainable management of each basin is of interest to both local communities and the state as a whole.

Our organizations have significant expertise in the environmental needs of groundwater and the needs of disadvantaged communities.

- The Nature Conservancy, in collaboration with state agencies, has developed several tools[1] for identifying groundwater dependent ecosystems in every SGMA groundwater basin and has made that tool available to each Groundwater Sustainability Agency.
- Local Government Commission supports leadership development, performs community engagement, and provides technical assistance dealing with groundwater management and other resilience-related topics at the local and regional scales; we provide guidance and resources for statewide applicability to the communities and GSAs we are working with directly in multiple groundwater basins.
- Audubon California is an expert in understanding wetlands and their role in groundwater recharge and applying conservation science to develop multiple-benefit solutions for sustainable groundwater management.
- The Union of Concerned Scientists has been working to ensure that future water supply meets demand and withstands climate change impacts by supporting stakeholder education and integration, and the creation and implementation of science-based Groundwater Sustainability Plans.

[1] https://groundwaterresourcehub.org/

- Clean Water Action and Clean Water Fund are sister organizations that have deep expertise in the provision of safe drinking water, particularly in California's small disadvantaged communities, and co-authored a report on public and stakeholder engagement in SGMA[2].

Because of the number of draft plans being released and our interest in reviewing every plan, we have identified key plan elements that are necessary to ensure that each plan adequately addresses essential requirements of SGMA. A summary review of your plan using our evaluation framework is attached to this letter as Appendix A. Our hope is that you can use our feedback to improve your plan before it is submitted in January 2020.

This review does not look at data quality but instead looks at how data was presented and used to identify and address the needs of disadvantaged communities (DACs), drinking water and the environment. In addition to informing individual groundwater sustainability agencies of our analysis, we plan to aggregate the results of our reviews to identify trends in GSP development, compare plans and determine which basins may require greater attention from our organizations.

Key Indicators

Appendix A provides a list of the questions we posed, how the draft plan responds to those questions and an evaluation by element of major issues with the plan. Below is a summary by element of the questions used to evaluate the plan.

1. Identification of Beneficial Users. This element is meant to ascertain whether and how DACs and groundwater-dependent ecosystems (GDEs) were identified, what standards and guidance were used to determine groundwater quality conditions and establish minimum thresholds for groundwater quality, and how environmental beneficial users and stakeholders were engaged through the development of the draft plan.
2. Communications plan. This element looks at the sufficiency of the communications plan in identifying ongoing stakeholder engagement during plan implementation, explicit information about how DACs were engaged in the planning process and how stakeholder input was incorporated into the GSP process and decision-making.
3. Maps related to Key Beneficial Uses. This element looks for maps related to drinking water users, including the density, location and depths of public supply and domestic wells; maps of GDE and interconnected surface waters with gaining and losing reaches; and monitoring networks.
4. Water Budgets. This element looks at how climate change is explicitly incorporated into current and future water budgets; how demands from urban and domestic water users were incorporated; and whether the historic, current and future water demands of native vegetation and wetlands are included in the budget.
5. Management areas and Monitoring Network. This element looks at where, why and how management areas are established, as well what data gaps have been identified and how the plan addresses those gaps.
6. Measurable Objectives and Undesirable Results. This element evaluates whether the plan explicitly considers the impacts on DACs, GDEs and environmental beneficial users in the development of Undesirable Results and Measurable Objectives. In addition, it examines

[2] https://www.cleanwater.org/publications/collaborating-success-stakeholder-engagement-sustainable-groundwater-management-act

whether stakeholder input was solicited from these beneficial users during the development of those metrics.

7. Management Actions and Costs. This element looks at how identified management actions impact DACs, GDEs and interconnected surface water bodies; whether mitigation for impacts to DACs is discussed or funded; and what efforts will be made to fill identified data gaps in the first five years of the plan. Additionally, this element asks whether any changes to local ordinances or land use plans are included as management actions.

Conclusion

We know that SGMA plan development and implementation is a major undertaking, and we want every basin to be successful. We would be happy to meet with you to discuss our evaluation as you finalize your Plan for submittal to DWR. Feel free to contact Suzannah Sosman at suzannah@aginnovations.org for more information or to schedule a conversation.

Sincerely,

Jennifer Clary
Water Program Manager
Clean Water Action/Clean Water Fund

Samantha Arthur
Working Lands Program Director
Audubon California

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

Danielle V. Dolan
Water Program Director
Local Government Commission

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Appendix A
Review of Public Draft GSP

Groundwater Basin/Subbasin: Pleasant Valley Basin/Subbasin (DWR 4-006)
GSA: Fox Canyon Groundwater Management Agency GSA
GSP Date: July 2019 Public Review Draft

1. Identification of Beneficial Users

Were key beneficial users identified and engaged?

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
(a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.
GSP Element 2.2.2, "Groundwater Conditions" (§354.16):
(d) Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.
(f) Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information.
(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.
GSP Element 3.3, "Minimum Thresholds" (§354.28):
(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
1. Do beneficial users (BUs) identified within the GSP area include:	a. Disadvantaged Communities (DACs)	X			"The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section."	Section 1.8.2 Pg 61
	b. Tribes	X			"According to the U.S. Bureau of Indian Affairs California Tribal Homelands and Trust Land Map, updated in 2011 and available from the DWR website, the entire PVB is within the Chumash Tribal/Cultural area. There are not currently any federally recognized tribes, Indian land currently or historically held in trust by the U.S. government, or smaller Reservation or Rancheria areas in the PVB. FCGMA recognizes that the Chumash culture and associated cultural resources are important in Ventura County. Several active local groups and individuals representing the interests of tribal communities in Ventura County have been added to the list of interested parties, including representatives from the Barbareno/Ventureno Band of Mission Indians (Chumash) and the Wishtoyo Chumash Foundation. FCGMA has reached out to the DWR Southern Region Office Tribal Liaison, Jennifer Wong, and added her to the list of interested parties. The San Gabriel Band of Mission Indians has also shown an interest in the groundwater sustainability planning process and has been added to the list of interested	Section 1.8.2 Pg 61

[1] Page numbers refer to the page of the PDF.

