NOTICE AND AGENDA OF SPECIAL MEETING

GROUNDWATER SUSTAINABILITY AGENCY
FOR THE WESTERN MANAGEMENT AREA
IN THE SANTA YNEZ RIVER GROUNDWATER BASIN

HELD AT
VANDENBERG VILLAGE COMMUNITY SERVICES DISTRICT, MEETING ROOM
3745 CONSTELLATION RD, LOMPOC, CALIFORNIA
WEDNESDAY, AUGUST 9, 2023, AT 10:00 A.M.

Optional remote public participation is available via Telephone or ZOOM

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AGENDA OF SPECIAL MEETING

1. Call to Order and Roll Call
2. Additions or Deletions to the Agenda
3. Public Comment (Any member of the public may address the Committee relating to any non-agenda matter within the Committee's jurisdiction. The total time for all public comment shall not exceed fifteen minutes and the time allotted for each individual shall not exceed five minutes. No action will be taken by the Committee at this meeting on any public comment item.)
4. Review and approve sending DWR a joint GSA response to SWRCB staff comments on the CMA, WMA and EMA GSPs.
5. Next WMA GSA Regular Meeting, Wednesday, August 23, 2023, at 10:00 a.m. at Vandenberg Village Community Services District, Meeting Room, 3745 Constellation Rd, Lompoc, California
6. WMA GSA Committee reports and requests for future agenda items
7. Adjournment

[This agenda was posted 24 hours prior to the scheduled regular meeting at 3669 Sagunto Street, Suite 101, Santa Ynez, California, and SantaYnezWater.org in accordance with Government Code Section 54954. In compliance with the Americans with Disabilities Act, if you need special assistance to review agenda materials or participate in this meeting, please contact the Santa Ynez River Water Conservation District at (805) 693-1156. Advanced notification as far as practicable prior to the meeting will enable the GSA to make reasonable arrangements to ensure accessibility to this meeting.]

STAFF MEMORANDUM

DATE: August 4, 2023

TO: WMA GSA Committee

FROM: WMA GSA Agency Staff Members

SUBJECT: Recommended Response to SWRCB Staff Comments on the Santa Ynez GSPs' Characterization of Santa Ynez River Alluvium Above the Narrows

Introduction:

State Water Resources Control Board ("SWRCB") staff provided the California Department of Water Resources ("DWR") with the attached comment letter, dated April 14, 2023 ("SWRCB Staff Comments"), regarding all three GSPs' characterization of the subsurface water in River Alluvium above the Lompoc Narrows. This Staff Memorandum summarizes the background and the SWRCB Staff Comments. This Staff Memorandum also encloses a recommended legal and technical response from all three GSAs for consideration and approval by the WMA GSA committee. Staff or its designee will transmit the approved response to DWR on behalf of the WMA GSA.

GSP Characterization of Above Narrows Alluvium Subsurface Water

As expressly authorized by SGMA and the SGMA Regulations, the three GSAs investigated whether the subsurface water in the Santa Ynez River Alluvium above the Lompoc Narrows is part of the groundwater or surface water system in the Basin, and concluded in their GSPs that such subsurface water is water flowing in a known and definite channel, and, thus, not "groundwater" (as defined by SGMA [Water Code, § 10721(g)]). Since Above Narrows alluvium subsurface water is not groundwater, the WMA, CMA, and EMA GSAs are not authorized or required to manage pumping of such water under SGMA. The GSPs are extensive and throughout describe this as an area of subsurface underflow of the Santa Ynez River. The comprehensive characterization of the groundwater and surface water systems occurs in the GSPs' Hydrogeologic Conceptual Model sections. Each GSP further included a technical appendix on this specific topic: the Stetson Engineer's December 2021 Technical Memorandum ("2021 Stetson Technical Memorandum"). In addition to other technical information and analyses in the GSPs, the 2021 Stetson Technical Memorandum documents the hydrogeological basis for the GSPs' characterization of such subsurface water as underflow that is part of the surface water system and not groundwater for purposes of SGMA regulation.

Summary of SWRCB Staff Comments:

The SWRCB Staff Comments assert that all GSAs are required to presume in their GSPs that all subsurface water is groundwater and, accordingly, manage extractions of subsurface water from the alluvial aquifer unless and until the State Water Board determines such subsurface water is not groundwater. No information is provided or referenced in the SWRCB Staff Comments that were not already considered as part of the GSPs. The SWRCB Staff Comments do not refer to the 2021 Stetson Technical Memorandum which was included with all GSPs. The comments

further do not explain the history of SWRCB orders and decisions, which consistently treats the subsurface water along the Santa Ynez River as underflow and part of the surface water system.

Proposed Response to SWRCB Staff Comments:
Staff from several of the GSA member agencies asked legal counsel for GSA members and Stetson Engineers to prepare a response to the SWRCB Staff Comments. That response includes the attached cover letter and the 2023 Stetson Engineer's Underflow Report.

The cover letter addresses the legal and technical issues raised by the SWRCB Staff Comments. This includes a discussion of the key legal decisions in *City of Los Angeles v. Pomeroy* and the SWRCB decision in *Garrapata Creek*, and the legal presumption referred to in the comments. It also identifies actions that the GSAs are continuing to take including cooperation with DWR and the SWRCB about subsurface water flow issues.

The 2023 Stetson Engineer's Underflow Report includes a detailed and extensive review of water in the alluvium subsurface including the relevant physical conditions of the alluvial channel. The report includes the following four (4) items:

- A technical analysis that concludes the subsurface water is part of the lower Santa Ynez River and constitutes what the *Garrapata Creek* Decision (based on the *Pomeroy* case) calls "underflow."
- A technical analysis that concludes the subsurface water analyzed under each part of the *Garrapata Creek* Decision four-part test constitutes a "subterranean stream."
- A description of the best available science that the GSAs used to characterize the subsurface water in the alluvium as surface water.
- A review of the longstanding technical and administrative record developed primarily during the public hearings and water rights decisions and orders of the SWRCB, where the SWRCB identifies the Santa Ynez River Alluvium above the Lompoc Narrows as "underflow," a subset of a subterranean stream.