					parties."	
	c. Small community public water systems (<3,300 connections)	**X**			"Municipal Well Operators, Public and Private Water Purveyors: All of the purveyors in the PVB, including all municipal well operators, are supplied water by either UWCD or CMWD. Both of these wholesale water districts have been an integral part of the GSP development. Staff from both UWCD and CMWD have provided groundwater monitoring data, participated in public meetings, and regularly collaborate with FCGMA staff. CMWD is an independent special district and a wholesale water provider that supplies eight water purveyors in Pleasant Valley: Zone MWC, Pleasant Valley MWC, Crestview MWC, City of Camarillo, Oxnard Union High School District, Ventura County Waterworks District No. 19, CWD, and Arroyo Las Posas (Figure 1-8). CMWD supplies water for mainly M&I uses. UWCD serves five water purveyors within Pleasant Valley. The City of Camarillo also has direct representation on the FCGMA Board and TAG by the representative appointed to serve on behalf of the five incorporated cities within FCGMA jurisdiction. Some of the smaller water districts and mutuals have also participated in FCGMA public meetings and provided comments throughout the development of the GSP."	Section 1.8.2 Pg 59
2. What data were used to identify presence or absence of DACs?	a. DWR DAC Mapping Tool[2]	**X**			"The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section."	Section 1.8.2 Pg 61
	i. Census Places		**X**		Not clear which classifications were used.	Section 1.8.2 Pg 61
	ii. Census Block Groups		**X**		Not clear which classifications were used.	Section 1.8.2 Pg 61
	iii. Census Tracts		**X**		Not clear which classifications were used.	Section 1.8.2 Pg 61
	b. Other data source		**X**			
3. Groundwater Conditions section includes discussion of:	a. Drinking Water Quality	**X**			"The primary water quality concerns in the PVB are inflows of poor-quality water from discharges from the Simi Valley Water Quality Control Plant, dewatering wells operated by the City of Simi Valley, and discharges from the MWTP percolation ponds adjacent to Arroyo Simi–Las Posas, discharges from the Hill Canyon WWTP and the CSD WRP to Conejo Creek, and saline intrusion in the FCA and the GCA from brine migration along the Bailey Fault." Water quality constituents (i.e., TDS, Chloride, Nitrate, Sulfate, and Boron) are compared to WQOs per the Basin Plan (LARWQCB 2013; Table 2-3). Data are not otherwise compared to drinking water standards.	Section 2.3.4 Pg 117-121
	b. California Maximum Contaminant Levels (CA MCLs)[3] (or Public Health Goals where MCL does not exist, e.g. Chromium VI)		**X**		WQOs are the only standards used for comparison of water quality constituents.	Section 2.3.4 Pg 117-121
4. What local, state, and	a. Office of Environmental Health		**X**		Water quality MTs are set as water level elevations and do not take into	Section 2.3.4 Pg

[2] DWR DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/
[3] CA MCLs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html

federal standards or plans were used to assess drinking water BUs in the development of Minimum Thresholds (MTs)?	Hazard Assessment Public Health Goal (OEHHA PHGs)[4]				account standards or plans.	117-121
	b. CA MCLs[3]		X		"Water quality impacts to the aquifers of the PVB are limited to locally high concentrations of nitrate, sulfate, boron, chloride, and TDS (Section 2.3 and Section 3.3.4, Degraded Water Quality). The sources and mechanisms controlling the concentration of these constituents differs throughout the PVB (Section 2.3). The primary water quality concerns in the PVB are inflows of poor quality surface water and saline intrusion in the FCA and the Grimes Canyon Aquifer from brine migration along the Bailey Fault. Distribution of the poor quality water is influenced by groundwater production, although groundwater production is not the cause of the poor-quality water. Groundwater production may exacerbate upward migration of brines from lower aquifers, but a direct correlation between increased brine migration and groundwater elevation has not yet been established. Additionally, the influence of groundwater production on migration of poor quality water is not well understood in the PVB. As a result, the minimum thresholds for groundwater quality are the same as the water level minimum thresholds for chronic lowering of groundwater levels (Section 3.4.1). They are groundwater elevations, rather than groundwater concentrations, that are higher than historical low elevations in the PVPDMA and the western NPVMA."	Section 2.3.4 Pg 117-121
	c. Data Quality Objectives (DQOs) in Regional Water Quality Control Plans		X			Section 2.3.4 Pg 117-121
	d. Sustainable Communities Strategies/ Regional Transportation Plans[5]		X			Section 2.3.4 Pg 117-121
	e. County and/or City General Plans, Zoning Codes and Ordinances[6]		X			Section 2.3.4 Pg 117-121
5. Does the GSP identify how environmental BUs and environmental stakeholders were engaged throughout the development of the GSP?		X			The GSP identifies the primary environmental users in the Pleasant Valley Basin as the willow/mulefat riparian scrub and Arundo vegetation communities found along the banks of Conejo Creek, and Calleguas Creek, lower Arroyo Las Posas and Conejo Creeks. The degree to which these ecosystems use groundwater versus percolating surface water is uncertain. 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.	1.8.2;

Summary / Comments

The water quality conditions assessment was limited to the constituents for which water quality objectives (WQOs) have been set for groundwater in the Basin Plan. The GSP does not explicitly provide an explanation of how the WQOs relate to MCLs and PHGs or articulate whether the WQOs for this particular area are specified as being protective of drinking water users. Additional explanation of the Basin Plan and WQO process would provide more context and understanding to the reader.

The Land Use Category in Table 1-8 should be revised 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. Open space and native habitat should be distinguished from the "vacant" category, as this devalues the environment and its water needs.

[4] OEHHA PHGs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[5] CARB: https://ww2.arb.ca.gov/resources/documents/scs-evaluation-resources
[6] OPR General Plan Guidelines: http://www.opr.ca.gov/planning/general-plan/

2. Communications Plan

How were key beneficial users engaged and how was their input incorporated into the GSP process and decisions?

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:
(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.
(d) A communication section of the Plan that includes the following:
(1) An explanation of the Agency's decision-making process.
(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.
(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.
(4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.

DWR Guidance Document for GSP Stakeholder Communication and Engagement[7]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Is a Stakeholder Communication and Engagement Plan (SCEP) included?	X			Appendix B. SCEP dated November 2017	Appendix B. pg 1 - 26
2. Does the SCEP or GSP identify that ongoing engagement will be conducted during GSP implementation?		X		The GSP and SCEP does not lay out a plan for stakeholder engagement beyond the 60-day DWR public comment period. "The draft GSPs will be brought before the FCGMA Board in December 2017. The Board will consider opening a 120-day public comment period. The draft GSPs will be updated based on comments with subsequent adoption of the final GSPs by the FCGMA Board. After the final GSPs are adopted by the FCGMA Board, DWR will accept public comments in another 60-day public comment period. After the final GSPs are adopted by the FCGMA Board, regular monitoring and reporting will be conducted as required by DWR and outlined in the GSPs. A detailed schedule of the GSP process including stakeholder review opportunities can be found on the FCGMA website and is updated as needed. Below is a summary table of key GSP engagement opportunities for the public (Figure 3)." Table 1-12 FCGMA Public Meetings on the Pleasant Valley Basin GSP	Appendix B. Section 5 Pg 23, Figure 3 Pg 23 Table 1-12 Pg 79
3. Does the SCEP or GSP specifically identify how DAC beneficial users were engaged in the planning process?	X			"4.5 Opportunities for DAC Communities The majority of the Disadvantaged Communities (DACs) within the FCGMA jurisdictional boundary receive water from cities, special district s, or mutual water companies. The FCGMA works closely with these water	Appendix B. Section 4.5 Pg 20-21 Section ES 1, Pg

[7] DWR Guidance Document for GSP Stakeholder Communication and Engagement https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Document-for-Groundwater-Sustainability-Plan---Stakeholder-Communication-and-Engagement.pdf

				agencies and mutual that represent the interests of the DACs. The Watersheds Coalition of Ventura County (WCVC) has established a DAC Involvement Committee to discuss DAC Community needs and project opportunities related to Integrated Regional Water Management (IRWM). FCGMA staff participates in the DAC Committee. The DAC Committee will oversee work conducted through a Proposition 1 IRWM grant to involve DAC members in water resources decision making and identify water resource needs in DAC communities. There are several DACs within the FCGMA jurisdiction, and representatives of those communities will have the opportunity to participate in this process. As part of the grant-funded DAC involvement, process participants will identify their needs and potential projects to improve water resource management in these areas. Some of those projects could be incorporated into the GSPs. Proposition 1 includes grant funding for projects that benefit DACs and these funds may be a resource in implementing key projects identified in the GSPs. FCGMA staff will continue to participate in the WCVC DAC Committee throughout the GSP process. Other members of the WCVC DAC Committee participated in the first FCGMA public stakeholder workshops and subscribe to the stakeholder list." "Public participation and stakeholder feedback have played a critical role in the development of this GSP. The FCGMA maintains a list of stakeholders interested in the GSP process, known as the List of Interested Parties. A monthly newsletter, meeting notices, and notices of GSP documents available for review are sent electronically to those on the List of Interested Parties. Public workshops were held to inform stakeholders and the general public on the contents of the GSP and to solicit feedback on that content. To further facilitate stakeholder understanding, the FCGMA Board of Directors (Board) approved release of a preliminary draft GSP for public comment in November 2017. Additionally, the FCGMA Board formed a Technical Advisory Group, which generally held monthly public meetings throughout the GSP development process, beginning in July 2015 and ending in February 2019. In addition, updates on the development of the GSP were given at meetings of the FCGMA Board, beginning in April 2015. All FCGMA Board meetings, Technical Advisory Group meetings, Board-appointed committee meetings, and Board special workshops are noticed in accordance with the Brown Act, and opportunities for public comment were provided at all FCGMA Board meetings, Technical Advisory Group meetings, Board-appointed committee meetings, and workshops." "FCGMA has provided ongoing and innovative opportunities for stakeholders to engage in the GSP development process. FCGMA has provided regular updates to interested parties through monthly electronic newsletters highlighting monthly progress on the GSP development, upcoming meetings, and opportunities for engagement. Monthly updates and opportunities for public comment were provided at FCGMA Regular Board Meetings, FCGMA Special Board Meetings, and TAG Meetings. Meeting agendas and minutes, as well as video recordings of all FCGMA Board Meetings and Workshops, were made available on the FCGMA website. Additional technical information about the GSP development was made available on the FCGMA website, including the Preliminary Draft GSP, Technical Memoranda, and TAG Meeting Materials.	15 Section 1.8.6 Pg 64 Section 1.2.3 Pg 25 Section 1.8.3 Og 61 Table 1-12 in Pg 79 Section 1.8.2 Pg 59-60

				The Preliminary Draft GSP was available online for more than 120 days, including an official 90-day public comment period. FCGMA encouraged active participation from stakeholders through four public workshops (November 15, 2016; September 20, 2017; February 8, 2019; and March 15, 2019), a survey for input on sustainability indicators, and a public call for project ideas for incorporation into the GSP." Board includes representation for the mutual water companies and the DAC of Camarillo: "FCGMA is governed by five Board of Directors (Board) members who represent the (1) County of Ventura (County), (2) the United Water Conservation District (UWCD), (3) seven mutual water companies and water districts within the Agency (Alta Mutual Water Company, Pleasant Valley County Water District (PVCWD), Berylwood Mutual Water Company, Calleguas Municipal Water District (CMWD), CWD, Zone Mutual Water Company, and Del Norte Mutual Water Company), (4) the five incorporated cities within the Agency (Ventura, Oxnard, Camarillo, Port Hueneme, and Moorpark), and (5) the farmers (FCGMA 2019a). Four of these Board members, representing the County, UWCD, the mutual water companies and water districts, and the incorporated cities, are appointed by their respective organizations or groups. The representative for the farmers is appointed by the other four seated Board members from a list of candidates jointly supplied by the Ventura County Farm Bureau and the Ventura County Agricultural Association." "Table 1-12 lists FCGMA public meetings in which participants discussed or took action on the PVB GSP." "The City of Camarillo also has direct representation on the FCGMA Board and TAG by the representative appointed to serve on behalf of the five incorporated cities within FCGMA jurisdiction. Some of the smaller water districts and mutuals have also participated in FCGMA public meetings and provided comments throughout the development of the GSP." "The majority of domestic groundwater users in the PVB are supplied water by a city, special district, or mutual water company. FCGMA maintains a database of well owners, including domestic well owners. Email addresses within the database have been added to the list of interested parties who receive electronic newsletters regarding the status and development of the PVB GSP."	
4. Does the SCEP or GSP explicitly describe how stakeholder input was incorporated into the GSP process and decisions?	**X**			See response to item 3 above. "A new comprehensive Water Allocation System for groundwater users in the PVB is under development by FCGMA, with ongoing contributions from stakeholder groups. This allocation system will allow for long-term sustainable management of the groundwater resources of the PVB."	ES.5 Pg 21
Summary / Comments					

The GSP and SCEP does not lay out a plan for stakeholder engagement beyond the 60-day DWR public comment period. Ongoing stakeholder engagement and inclusion throughout the GSP implementation process will be crucial to ensuring that the needs of the most vulnerable beneficial users in the basin are met. The GSP does not include detailed information on the membership of the Technical Advisory Group. The number of members and the organizations and interest represented by each member should be identified so that the public may make an assessment as to how well DACs, GDEs, and other BUs were represented in the process. The Notification and Communication Summary section is very general and should include more specific, detailed information as to how input from stakeholders was incorporated into the decision making process and specific management decisions in the GSP.