Combined the cover letter and Underflow Report respond to legal and technical issues raised by the SWRCB Staff Comments, and describe the best available science that was considered by the GSAs and which supports the GSPs' conclusion that the subject subsurface water that flows in a known and definite channel, i.e., water that is considered surface water and not "groundwater" as defined by SGMA.

Recommendation:
Staff recommends that the WMA GSA Committee authorize the execution of the attached cover letter for transmittal to DWR along with the enclosed 2023 Stetson Engineer's Underflow Report and associated exhibits and reference documents ("Response").

Recommended Motion: *The WMA GSA Committee approves the Response in substantially the form presented and authorizes its chair or other committee member, if the chair is unavailable, to sign the cover letter transmitting the Response to DWR on behalf of the GSA.*

State Water Resources Control Board

April 14, 2023

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SANTA YNEZ RIVER VALLEY GROUNDWATER SUSTAINABILITY PLANS, GROUNDWATER BASIN NO. 3-015

The Santa Ynez River Valley Groundwater Basin is managed by three groundwater sustainability agencies (GSAs) which cover the three management areas (western, central, and eastern) that comprise the basin. Each GSA submitted a groundwater sustainability plan (GSP) for its management area. The GSPs state that the GSAs will not manage the Santa Ynez River Alluvium—a significant portion of the basin—because it is "underflow" of the Santa Ynez River and is subject to management by the State Water Resources Control Board (State Water Board).[1] However, the assertion that all underground water in the Santa Ynez River Alluvium is surface water managed by the State Water Board is not correct, and it appears that it will be necessary to treat this area as an unmanaged area under the Sustainable Groundwater Management Act (SGMA).

[1] E.g., Santa Ynez River Valley Groundwater Basin – Eastern Management Area Groundwater Sustainability Plan, pp. 29-30 ("Water present within the Santa Ynez River Alluvium is considered surface water subject to the jurisdiction of the SWRCB, and, thus, is not managed by the GSAs under SGMA…. The hydraulic continuity of this underflow with the surface flow of the Santa Ynez River is such that diversion from the underflow constitutes diversion of the surface water system."); Santa Ynez River Valley Groundwater Basin – Western Management Area Groundwater Sustainability Plan, p. ES-3; Santa Ynez River Valley Groundwater Basin – Central Management Area Groundwater Sustainability Plan, p. ES-2.

SGMA does not alter surface water or groundwater rights under common law or any provision of law that determines or grants surface water rights. (Wat. Code, § 10720.5, subd. (b).) Accordingly, the presumptions and principles that guide the distinction between surface water (and underground water flowing in known and definite channels) and groundwater in California law also apply to the determination of whether underground water is subject to SGMA. The similar terminology used in SGMA's definition of "groundwater," which excludes "water that flows in known and definite channels," and Water Code section 1200, which includes "subterranean streams flowing through known and definite channels" with "surface water" for the purpose of identifying water that is subject to the appropriative water rights system, supports this conclusion. (Compare Wat. Code, § 1200 and Wat. Code, § 10721, subd. (g).)

Water under the ground is presumed to be percolating groundwater, and the burden of proving otherwise is on the person asserting that the groundwater is a subterranean stream flowing through known and definite channels. (*City of Los Angeles v. Pomeroy* (1899), 124 Cal. 597, 628 (*Pomeroy*); State Water Resources Control Board Water Rights Decision 1639 at p. 3 (Garrapata Decision).) It is not unusual for groundwater to flow underground within a defined subterranean basin, but unless the flow is through known and definite channels the water is properly classified as percolating groundwater. (*Pomeroy*, 124 Cal. at 629, see Hutchins, The California Law of Water Rights, at pp. 426-427.)

The State Water Board addressed the interpretation and application of "subterranean streams flowing through known and definite channels" as used in Water Code section 1200 in the Garapata Decision. Relying on the California Supreme Court's decision in *Pomeroy*, the State Water Board identified a four-factor test for determining whether groundwater is properly classified as a subterranean stream flowing in known and definite channels: (1) a subsurface channel must be present; (2) the channel must have relatively impermeable bed and banks; (3) the course of the channel must be known or capable of being determined by reasonable inference; and (4) groundwater must be flowing in the channel. (Garrapata Decision at p. 4.)[2] As noted above, because SGMA's definition of "groundwater" is nearly identical to the language used in Water Code section 1200, it is appropriate to apply both the presumption of percolating groundwater and the four factors from the Garrapata Decision to determine whether water beneath the ground is flowing through known and definite channels and thus excluded from SGMA's definition of "groundwater." This means that unless there has been an actual determination that the Garrapata factors are present, water that is beneath the ground is

[2] The First District Court of Appeal held that the Garrapata factors are consistent with the language and intent or Water Code section 1200 in *North Gualala Water Co. v. State Water Resources Control Board* (2006) 139 Cal.App.4th 1577, 1606.

presumed to be percolating groundwater and is subject to SGMA, even if the water is moving in a defined subterranean basin.

“Underflow” is not defined in the Water Code: it is an informal clarification of the source of water that is sometimes used in State Water Board permits and licenses authorizing diversion from streams subject to the Board jurisdiction when the diversion occurs through wells. An appropriative water right that identifies “underflow” as a source authorizes the holder to divert the identified water in accordance with the terms of the right, but the issuance of such a right does not authorize the diversion of percolating groundwater or constitute a determination regarding the existence or location of any known and definite subsurface channels unless there is a State Water Board determination or order containing findings that identify subsurface channels pursuant to the Garrapata factors. If a State Water Board determination or order does find sufficient proof that the four factors of the Garrapata test are present and identifies a subterranean stream flowing through known and definite channels, the State Water Board will proceed to manage extractions from the subterranean stream under the appropriative water rights system. But until the State Water Board makes or issues such a determination or order, the presumption of percolating groundwater holds and management under SGMA is necessary. Thus, while it may be appropriate for a GSA to forgo management of wells that are subject to regulation through a Board-issued permit or license, it is not appropriate for a GSA to exclude any other wells, let alone an entire alluvial subbasin, from management under SGMA based on the existence of a discrete number of Board-regulated wells.