3. Maps Related to Key Beneficial Uses

Were best available data sources used for information related to key beneficial users?

Selected relevant requirements and guidance:
GSP Element 2.1.4 "Additional GSP Elements" (§354.8):
Each Plan shall include a description of the geographic areas covered, including the following information:
(a) One or more maps of the basin that depict the following, as applicable:
(5) The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.

GSP Element 3.5 Monitoring Network (§354.34)
(b) Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:
(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:
(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:
(A) A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.
(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.
(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:
(A) Flow conditions including surface water discharge, surface water head, and baseflow contribution.
(B) Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.
(C) Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.
(D) Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.
(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:
(3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP Include Maps Related to Drinking Water Users?	a. Well Density		X			
	b. Domestic and Public Supply Well Locations & Depths		X			
	i. Based on DWR Well Completion Report Map Application[8]?		X			
	ii. Based on Other Source(s)?		X			

[8] DWR Well Completion Report Map Application: https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37

2. Does the GSP include maps related to Groundwater Dependent Ecosystem (GDE) locations?	a. Map of GDE Locations	X			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). In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the potential GDEs. Given the uncertainty regarding the depths to groundwater within these areas, the ecosystems are appropriately considered potential GDEs, with future monitoring needs identified to assess the degree to which existing habitat is reliant on groundwater.	2.3.7
	b. Map of Interconnected Surface Waters (ISWs)	X			Arroyo Las Posas, Conejo Creek, and Calleguas Creek have all been identified as surface water bodies that may have a connection to the Shallow Alluvial Aquifer in the Pleasant Valley Basin. Arroyo Las Posas is ephemeral in the Pleasant Valley Basin and is likely to be a disconnected losing stream. Conejo Creek and Calleguas Creek, which are perennial due to wastewater treatment discharges. Numerical modeling estimates of annual quantification of recharge to groundwater from Arroyo Las Posas, Conejo Creek, and Calleguas Creek are provided in Section 2.3.6. However, while the model results list net recharge to groundwater via stream loss, the discussion in Sections 2.3.6 and 2.3.7 indicates there is insufficient knowledge to build a conceptual model of the extend of losing and gaining reaches.	1.3.2.1; 2.3.6; 2.3.7; 2.4.1.1
	i. Does it identify which reaches are gaining and which are losing?	X				
	ii. Depletions to ISWs are quantified by stream segments.		X			
	iii. Depletions to ISWs are quantified seasonally.		X			
3. Does the GSP include maps of monitoring networks?	a. Existing Monitoring Wells	X			Figure 4-1 and Figure 4-2. Surface monitoring is shown on Figure 4-3.	Figures 4-1 and 4-2 in Pg 343 and Pg 345 Figure 4-3 in Pg 347
	b. Data sources:					
	i. California Statewide Groundwater Elevation Monitoring (CASGEM)		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	ii. Water Board Regulated monitoring sites		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	iii. Department of Pesticide Regulation (DPR) monitoring wells		X		Not clear which data sources are used for Figures 4-1 and 4-2.	
	c. Future SGMA Compliance-Monitoring Well Network	X			Figures 4-1, 4-2, and 4-5	Figures 4-1, 4-2, and 4-5 in Pg 343, 345, and 351.
	i. SGMA Monitoring Network map includes identified DACs?		X			
	ii. SGMA Monitoring Network map includes identified GDEs?		X			

Summary / Comments

The draft GSP does not include the maps required per 23 CCR § 354.8. (a)(5): "The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information."

Appendix A
Review of Public Draft GSP

The monitoring network figures presented are somewhat ambiguous. It is not entirely clear if Figures 4-1 through 4-5 reflect all existing monitoring wells and points in the basin. It is also not clearly stated in the document which wells will be monitored for compliance with MOs/MTs. It is recommended that additional clarifying language be added. In addition, it is not clear if these figures are inclusive of all CASGEM, Water Board, and DPR sites. If these figures are not inclusive of all wells being monitored under the various regulatory programs, then such figures should be added.

Detailed information regarding the number, location, and depths of domestic wells in the basin is currently lacking in the GSP. Without this information, the public cannot evaluate whether the proposed sustainable management criteria are appropriately protective of domestic well users.

Providing maps of the monitoring network overlaid with location of DACs, domestic wells, community water systems, GDEs, and any other sensitive beneficial users will allow the reader to evaluate the adequacy of the network to monitor conditions near these beneficial users.

It is recommended that remote sensing vegetative indices be included 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), a satellite-derived index that represents water content in vegetation.

GDEs and ISWs are identified and mapped. However, it is not clear if the model estimating the stream depletion analyzed data seasonally. Please quantify the depletion to ISWs by stream segments and seasonally.

4. Water Budgets

How were climate change projections incorporated into projected/future water budget and how were key beneficial users addressed?

<u>Selected relevant requirements and guidance:</u>
GSP Element 2.2.3 "Water Budget Information" (Reg. § 354.18)
Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.

Projected water budgets shall be used to estimate future baseline conditions of supply, ***demand****, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:*
(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:
(5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.
(6) The water year type associated with the annual supply, demand, and change in groundwater stored.
(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:
(1) Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, ***water demand****, and land use information.*

DWR Water Budget BMP[9]
DWR Guidance for Climate Change Data Use During GSP Development and Resource Guide[10]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are climate change projections explicitly incorporated in future/ projected water budget scenario(s)?	X			"An initial set of four modeling simulations were conducted using the future baseline conditions with two 50-year average climate cycles (1930–1979 and 1940–1989), and two DWR climate-change factors (2030 and 2070) applied to each of the 50-year periods. The 1930–1979 50-year period with the 2070 DWR climate-change factor was found to be the most conservative and was used for the comparison with the other modeling simulations conducted. Additional details about the selection of the two 50-year average climate cycles is provided in Section 2.4.5.7, Alternative Climate and Rainfall Patterns."	Section 2.4.5 Pg 142-143
2. Is there a description of the methodology used to include climate change?	X			"2.4.5.7 Alternative Climate and Rainfall Patterns To begin to assess the potential impacts on model predictions from alternate climate change assumptions and precipitation patterns, two additional simulations were conducted using the Reduction Without	Section 2.4.5.7 Pg 151

[9] DWR BMP for the Sustainable <management of Groundwater Water Budget: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget.pdf
[10] DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf

					Projects Scenario 1. These additional simulations changed the scenario assumptions in two ways. First, the Reduction Without Projects Scenario 1 was simulated using the DWR 2030 climate-change factors, rather than the more conservative 2070 climate-change factors. This revised scenario is referred to as the Reduction Without Project Scenario 1a. Second, the Reduction Without Projects Scenario 1 was simulated with the DWR 2030 climate-change factors applied to the historical precipitation and hydrology period from 1940 to 1989, rather than the original period from 1930–1979. This revised scenario is referred to as the Reduction Without Projects Scenario 1b. The 50-year periods from 1930 to 1979 and 1940 to 1989 were selected because they were the two periods from the entire historical record with the closest mean, or average, precipitation to the mean precipitation for the entire historical record of 14.4 inches. The mean precipitation for the historical period from 1930 to 1979 is also 14.4 inches and the mean precipitation from the historical period from 1940 to 1979 is 14.6 inches. These periods also have a similar distribution of precipitation years to the historical record and a similar average drought length to the average drought length in the historical record. The primary difference between the two periods is the timing of the dry periods in the records. The period from 1930 to 1979 begins with a 7-year dry period from 1930 to 1936 (model years 2020–2026), while the period from 1940 to 1989 begins with a 5-year wetter-than-average period (model years 2020–2024). The differences between these scenarios are discussed below.”	
3. What is used as the basis for climate change assumptions?	a. DWR-Provided Climate Change Data and Guidance[11]	X			“An initial set of four modeling simulations were conducted using the future baseline conditions with two 50-year average climate cycles (1930–1979 and 1940–1989), and two DWR climate-change factors (2030 and 2070) applied to each of the 50-year periods. The 1930–1979 50-year period with the 2070 DWR climate-change factor was found to be the most conservative and was used for the comparison with the other modeling simulations conducted. Additional details about the selection of the two 50-year average climate cycles is provided in Section 2.4.5.7, Alternative Climate and Rainfall Patterns.”	Section 2.4.5 Pg 142-143
	b. Other		X			
4. Does the GSP use multiple climate scenarios?		X			“2.4.5.7 Alternative Climate and Rainfall Patterns To begin to assess the potential impacts on model predictions from alternate climate change assumptions and precipitation patterns, two additional simulations were conducted using the Reduction Without Projects Scenario 1. These additional simulations changed the scenario assumptions in two ways. First, the Reduction Without Projects Scenario 1 was simulated using the DWR 2030 climate-change factors, rather than the	Section 2.4.5.7 Pg 151

[11] DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf
DWR Resource Guide DWR-Provided Climate Change Data and Guidance for Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance_v8.pdf

					more conservative 2070 climate-change factors. This revised scenario is referred to as the Reduction Without Project Scenario 1a. Second, the Reduction Without Projects Scenario 1 was simulated with the DWR 2030 climate-change factors applied to the historical precipitation and hydrology period from 1940 to 1989, rather than the original period from 1930–1979. This revised scenario is referred to as the Reduction Without Projects Scenario 1b. The 50-year periods from 1930 to 1979 and 1940 to 1989 were selected because they were the two periods from the entire historical record with the closest mean, or average, precipitation to the mean precipitation for the entire historical record of 14.4 inches. The mean precipitation for the historical period from 1930 to 1979 is also 14.4 inches and the mean precipitation from the historical period from 1940 to 1979 is 14.6 inches. These periods also have a similar distribution of precipitation years to the historical record and a similar average drought length to the average drought length in the historical record. The primary difference between the two periods is the timing of the dry periods in the records. The period from 1930 to 1979 begins with a 7-year dry period from 1930 to 1936 (model years 2020–2026), while the period from 1940 to 1989 begins with a 5-year wetter-than-average period (model years 2020–2024). The differences between these scenarios are discussed below."	
5. Does the GSP quantitatively incorporate climate change projections?		X			Table 2-11 UWCD Model Scenario Results (AFY) Section 2.4.5 Projected Water Budget and Sustainable Yield	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
6. Does the GSP explicitly account for climate change in the following elements of the future/projected water budget?	a. Inflows: i. Precipitation		X		The draft GSP does not provide a detailed accounting of the components included in the projected/future water balance. Only total groundwater extractions and project water are identified. More discrete information is provided for the historical water budget.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
	ii. Surface Water		X			
	iii. Imported Water		X			
	iv. Subsurface Inflow		X			
	b. Outflows: i. Evapotranspiration		X			
	ii. Surface Water Outflows (incl. Exports)		X			
	iii. Groundwater Outflows (incl. Exports)		X			
7. Are demands by these sectors (drinking water users) explicitly included in the future/projected water budget?	a. Domestic Well users (<5 connections)		X		The draft GSP does not provide a detailed accounting of the components included in the projected/future water balance. Only total groundwater extractions and project water are identified. More discrete information is provided for the historical water budget, including domestic pumpage and municipal and industrial (M&I) pumping. This pumping is not broken down by water system, however.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155
	b. State Small Water systems (5-14 connections)		X			
	c. Small community water systems (<3,300 connections)		X			
	d. Medium and Large community water systems (> 3,300 connections)		X			
	e. Non-community water systems		X			
8. Are water uses for native vegetation and/or wetlands explicitly included in the current and historical water budgets?		X			The water budget includes the natural system surface hydrology components including the surface water recharge from the Arroyo Las Posas, Conejo Creek, and Calleguas Creek and natural vegetation evapotranspiration (ET) along these riparian systems. These have been	2.4

				modeled using the UWCD numerical model.	
9. Are water uses for native vegetation and/or wetlands explicitly included in the projected/future water budget?		X		The GSP does not document how they account for the demands of various water users.	Table 2-11 Pg 179 Section 2.4.5 Pg 141-155

Summary / Comments

Based on the data presented, it is not clear how climate change is expected to affect specific elements of the water budget (i.e., imported water, subsurface flows, surface water and groundwater outflows, including exports).