Prior to the issuance of the Santa Ynez River GSPs, Division of Water Rights staff conducted an initial review of State Water Board files and notified the Groundwater Program Manager of the Santa Ynez River Water Conservation District in September 2021 by phone of staff’s findings: (1) the Board has not made a determination that the Santa Ynez River Valley Basin does contain a subterranean stream, and (2) the State Water Board does not manage groundwater extractions this area, aside from three permits for wells approved without consideration of whether the source was surface water or groundwater. After the Santa Ynez River GSPs were finalized, staff conducted a further review of State Water Board files to determine whether there have been any technical determinations sufficient to overcome the presumption that underground water in areas near the Santa Ynez River is percolating groundwater. The staff review is summarized below.

The State Water Board has issued appropriative water rights permits and licenses in the Santa Ynez River watershed that use wells for diversion or identify “Santa Ynez River underflow” as the source of the appropriation but has not made any subterranean

stream designations or determinations in the watershed or for the alluvial basin. For example, Water Right Decision 886 addresses the geology in the Santa Ynez River Basin and refers several times to “underflow” and the presence of impermeable rocks but does not make a determination identifying known and definite channels with impermeable banks, and instead indicates that there are areas of the river (and its alluvium) that are adjacent to water bearing rocks. (See Decision 886 at p. 18 [description of Buellton Subarea].) Water Right Decision 1338 also involved appropriation from “Santa Ynez River Underflow” but does not determine that the entire alluvial basin is a subterranean stream flowing in known and definite channels. A memo written in 1966 regarding one of the water rights considered in Decision 1338 does address identifiable “bed and banks” and can be read as supporting an argument that some water in the alluvium can be characterized as part of an subterranean stream flowing in known and definite channels, however it also misinterprets the geology at depth, meaning that it fails to recognize that the water-bearing Careaga Sands form part of the “bed and banks” of the alluvium. Furthermore, a staff analysis written in 1968 by the same author discusses percolation between streams and groundwater basins in the Santa Ynez River Valley and can be read to support the conclusion that the groundwater is percolating groundwater due to the permeability of the “bed and banks.”

The State Water Board’s Division of Water Rights’ Sacramento Valley Enforcement Unit drafted a memo dated February 6, 2019, addressing a subterranean stream designation for a single well completed in alluvium near Buellton, CA. However, this memo is a staff-level analysis regarding one well, not a State Water Board subterranean stream designation for the entire Santa Ynez Alluvium and is not sufficient to overcome the general presumption that underground water in the Santa Ynez Alluvium is percolating groundwater. Moreover, the current data shows that the Santa Ynez Alluvium is not completely bounded by relatively impermeable bed and banks. There is complex geology in this area and not all margins of the river valley are underlain by the same units that are present in the well log that is the subject of the memo. Recent mapping published by the USGS shows the alluvial deposits are underlain by both the Paso Robles Formation and the Careaga Sandstone in large portions of the river valley. Subterranean streams, as determined by the State Water Board and its predecessor, generally have banks of low or very-low permeability fractured bedrock that confine beds of alluvium and other high permeability materials. Both the Paso Robles and Careaga formations are productive, unconsolidated regional aquifers with generally high permeability, and do not meet the definition or characteristics of a bounding or constraining ‘bank’ of a subterranean stream. Having relatively permeable underlying units negates the possibility of satisfying the bed and banks criterion of the Garrapata four-part test in the Buellton area.

At this time, it is appropriate to continue treating the Santa Ynez River Alluvium as percolating groundwater subject to SGMA, which provides tools to manage groundwater use to avoid the undesirable result of depletions of interconnected surface water that cause significant and unreasonable adverse impacts. If, in the future, the State Water Board finds that water in the basin or a portion of the basin meets the Garrapata factors, State Water Board staff would begin the process of identifying water rights or recording statements of claim to all wells within the areas identified as subterranean streams. Those wells would be required to file annual reports of water diversion and use, and failure to do so could result in future enforcement.

Sincerely,

Natalie Stork

Natalie Stork
Supervising Engineering Geologist
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August __, 2023

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RE: SANTA YNEZ VALLEY GROUNDWATER SUSTAINABILITY PLANS, GROUNDWATER BASIN NO. 3-015

Dear GSP Review Section Managers Salais and Edmunds:

This letter addresses the April 14, 2023 comments ("SWRCB Staff Comments") offered by the State Water Resources Control Board ("SWRCB" or "State Water Board") staff to the California Department of Water Resources ("DWR") regarding the Santa Ynez River Valley Groundwater Sustainability Plans ("GSPs") for Groundwater Basin No. 3-015 ("Basin"). Specifically, this letter addresses the comments related to the GSPs' characterization of subsurface water within the Santa Ynez River Alluvium above the Lompoc Narrows ("Santa Ynez River Alluvium" or "alluvium") as river underflow and not "groundwater" as defined by the Sustainable Groundwater Management Act, Water Code section 10720, *et seq*. ("SGMA"). The three Groundwater Sustainability Agencies ("GSAs") for the Basin appreciate the opportunity to provide this response. GSA representatives and technical consultants would also be happy to meet with DWR and SWRCB staff to discuss the issues described in this response, as needed.

I. Executive Summary.

For the reasons described in this letter and in the two enclosed technical reports prepared by Stetson Engineers, the GSAs respectfully disagree with the assertions made by the SWRCB Staff Comments that subsurface water pumped from the alluvial area underlying the Santa Ynez River is percolating groundwater subject to regulation under SGMA. It appears that SWRCB staff did not have before it, or at least did not consider, the best available scientific information which confirms that subsurface water in the lower Santa Ynez River alluvium below Cachuma Dam and

upstream of the Lompoc Narrows flows through a known and definite channel. This conclusion reached by the GSAs is fully supported in the GSPs by extensive technical analyses and data, geologic reports, well logs, aquifer tests, fieldwork, geologic and hydrogeologic modeling, and other information, including recent Airborne Electromagnetic (AEM) survey results. Among other determinations, these data and analyses show that the conductivity of the alluvium in the lower Santa Ynez River is estimated to be 40 times to 800 times greater than the conductivity of the bed and banks of the river. These significant differences in permeability of the alluvial material as compared with the material comprising the bed and banks of the Santa Ynez River are comparable to and exceed those relied upon by the SWRCB in Decision 1639 ("*Garrapata*") to determine the presence of a subterranean stream. (*Id.* pp. 9-10, 15; see additional discussion below.) Notably, in contrast to the overwhelming scientific data and analyses relied upon by the GSPs, the SWRCB Staff Comments provide virtually no evidence to support their assertions.

The GSAs also respectfully disagree with the legal positions set forth by the SWRCB Staff Comments as they pertain to SGMA and the lower Santa Ynez River. As further set forth below, the processes and conclusions of the GSAs and GSPs in this Basin, particularly those relating to the presence of underflow and a subterranean stream, fully comport with: (1) the letter and spirit of SGMA, the SGMA Regulations, and California water law and policy; (2) more than 10 prior SWRCB water rights orders and decisions confirming that water diverted from the river alluvium is underflow subject to SWRCB jurisdiction; (3) the downstream settlement agreement incorporated into and approved by WRO 2019-0148; and (4) other technical, legal, and historical information related to diversions from the lower Santa Ynez River.

Notwithstanding the above, the GSAs recognize and agree that sustainable groundwater management is a top priority for this Basin and throughout the State, and to that end the GSAs are committed to continuing their examination of underflow and related issues over time as comprehensively as needed to address any specific concerns of DWR and the State Water Board. Additionally, the GSAs fully support ongoing and cooperative interactions with DWR and the State Water Board to ensure that: (1) groundwater/surface water interactions in the lower Santa Ynez River are addressed as needed by the GSPs and GSAs, (2) the State Water Board is alerted about new well permit applications received by the GSAs for proposed pumping in the Santa Ynez River Alluvium such that SWRCB staff remain apprised of potential new or expanded pumping from the alluvial system; (3) robust groundwater monitoring continues, as described in the GSPs; and (4) the GSPs are regularly updated, including at the 5-year update due in 2027, to address the best and most current available information pertaining to the surface and groundwater systems in the Basin.

II. Major Points.

As explained in further detail below, the three groundwater sustainability agencies ("GSAs") managing the Basin, namely the Western Management Area ("WMA") Groundwater Sustainability Agency ("GSA"), the Central Management Area ("CMA") GSA, and the Eastern Management Area ("EMA") GSA, believe that the State Water Board staff did not consider all of

the technical and other scientific and relevant information available specific to conditions and circumstances in the lower Santa Ynez River (SYR) area. This information includes the following:

- The GSAs attached as an exhibit to each of the three GSPs a December 2021 Technical Memorandum ("2021 Stetson Technical Memorandum") prepared by Stetson Engineers, Inc. ("Stetson") that specifically analyzed many of the issues raised in the SWRCB Staff Comments. The 2021 Stetson Technical Memorandum is robust and is based upon the best available hydrogeological and other scientific information collected and available regarding the lower Santa Ynez River ("SYR") area. Based upon the 2021 Stetson Technical Memorandum and other modeling analyses prepared in accordance with SGMA, the GSAs made reasonable and scientifically supported determinations that wells in the reach of the Santa Ynez River alluvium from Bradbury Dam downstream to the Lompoc Narrows do not pump "groundwater" for purposes of SGMA regulation.[1] It is not clear from the SWRCB Staff Comments whether the State Water Board fully reviewed the 2021 Stetson Technical Memorandum, which supports the GSPs' characterization of subsurface water within the alluvium in all reaches above the narrows as part of the surface water system and not groundwater as defined by SGMA.
- In order to ensure that the SWRCB Staff Comments are fully addressed to DWR's satisfaction, on behalf of the GSAs Stetson has prepared a supplemental, even more detailed technical memorandum based upon the best available scientific information regarding the subterranean stream / underflow issues in the lower SYR, specifically including an analysis of the *Garrapata Creek* (SWRCB, Decision 1639 ("*Garrapata*"]) conditions or factors referenced in the SWRCB Staff Comments. This Santa Ynez River Alluvium Underflow and Subterranean Stream Report (August 2023) ("2023 Stetson Underflow Report") is attached to this letter. This document includes a review of geologic reports, well logs, aquifer tests, the results of new fieldwork, geologic, and hydrogeologic modeling tools, as well as consideration of the most current information about lower SYR hydrogeology, to characterize the groundwater and surface water systems, including the alluvium. The 2023 Stetson Underflow Report provides comprehensive information confirming that water flowing through the Santa Ynez River Alluvium is flowing through a known and definite channel and meets the other "*Garrapata*" factors. The report also explains the bounds of the known and definite channel in the lower Santa Ynez River. We invite DWR and State Water Board staff to review the 2023 Stetson Underflow Report. We would also be happy to meet as needed to discuss

[1] As discussed herein, the GSAs acknowledge that a small number of pumpers in the Buellton Reach of the lower Santa Ynez River may have wells screened below the alluvial zone. The CMA GSA will continue its investigation of any such wells and, to the extent the GSA determines that wells are screened below the alluvial zone and water is being produced from such underlying non-alluvial areas, such pumping will continue to be regulated as percolating groundwater.

the 2021 and 2023 reports and other scientific information prepared in support of the GSPs. The GSAs are also willing to conduct further monitoring and analysis during GSP implementation to further confirm the reports' conclusions and identify any potential data gaps related to these issues, including as specifically described in Section C.5. below.

- In addition to the hydrogeological and technical information, the 2023 Stetson Underflow Report also discusses the more than ten decisions/permits/licenses that have been issued by the State Water Board over the last 50-plus years determining that pumping from Santa Ynez River Alluvium above the Lompoc Narrows is within the surface water permitting jurisdiction of the State Water Board. Many of these State Water Board decisions expressly identify "underflow" as the source of water. The SWRCB Staff Comments state that use of the term "underflow" is simply an "informal clarification of the source of water that is sometimes in State Water Board permits and licenses." However, as discussed below, the courts have characterized "underflow" as a subset of water flowing in a subterranean stream for over 100 years. Thus, the term "underflow" used in the State Water Board permits and decisions had legal meaning at the time those decisions were issued and continues to have meaning today. Indeed, the *Garrapta* Decision itself uses the term "underflow" to describe water that may exist in a subterranean stream, and recites the test for underflow as defined by the Supreme Court in *City of Los Angeles v. Pomeroy* (1899) 124 Cal. 597, 624 ["*Pomeroy*"].
- The GSAs also believe it necessary to address the point raised by the SWRCB Staff Comments that all subsurface water is legally presumed to be percolating groundwater and that only the State Water Board can make determinations that overcome the presumption. The Comment's position in this regard is tantamount to requiring the GSAs to treat the presumption as a conclusive presumption, unless the SWRCB says otherwise. That position is contrary to law including SGMA, which expressly authorizes and requires GSAs to characterize groundwater and surface water systems in light of best available information and science.
    - First, like most presumptions in the law, the groundwater presumption referenced by the SWRCB Staff Comments is rebuttable. (See generally Evid. Code, section 600(a) ["A presumption is an assumption of fact that the law requires to be made from another fact or group of facts found or otherwise established[.] **A presumption is not evidence**."] (emphasis added).) This means that contrary factual evidence can overcome the presumption, which is what the GSAs assert they have done through the presentation of their 2021 and 2023 technical reports. At the same time, as discussed below, the GSAs are committed to fully analyze an airborne electromagnetic (AEM) survey of the basin conducted by a helicopter, modeling and other data that has been collected since the GSPs were