The GSP also does not provide specifics on drinking water demands included for large urban water systems, domestic well users, or community water systems in the historical, current or future water budgets. This information should be provided and broken out by each individual water system for full transparency of the assumptions, data, and results of the water budgets.

It is also not clear based on the information presented how climate change is anticipated to change the demands of domestic users and public water systems and how these demands were accounted for in the projected water budget.

5. Management Areas and Monitoring Network

How were key beneficial users considered in the selection and monitoring of Management Areas and was the monitoring network designed appropriately to identify impacts on DACs and GDEs?

Selected relevant requirements and guidance:
GSP Element 3.3, "Management Areas" (§354.20):

(b) A basin that includes one or more management areas shall describe the following in the Plan:
(2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.
(3) The level of monitoring and analysis appropriate for each management area.
(4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.
(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.

CWC Guide to Protecting Drinking Water Quality under the SGMA[12]
TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs[13]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP define one or more Management Area?	X			"the PVB has been divided into three management zones: the North Pleasant Valley Management Area (NPVMA), the Pleasant Valley Pumping Depression Management Area (PVPDMA), and the East Pleasant Valley Management Area (EPVMA; Figure 2-46, Pleasant Valley Basin Management Areas)."	Section 2.5, Pg 155 Figure 2-46, Pg 271
2. Were the management areas defined specifically to manage GDEs?		X		"The NPVMA lies within the PVB northern boundary, the Bailey Fault, and the PVPDMA, which were defined by the lateral extent of the FCA in the PVB." "The PVPDMA is west of the NPVMA and north of the EPVMA (Figure 2-46). The boundaries of the PVPDMA include the Bailey Fault, the Oxnard Subbasin, and a northwest-trending line starting at the intersection of Lewis Road and the Bailey Fault." "The EPVMA lies to the east of the Bailey Fault and is predominantly within the jurisdiction of CWD."	Section 2.5, Pg 155 Figure 2-46, Pg 271
3. Were the management areas defined specifically to manage DACs?		X			
a. If yes, are the Measurable Objectives (MOs) and MTs for GDE/DAC management areas more restrictive than for the basin as a whole?			X	The management areas were not defined specifically to manage GDEs or DACs.	
b. If yes, are the proposed management actions for GDE/DAC management areas more restrictive/ aggressive than for the basin as a whole?			X	The management areas were not defined specifically to manage GDEs or DACs.	

[12] CWC Guide to Protecting Drinking Water Quality under the SGMA: https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858
[13] TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs: https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf

4. Does the GSP include maps or descriptions indicating what DACs are located in each Management Area(s)?		**X**		"The only Disadvantaged Communities shown on the DWR mapping tool (DWR 2017) within the PVB is within the City of Camarillo and is represented by the City as discussed earlier in this section." The City of Camarillo boundaries are not clearly shown on any figures depicting the different management areas.	Section 1.8.2 Pg 61
5. Does the GSP include maps or descriptions indicating what GDEs are located in each Management Area(s)?	X			"Calleguas Creek, Conejo Creek, and the lower reach of Arroyo Las Posas were identified as potential groundwater-dependent ecosystems (GDEs) on the statewide potential GDE map (TNC 2017). Of these potential GDEs, only lower Arroyo Las Posas north of Pleasant Valley Road lies within FCGMA jurisdiction. All three watercourses are connected to the Shallow Alluvial Aquifer, although the extent of gaining or losing reaches for these streams is not clear in the PVB (see Section 2.2.4)." No figures depict identified GDEs relative to the 3 Management Areas.	Section 2.3.7 Pg 123-125 Figure 2-32 -2-34 Pg 243-247
6. Does the plan identify gaps in the monitoring network for DACs and/or GDEs?	**X**			"In general, the connection between surface water and groundwater along Conejo Creek and Calleguas Creek is not well characterized. There was one well screened solely in the Shallow Alluvial Aquifer adjacent to the GDEs (Figure 2-34, Water Level Record for Well Locations Adjacent to Arroyo Las Posas). This well, which was destroyed in 2011, was adjacent to lower Arroyo Las Posas. There are no existing wells screened solely in the Shallow Alluvial Aquifer adjacent to Conejo Creek or Calleguas Creek, and none of the wells are screened shallower than 50 feet bgs." "The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat."	Section 2.3.7, Pg 124; 3.3.6
a. If yes, are plans included to address the identified deficiencies?		**X**		"As described above, the ecohydrology of the lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek potential GDEs is complex, and the connection between these potential GDEs and groundwater in the PVB is not well characterized. The degree to which the vegetation is reliant on groundwater versus unsaturated soil water is unknown. Better understanding of the hydrology along lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek would aid in determining the impacts of decreasing groundwater levels on the riparian habitat. Until this connection between groundwater and the potential GDEs is established, lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek cannot be conclusively determined to be GDEs. The future monitoring network would be improved by including wells dedicated to monitoring water levels in the potential GDEs to assess the degree to which existing habitat is reliant on groundwater." "In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water."	Section 2.3.7 Pg 125 Section 4.6.1 Pg 335

Summary / Comments

For transparency, the GSP should explicitly identify (preferably via maps) the extents of identified DACs and potential GDEs located within each separate Management Area.

The GSP identifies deficiencies in monitoring network for GDEs, and discusses what changes would improve the network, but does not include any concrete plans, costs, or funding sources to implement the filling of this data gap.

6. Measurable Objectives and Undesirable Results

How were DAC and GDE beneficial uses and users considered in the establishment of Sustainable Management Criteria?

Selected relevant requirements and guidance:
GSP Element 3.4 "Undesirable Results" (§ 354.26):
(b) The description of undesirable results shall include the following:
(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results

GSP Element 3.2 "Measurable Objectives" (§ 354.30)
(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are DAC impacts considered in the development of Undesirable Results (URs), MOs and MTs for groundwater levels and groundwater quality?		X		The Section on Sustainable Management Criteria includes very limited explicit consideration of DAC impacts under water quality, and no discussion under water levels. WQ UR: "Degradation of groundwater quality from increased concentrations of chloride and TDS has the potential to impact the beneficial uses and users of groundwater in the PVB by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015)." "Degradation of groundwater quality from increased concentrations of nitrate, sulfate, and boron has the potential to impact the beneficial uses and users of groundwater in the basin by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the northern part of the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015)." WL MT: "These minimum thresholds are water levels that were selected based on future groundwater model simulations that allow groundwater elevations to recover during multi-year cycles of drought and recovery, and limit migration of the 2015 saline water impact front in the Oxnard Subbasin, after 2040. Numerical groundwater model simulations indicate that, under the conditions modeled, declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall throughout all of the management areas of the PVB." WQ MT: "As a result, the minimum thresholds for groundwater quality are the same as the water level minimum thresholds for chronic lowering of groundwater levels (Section 3.4.1). They are groundwater elevations, rather	Section 3.3, 3.4, and 3.5 Pg 275-297

				than groundwater concentrations, that are higher than historical low elevations in the PVPDMA and the western NPVMA.”	
2. Does the GSP explicitly discuss how stakeholder input from DAC community members was considered in the development of URs, MOs and MTs?		X		The Section on Sustainable Management Criteria does not mention or discuss DACs, the City of Camarillo, or the Technical Advisory Group (TAG). This connection is discussed under Section 1.8 Notification and Communication either.	Section 3.3, 3.4, and 3.5 Pg 275-297
3. Does the GSP explicitly consider impacts to GDEs and environmental BUs of surface water in the development of MOs and MTs for groundwater levels and depletions of ISWs?		X		The GSP does not explicitly list the potential impacts to GDEs and Environmental BUs. “3.5.6 Depletions of Interconnected Surface Water No measurable objectives or minimum thresholds specific to the depletion of interconnected surface water are proposed at this time. Because lower Arroyo Simi–Las Posas, Calleguas Creek, and Conejo Creek are ephemeral streams; groundwater elevations in this aquifer, where known, are deeper than 30 feet below land surface; and the Shallow Alluvial Aquifer is not used for groundwater production within the boundaries of the PVB, depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future.”	Section 3.5.6 Pg 297
4. Does the GSP explicitly consider impacts to GDEs and environmental BUs of surface water and recreational lands in the discussion and development of Undesirable Results?	X			“The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat.”	3.3.6

Summary / Comments

Based on the information presented in the GSP, it is not clear how stakeholder input from DAC community members was considered in the establishment of water quality URs.

Water quality assessment in the document appears to have been limited to just the constituents for which WQOs have been established in the Basin Plan. It is recommended that a discussion be added whether any of the water systems in the basin (including small community water systems and mutual water companies) have had detections of water quality constituents above PHGs or MCLs. For any compounds detected above these levels, include a full assessment of relevant data in the basin, its potential impacts on drinking water BUs, and how the proposed water quality MOs/MTs are protective of drinking water BUs (including domestic well users).

The discussion of impacts to DACs, domestic well users, and small community water systems with respect to URs, MOs, and MTs is very limited. It is recommended that additional information be provided to clarify how URs are defined relative to these sensitive BUs and how their use of groundwater resources may be affected.

We agree that no minimum thresholds for ISW need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams should be corrected as they are perennial within PBV. Statements like “depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future” should be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, language like that from the Oxnard Subbasin GSP: “if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds should be reevaluated” is recommended.

The recognition of GDEs as an important beneficial use that must be protected is clear. Further statements are needed that 1) undesirable results are not currently occurring, 2) linkage between groundwater and the potential GDEs must be established and 3) if future projects involve the use of the Shallow Alluvial Aquifer, then “depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur.”

7. Management Actions and Costs

What does the GSP identify as specific actions to achieve the MOs, particularly those that affect the key BUs, including actions triggered by failure to meet MOs? What funding mechanisms and processes are identified that will ensure that the proposed projects and management actions are achievable and implementable?

Selected relevant requirements and guidance
GSP Element 4.0 Projects and Management Actions to Achieve Sustainability Goal (§ 354.44)
(a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.
(b) Each Plan shall include a description of the projects and management actions that include the following:
(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP identify benefits or impacts to DACs as a result of identified management actions?		X		Neither benefits or impacts to DAC members, City of Camarillo, or domestic well users are explicitly discussed relative to the projects and management actions. Benefits to reducing seawater intrusion are discussed.	Section 5 Pg 353-360
2. If yes: b. Is a plan to mitigate impacts on DAC drinking water users included in the proposed Projects and Management Actions?		X		DACs and domestic well users are not discussed. No well impact mitigation program is discussed. It should be noted that the MOs and MTs are generally set higher than current/recent water levels (Figure 3-6 – 3-8).	Section 5 Pg 353-360
c. Does the GSP identify costs to fund a mitigation program?		X			
d. Does the GSP include a funding mechanism to support the mitigation program?		X			
2. Does the GSP identify specific management actions and funding mechanisms to meet the identified MOs for groundwater quality and groundwater levels?	X			"5.2.6 Economic Factors and Funding Sources for Project No. 1 The funding source for this project is anticipated to be replenishment fees collected by FCGMA. The cost of the water is estimated to be $1,200 to $1,800 per acre-foot. Any action taken by the FCGMA Board, acting as the GSA for the portion of the PVB in its jurisdiction, to impose or increase a fee shall be taken by ordinance or resolution. Should the FCGMA Board decide to fund a project through imposition of a replenishment fee, the FCGMA will hold at least one public meeting, at which oral or written presentations may be made. Notice of the meeting will include an explanation of the fee to be considered and the notice shall be provided by publication pursuant to Section 6066 of the California Government Code.1 At least 20 days prior to the meeting, the GSA will make the data on which the proposed fee is based available to the public."	Section 5.2.6 Pg 356
3. Does the GSP include plans to fill identified data gaps by the first five-year report?		X		Spatial Data Gaps: "Additional monitoring wells could be used to improve spatial coverage for groundwater elevation measurements in all three management areas of the PVB. Wells that are added to the network should be dedicated monitoring well clusters, with individual wells in the cluster screened in a single aquifer. The	Section 4.6 Pg 334-336