adopted, to continue monitoring and to conduct further studies and analysis to more comprehensively identify the "known and definite channel" issue, and to update the GSPs as necessary to discuss the results of these further analyses.

- Second, the point made by the SWRCB Staff Comments that all subsurface water is legally presumed to be percolating groundwater until the State Water Board determines otherwise may have direct application in the context of the State Water Board's permit and licensing jurisdiction for surface water appropriations under Water Code section 1200 et seq.; however, the Water Code does not universally extend that application throughout all facets of California water management.
- To the contrary, the Legislature specifically and intentionally defined "groundwater" for purposes of SGMA regulation. (See Water Code § 10721, subd. (g).) This statutory definition is unique to SGMA and mirrors California's previous groundwater management enactment under AB 3030. (See Water Code, § 10752, subd. (a).) Notably the definition qualifies the term groundwater, it makes no reference to a legal presumption of groundwater, and it contains no requirement for the State Water Board to make threshold legal determinations in characterizing subsurface waters in a basin.
- Third, the SWRCB Comment's position that all GSAs must irrefutably presume all subsurface water is groundwater absent a State Water Board *Garrapta* determination to the contrary, would in effect require all GSAs to manage riparian and other diversions of underflow in a manner contrary to law. This would be particularly problematic as the SWRCB has for over 50 years asserted jurisdiction over and issued permits and licenses for appropriative diversions of alluvium "underflow" along the lower Santa Ynez River. In addition, a large number of riparian diverters pump alluvium underflow, which presents no occasion for any future SWRCB *Garrapata* determination to rebut the presumption due to the SWRCB's lack of permitting jurisdiction over such riparian diversions. Thus, the GSAs would be presuming all subsurface water is groundwater subject to a *Garrapata* determination that may never occur, and thereby be required to assume the legal risk of managing diversions of subsurface waters that do not meet SGMA's definition of groundwater.
- Finally, the GSAs disagree with the SWRCB Staff Comment's suggestion that the alluvium is an unmanaged area. As noted herein, the degree to which the GSPs provide for regulation of this area of the basin is as required by SGMA. Furthermore, replenishment of the alluvium for the benefit of downstream landowners and water rights holders pumping its subsurface flows has been highly managed and regulated by the SWRCB since the

1950s. For example, as detailed in the SWRCB's most recent Cachuma Project Order, WRO 2019-0148, which resulted from decades of contested proceedings before the SWRCB and expressly considered the needs of fishery resources and downstream pumpers, downstream releases are made from the Cachuma Project's Bradbury Dam to replenish the alluvium for the benefit of those that pump subsurface water from the alluvium.

- SGMA expressly vested the GSAs with the authority and obligation to investigate and characterize the Basin in their respective GSPs, consistent with the best available science. (See e.g., Water Code, § 10725.4 [A GSA may investigate "the need for groundwater management," and its investigation may include "surface waters and surface water rights as well as groundwater and groundwater rights."]; 23 CCR sections 354.14(a) ["Each plan shall include a descriptive hydrogeologic conceptual model of the basin based on technical studies . . . that characterizes the physical components and interaction of the surface water and groundwater systems[.]"]; 354.18(b) [Water Budgets].) The GSAs, accordingly, reviewed the available data, including the State Water Board permits and licenses and hydrogeologic data, performed modeling, and concluded that the best available information and science supports the conclusion that wells producing water from the alluvial area are not pumping percolating groundwater. The SWRCB Staff Comments advance a view of SGMA which suggests that GSAs cannot exercise their statutory authorities and discretion to investigate and characterize surface and groundwater systems in a basin because only the State Water Board can determine that subsurface water is not "groundwater" for purposes of SGMA regulation. That approach is contrary to SGMA and its regulations, and would require SGMA to be amended by the Legislature.

The GSAs have reviewed the suggestion in the SWRCB Staff Comments that, notwithstanding all of the available technical evidence, the GSAs should regulate all wells within the Santa Ynez River Alluvium until more formalized well-by-well Garrapata analyses are undertaken by the State Water Board. We believe this suggestion presents profound legal and regulatory issues that could put the GSAs in legal jeopardy through claims of unlawful, dual regulation of Santa Ynez River Alluvium water producers by those who are otherwise subject to regulation by the State Water Board. For example, most or all producers in the alluvial area (1) submit annual statements of water diversion and use to the State Water Board; (2) as required, pay annual surface water fees to the State Water Board; (3) comply with SB 88 surface water measuring requirements, including at the specific direction of the State Water Board (see, e.g., 2022 letter from State Water Board to local landowner attached as Appendix C to the 2023 Stetson Underflow Report); and (4) are otherwise subject to State Water Board jurisdiction. To determine that the three GSAs have a parallel duty to manage and regulate such pumping and, presumably, also the power to impose curtailments and SGMA well pumping charges on the subject pumpers, would create dual, overlapping regulation and potential for significant litigation

against the GSAs by riparian pumpers and others. With its careful proscription limiting a GSA's authority to regulate "groundwater" and not allowing GSAs to determine water rights, it seems clear that the Legislature did not intend such dual regulation, nor to expose GSAs to such lawsuits.

III. Detailed Comments.

A. Background.

For background and context, the Santa Ynez River Alluvium at issue is depicted by the yellow highlighted area in Figure 1 of the December 2021 Stetson Technical Memorandum appended to each of the GSPs for the EMA, CMA, and WMA and is also attached to this response. (WMA GSP, Appendix 1d-B; CMA GSP, Appendix 1d-B; and EMA GSP, Appendix K.) The Santa Ynez River Alluvium subsurface water characterized by the GSPs as river "underflow" and "water flowing in a known and definite channel" occurs within the relatively narrow and shallow Santa Ynez River alluvium subsurface channel. As depicted in Figure 1 to the 2021 Stetson Technical Memorandum, that channel extends in a northwesterly direction downstream from Lake Cachuma's Bradbury Dam to a point on the river known as the Lompoc "Narrows," just east of the City of Lompoc and the Lompoc Plain area. Extractions of other subsurface waters within the boundaries of the Basin identified in DWR Bulletin 118[2], including from the Lompoc Plain and uplands areas, are managed by the GSAs as provided in their respective GSPs. It is only the regulation of pumping of subsurface water within the relatively narrow and shallow Santa Ynez River Alluvium area that is put in question by the SWRCB Staff Comments.

As explained below, the GSAs' collective and unanimous decision to abide by the requirements of SGMA to ensure they regulate only statutorily defined "groundwater" (see Water Code, section 10721, subd. (g)), and not subsurface water flowing in Santa Ynez River Alluvium, was made after conducting a thorough investigation, based on the best available science and other information and expert opinion (Stetson and GSI Consultants), as well as prior State Water Board decisions and determinations related to the Santa Ynez River. That 2021 investigation concluded such subsurface water is within the class of underflow or subsurface water that the Legislature intentionally excluded from the definition of "groundwater" for purposes of SGMA regulation. Thus, consistent with legal standards, the GSPs characterized such subsurface water as part of the surface water system within the basin.[3]

We appreciate the opportunity to provide and bring to DWR's attention and invite its review of information that is relevant to this very important issue in the Santa Ynez River Valley

[2] I.e., Lompoc Plain; Lompoc Upland; Santa Rita Upland; Bulleton Upland; Santa Ynez Upland. As was the case with the 2021 Stetson Technical Memorandum, **neither this letter nor the enclosed 2023 Stetson Underflow Report attempts to address the appropriate characterization of such other subsurface water, including water within or downstream of the Lompoc Plain**.

[3] According to the State Water Board's Decision 1639 (*Garrapata*), "In *Los Angeles v. Pomeroy*, the court stated it is undisputed that subterranean streams are governed by the same rules that apply to surface streams." (Decision 1639, p. 3, citing *Los Angeles v. Pomeroy* (1899) 124 Cal. 597, 598 ["*Pomeroy"*].)

Basin. Much of the information provided below may not have been considered by the State Water Board staff in its comment letter. Such information includes the enclosed 2021 Stetson Technical Memorandum, which was relied upon and appended to each of the three GSPs, and 2023 Stetson Underflow Report prepared by Stetson in response to the SWRCB Staff Comments.

B. The Comment's Position: All GSAs and their GSPs Must Presume All Subsurface Water Including River "Underflow" is Percolating Groundwater, Absent a State Water Board Determination to the Contrary under the *Garrapata* Four-Part Test.

In enacting SGMA, with one exception not relevant here, the Legislature made a policy decision to expressly exclude from the definition of "groundwater" to be managed by GSAs "…water that flows in known and definite channels…."[4] (Water Code, § 10721, subd. (g).) The SWRCB Staff Comments suggest this is the same subsurface water over which the State Water Board has permitting jurisdiction pursuant to Water Code section 1200, defined there as "subterranean streams flowing through known and definite channels." The SWRCB Staff Comments seem to interpret SGMA as requiring GSAs and their GSPs to *irrebuttably presume* that the subsurface waters of the Santa Ynez River Alluvium are "percolating" groundwater, *unless and until* the State Water Board determines that the four-part *Garrapata* test is satisfied and issues a permit or license for each particular well. (SWRCB Staff Comments, pp. 2-3.) The SWRCB Staff Comments imply this position holds true even when a GSA is faced with substantial or overwhelming evidence sufficient to rebut such a presumption, and even in circumstances where the State Water Board has already exercised surface water jurisdiction under Water Code section 1200 et seq. or where State Water Board jurisdiction would otherwise not apply to surface water diversions, e.g., pumping of shallow river underflow for use on riparian lands. (*Id*.)

The SWRCB Staff Comments acknowledge the State Water Board has, in various Santa Ynez River Alluvium proceedings, decisions, and orders, determined the subject alluvium contains "underflow" of the lower Santa Ynez River. However, the Comments downplay those determinations, noting that "underflow" is not defined by the Water Code and referring to underflow as an informal "clarification" of the source of water sometimes used in State Water Board permits and licenses. To the contrary, case law has determined that "[t]o constitute **underflow**, it is essential that the surface and subsurface flows be in contact and that the subsurface flow shall have a definite direction corresponding to the surface flow." (*Pomeroy*, pp. 623-24 (emphasis added); *Verdugo Canyon Water Co. v. Verdugo* (1908) 152 Cal. 655, 662-663.) Thus, by designating "underflow" or the "Santa Ynez River" itself as the source of water in each issued permit or license, the State Water Board necessarily reached a conclusion at the time of issuance of such permits and licenses based upon prevailing legal standards, that the water right

[4] This is the same class of subsurface water excluded from "groundwater" as defined in the AB 3030 Groundwater Management Plan law. (Water Code, § 10752(a) ["'Groundwater' means all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, **but does not include water that flows in know and definite channels**."] [emphasis added].)

applies to surface water within its jurisdiction. (See also Water Code, sections 1605, 1610 (Board water rights license issuance requirements)[5].)

The SWRCB Staff Comments state that State Water Board staff conducted a review of its files to determine whether there have been any technical determinations sufficient to overcome the presumption that underground water in areas near the Santa Ynez River are percolating groundwater. The Comments do not expressly mention that they took into consideration the 2021 Stetson Technical Memorandum appended to the GSPs in support of their characterization of the subsurface alluvium. The Comments contend a 1968 staff analysis (not enclosed therewith) can be read to support the conclusion that the groundwater in the Buellton area is percolating groundwater due to the permeability of the bed and banks, even though the State Water Board has permitted and licensed many wells pumping from that portion of the alluvium.