				potential improvements to the monitoring network in each aquifer are shown on Figure 4-5, Approximate Locations and Screened Aquifers for Proposed New Monitoring Wells in the Pleasant Valley Basin. In the PVPDMA, the groundwater monitoring network in the PVB could be improved by adding a monitoring well or wells to the south of 5th Street (Figure 4-5). An additional well, or wells, in this area would provide aquifer specific groundwater elevations in an area that does not have a well screened in any of the primary aquifers in the PVB that is suitable for inclusion in the monitoring network. Groundwater elevation measurements in this area would help constrain groundwater gradients across the boundary between the PVB and the Oxnard Subbasin. FCGMA has applied for funding through a DWR Technical Support Services (TSS) monitor well funding grant to add a monitoring well in the PVPDMA. In the NPVMA, the groundwater monitoring network could be improved by adding a monitoring well or wells. Currently, there are no dedicated monitoring wells screened in any of the primary aquifers in this NPVMA. Adding a monitoring well would provide for aquifer-specific water levels that would improve the understanding of groundwater gradients between the PVPDMA and the NPVMA. There are no monitoring wells in the East Pleasant Valley Management Area (Figures 4-1 and 4-2). Addition of a monitoring well in the vicinity of Calleguas Creek, downstream of the junction between Lower Arroyo Las Posas and Conejo Creek, would improve understanding of groundwater conditions in this management area. It would also provide data to help constrain the relationship between groundwater elevations in the East Pleasant Valley Management Area and groundwater conditions in the adjacent PVPDMA. In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water. New wells will be constructed to applicable well installation standards set in California DWR Bulletin 74-81 and 74-90, or as updated (DWR 2016b). It is recommended that, where feasible, new wells be subjected to pumping tests in order to collect additional information about aquifer properties in the vicinity of new monitoring locations. Proposed locations are approximate and subject to feasibility review (accounting for infrastructure, site acquisition, and site access among other factors), after GSP submittal. The schedule for new well installation will be developed in conjunction with feasibility review." Temporal Data Gap:	

				"Currently, groundwater elevation measurements are not scheduled according to these criteria. To minimize the effects of this type of temporal data gap in the future, it will be necessary to coordinate the collection of groundwater elevation data so it occurs within a 2-week window during the key reporting periods of mid-March and mid-October. The recommended collection windows are October 9–22 in the fall and March 9–22 in the spring (see Section 4.4). Additionally, as funding becomes available, pressure transducers should be added to wells in the groundwater monitoring network. Pressure transducer records provide the high-temporal-resolution data that allows for a better understanding of water level dynamics in the wells related to groundwater production, groundwater management activities, and climatic influence."	
4. Do proposed management actions include any changes to local ordinances or land use planning?		**X**		No ordinances or actions by an entity with land use authority are included.	Section 5.2 Pg 354
5. Does the GSP identify additional/contingent actions and funding mechanisms in the event that MOs/MTs are not met by the identified actions?		**X**		The GSP does not discuss actions that will result in the event that MOs/MTs are not met.	Section 5 Pg 353-360
6. Does the GSP provide a plan to study the interconnectedness of surface water bodies?		**X**		"In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water. New wells will be constructed to applicable well installation standards set in California DWR Bulletin 74-81 and 74-90, or as updated (DWR 2016b). It is recommended that, where feasible, new wells be subjected to pumping tests in order to collect additional information about aquifer properties in the vicinity of new monitoring locations. Proposed locations are approximate and subject to feasibility review (accounting for infrastructure, site acquisition, and site access among other factors), after GSP submittal. The schedule for new well installation will be developed in conjunction with feasibility review." "As discussed in Section 4.6.1 (Water Level Measurements: Spatial Data Gaps), there are no dedicated monitoring wells that can be used to monitor shallow groundwater that may be interconnected with surface water bodies, or sustain potential GDEs in the PVB. Additionally, historical records of shallow groundwater elevations are limited. Water level records in the younger alluvium are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker. Because these shallow wells were installed for specific remediation cases and are not controlled by FCGMA or its partner agencies, these wells may be destroyed after the cases are closed. Therefore, the possibility of using them for future monitoring is uncertain. To fill the existing data gap and to assist with understanding the potential connectivity between shallow groundwater and potential GDEs, shallow dedicated monitoring wells can be added within the boundaries of the	Section 4.6.1 Pg 335Section 4.6.5 Pg 337

						potential GDE along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek."	
7. If yes:	a. Does the GSP identify costs to study the interconnectedness of surface water bodies?		X			See response above.	Section 4.6.1 Pg 335
	b. Does the GSP include a funding mechanism to support the study of interconnectedness surface water bodies?		X			See response above.	Section 4.6.1 Pg 335
8. Does the GSP explicitly evaluate potential impacts of projects and management actions on groundwater levels near surface water bodies?			X			The GSP does not discuss groundwater levels near surface water bodies explicitly.	Section 5 Pg 353-360

Summary / Comments

The likely benefits and impacts to DAC members by the proposed projects and management actions are not clearly identified in the GSP. A discussion should be added for each project to clearly identify the benefits to DAC drinking water users and potential impacts to the water supply. For all potential impacts, the project/management action should include a clear plan to monitor for, prevent, and/or mitigate against such impacts.

Very limited information is included in the GSP regarding domestic wells. The GSP should provide more information on this as well as the potential impacts to these users by the proposed MOs/MTs and management actions.

The draft GSP describes the need for additional monitoring wells, but does not lay out a clear plan to fund and install these wells. It is also not clear if these wells will be installed, and if data will be available for inclusion, in the 5-year update. The draft GSP notes that the GSA has applied for grant funding to install some of the proposed new wells. However, receipt of grant funds are not certain and thus the GSP should provide an alternate funding mechanism in the event that grant funds are not received.

The GSP identifies deficiencies in the monitoring network for GDEs/ISW, and discusses what changes would improve the network, but does not include any concrete plans, costs, or funding sources to implement the filling of this data gap.

If future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."

Inclusion of remote sensing vegetative indices as a low cost approach to monitor baseline conditions of GDEs is recommended. 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), a satellite-derived index that represents water content in vegetation.

The GSP notes the lack of shallow groundwater monitoring wells in the Shallow Alluvial aquifer that can be used to monitor interconnected surface water bodies/GDEs along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek. It is not necessary for the Arroyo Las Posas.

Further investigation of the water level records in the younger alluvium that are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker is recommended. If these water level records can demonstrate the groundwater connection, or lack thereof, then the data gap regarding connectivity can be closed. This could be very useful given that there is limited funding available to install new monitoring wells, and this is currently a low priority given that the Shallow Alluvial Aquifer is not a principal aquifer.

It is also suggested to survey the water surface elevation in the drains, as they should provide easy to measure, calibration head values for the numerical model and good indication of the semi-perched aquifer elevations.