The SWRCB Staff Comments also refer to a relatively recent (February 6, 2019) memorandum prepared by the State Water Board's Division of Water Rights' Sacramento Valley Enforcement Unit. That State Water Board memorandum applied the *Garrapata* test to a well installed in the Buellton area of the alluvium, and concluded that a permit was required because that well would pump from a subterranean stream flowing in a known and definite channel. The Comments suggest that more recent data conflict with the memorandum's conclusions, but do not include or reference any specific data.

Finally, the SWRCB Staff Comments conclude that the *relatively permeable* underlying units in the Buellton area negate the possibility of satisfying the bed and banks condition of the *Garrapata* four-part test. (SWRCB Staff Comments, p. 4.) The Comments do not point to any information suggesting that the subsurface alluvium flow is not "underflow," which is not subject to the four-part *Garrapata* test mentioned by the Comments. Other than in the Buellton area, there is no contention in the Comments that the *Garrapata* relative impermeability condition is absent elsewhere within the Santa Ynez River Alluvium.

The SWRCB Staff Comments' material points are addressed below.

C. The GSAs Respectfully Disagree with Many of the Technical and Legal Positions in the SWRCB Staff Comments

We respectfully disagree that SGMA requires GSAs to presume all subsurface water is percolating groundwater in the absence of a State Water Board *Garrapata* determination to the contrary. The comments do not take into account relevant provisions of SGMA and other legal authorities, or substantial evidence supporting the GSPs' characterization of the Santa Ynez River Alluvium as not fitting within the definition of "groundwater" as defined in SGMA.

[5] Furthermore, water rights licensing requirements confirm the State Board will validate the source of water before issuing a license.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/docs/licensing.pdf

1. *SGMA Authorizes and Directs GSAs To Investigate, Characterize, and Consider Basin Setting Conditions, Including Surface Water and Groundwater Systems, in their GSPs to Determine the Need for SGMA Management Including Extraction Limits.*

Under SGMA, the GSAs are required in their GSP planning efforts to investigate and characterize the environmental setting including the surface and groundwater conditions and systems and their interrelationships. (E.g., SGMA Regulations, §§ 354.12, 354.14(a), 354.18.) The Comments are correct that SGMA does not give GSAs the power to adjudicate or determine or alter water rights; nor have the GSAs done so here. Importantly, SGMA does, however, give GSAs broad powers including broad investigative authority to "determine the need for groundwater management" and investigate "surface waters and surface water rights and groundwater and groundwater rights," as well as the authority to limit "groundwater" extractions. (Water Code, §§ 10725.4, subds. (a)(1), (b), Water Code, 10726.4, subd. (a)(2).)

Here, the GSAs exercised those relevant authorities and discretion, and after conducting thorough investigations, characterized the alluvium as being part of the surface water system of the basin for purposes of SGMA regulation. The results of that investigation and characterization are based on substantial evidence, including analysis and reasonable inferences and assumptions by qualified professional geologists and engineers based on best available information and science, as provided in the Hydrogeological Conceptual Model ("HCM") analyses and the 2021 Stetson Technical Memorandum that were incorporated into each of the GSPs. If the GSAs had foregone such investigation and characterization and simply presumed all subsurface water in the Santa Ynez River Alluvium were percolating groundwater[6] (notwithstanding substantial evidence to the contrary), the GSAs would immediately be subject to lawsuits from non-groundwater pumpers, including riparian pumpers of underflow, who are legally not subject to SGMA management.

2. *As Explained in Stetson's 2021 Technical Memorandum and 2023 Stetson Underflow Report, Substantial Evidence Supports the GSPs' Characterization of Subsurface Water Within the River Alluvium as Underflow and Water Flowing in a Known and Definite Channel and Not Groundwater as Defined by SGMA.*

SGMA does not require GSAs and GSPs to adopt a legal presumption that all subsurface water in a basin is percolating groundwater until the State Water Board determines otherwise. Yet if any such presumption exists, it is a rebuttable presumption that may be overcome by substantial evidence. (*North Gualala Water Company v. State Water Resources Control Board* (2006) 139 Cal.App.4th 1577, 1586, 1606 ["*North Gualala"*]. This is a question of fact subject to the preponderance of the evidence standard. (Wells A. Hutchins, The California Law of Water

[6] As explained above, nothing in SGMA or its regulations or guidance materials directs or suggests GSAs should presume all subsurface water is percolating groundwater absent a State Water Board determination to the contrary.

Rights (1956), p. 427; *Hooker v. Los Angeles* 188 U.S. 314, 317 (1903); Evid. Code, § 115; State Water Board Decision No. 1645 (2002), p. 6 (presumption of percolating groundwater is overcome when the preponderance of the evidence shows that groundwater is flowing in a subterranean stream; proof of the existence of a subterranean stream is shown by evidence that water flows through a known and defined channel; Evid. Code, sections 600 et seq. (legal presumption is not evidence].) Indeed, as outlined above SGMA expressly directs GSAs and GSPs to address and determine the scope and interaction of surface and groundwater systems in a basin. (See, e.g., SGMA Regulations, §§ 354.12, 354.14(a), 354.18.) The HCM analyses and other technical analyses and factual evidence supporting the GSPs, including geologic and hydrogeologic modeling, along with Stetson's 2021 Technical Memo, present substantial evidence sufficient to satisfy the GSAs' obligation under SGMA to characterize surface and groundwater systems in a basin. (2021 Stetson Technical Memorandum, pp. 3-8; 2023 Stetson Underflow Report, pp. 1-27.) The GSPs' conclusions in this regard are further bolstered by the enclosed 2023 Stetson Underflow Report.

Stetson's conclusions are in accord with a long line of State Water Board decisions dating back to the 1950s, consistently characterizing alluvium subsurface water in the lower Santa Ynez River as "underflow" subject to its permitting jurisdiction. (2021 Stetson Technical Memorandum, pp. 2-3, 8; 2023 Stetson Underflow Report, pp. 28-36.) In addition to the instances where the State Water Board has issued permits and licenses to appropriators pumping river underflow within the alluvium, the Board has also recognized the existence of various riparian claimants pumping such underflow from the alluvium. (2023 Stetson Underflow Report, Appendix B.) Based on detailed data, modeling and an investigation and characterization of the alluvium by Stetson, contained in its 2021 Technical Memo appended to the GSPs, each of the GSPs concluded that the subsurface flow within the alluvium is not groundwater. (*E.g.,* WMA GSA, p. 2b-37, Appendix 1d-B; CMA GSP, p. 2a-21, Appendix 1d-B; EMA GSP, pp. ES-3, 3-84, Appendix K.) The Comments did not address the 2021 Stetson Technical Memorandum or the other modeling and technical evidence in the GSPs that were relied upon by the GSAs to characterize the subsurface alluvium water as being part of the surface water system for purposes of SGMA regulation.

The SWRCB Staff Comments contend the *Garrapata* test applies to determine whether there is water that flows in a known and definite channel for purposes of SGMA. Nothing in SGMA or the case law finds the *Garrapata* four-part test is controlling or applicable for purpose of the SGMA definition and determinations to be made by the GSAs. However, in considering the Comments, the attached 2021 Stetson Technical Memorandum and 2023 Stetson Underflow Report addresses the physical conditions that need to exist to characterize subsurface water as "underflow"[7] and a "subterranean stream flowing in a known and definite channel," and conclude, based on substantial evidence, that each of the relevant conditions exist and support

[7] The underflow test is not the same as the *Garrapata* four-part test for a subterranean stream. (*Garrapata*, p. 7.) As explained in the 2023 Stetson Underflow Report, the subsurface alluvium water meets the test for underflow, but to the extent the subsurface alluvium water is not underflow, the *Garrapata* conditions exist and the alluvium water is still water flowing in a known and definite channel. (2023 Stetson Underflow Report, pp. 18-20.)

the GSPs' characterization of subsurface alluvium water as being separate from the groundwater system under SGMA.

With one exception, the Comments do not seriously contend that the geologic evidence is insufficient to support the GSPs' characterization of subsurface water within the alluvium as underflow or subterranean stream flow. The one exception is the relatively short reach of the alluvium in the Buellton area of the alluvium ("Buellton Reach"). While not addressing whether subsurface water in the Buellton Reach is underflow (which is not subject to the entire *Garrapata* four-part test), the Comments focus on one physical condition of the four-part *Garrapata* test, that is, "[t]he channel must have **relatively impermeable** bed and banks." (*Garrapata*, p. 4.)

The question is not whether the bed and banks are completely impermeable[8] or relatively permeable. Rather the question, not specifically addressed by the SWRCB Staff Comments, is whether the bed and banks are "relatively impermeable [when] **compared to the alluvium filling the channel**." (*Garrapata*, p. 8; *North Gualala*, pp. 1598-1600 (emphasis supplied).) The 2021 Stetson Technical Memorandum and 2023 Stetson Underflow Report explain why the relatively "impermeable condition" exists in the Buellton area (and throughout the alluvium), based on the best available data as well as modeling prepared for the GSPs. (2021 Stetson Technical Memorandum, pp. 4-6; 2023 Stetson Underflow Report, pp. 13-16 .)

Among other things, the 2021 Stetson Technical Memorandum and 2023 Stetson Underflow Report observe that the confining bed and banks boundary is substantially less permeable to water than the river deposits and younger alluvium. (Stetson Technical Memo, p. 6; 2023 Stetson Underflow Report, pp. 13-16.) Depending on the methodology used the hydraulic conductivity of the alluvium is estimated to be 40 times to 800 times greater than the conductivity of the bed and banks. (*Id*, p. 27.) These large differences in permeability are comparable to the relative impermeability of the bed and banks at issue and found to constitute a subterranean stream in *Garrapata*. In *Garrapata*, the hydraulic conductivity of the alluvium was approximately 40 times greater than the bed and banks determined to constitute a "relatively impermeable" channel. (*Garrapata*, p. 15.)

As mentioned, Stetson's underflow and subterranean stream conclusions are also supported by a long line of State Water Board decisions and orders. (2021 Stetson Technical Memorandum, pp. 2-3, 8; 2023 Stetson Underflow Report, pp. 28, et seq.). For example, State

[8] The Court of Appeal in *Gualala* accepted the SWRCB's standard of relative impermeability it advocated for in that case over a more significant boundary to flow as has been urged by appellants in that case. According to Slater, the Court of Appeal agreed with the SWRCB's position that the more appropriate focus should be on whether there is physical coherence of the stream once formed. (Slater, p. 2-42.2. citing *Gualala*, pp. 1599-1600 ["In our view, the Board's position is more consistent with *Pomeroy* and other pre-1913 case law than is [appellants]. These cases focus not on the source of the water gathered in a subterranean stream, but on the physical coherence of the stream *one it is formed*: "'Where percolating waters collect or are gathered in a stream running in a defined channel, no distinction exists between waters so running under the surface or upon the surface of land'" (emphasis in original).) Accordingly, to the extent the subsurface flow maintained a consistency in its controlled migratory path, some lateral inflow and outflow does not defeat or negate the observed physical coherence. (*Id*.)

Water Board Decision 1338 directly addressed whether the Board had authority to permit wells that would pump from the alluvium, including a well in the Buellton area. In concluding it had permitting jurisdiction in the Buellton Reach, the State Water Board expressly "found" that the alluvium in that area consisted of "underflow":

> "**The Buellton Community Services District (Buellton) diverts water by means of a well which is in the underflow of the Santa Ynez River in the Buellton subarea; in this subarea the river channel deposits lie along the river course and are nearly everywhere flanked by bodies of the younger alluvium**." (Decision 1338, p. 4 [emphasis supplied]; see also, 2023 Stetson Underflow Report, pp. 19-20, 33-34.)

In another example, the enclosed State Water Board memorandum dated February 6, 2019 (attached as Appendix D to the 2023 Stetson Underflow Report) determined that a well installed in the alluvium in the Buellton Reach required a permit from the State Water Board because the *Garrapata* test conditions existed in the Buellton Reach, including the relative impermeability condition. The memorandum concludes:

> *Flowing Water*
> *** Water flow levels are maintained by releases made from Lake Cachuma (Santa Barbary County 2011 Groundwater Report). The alluvium within the river valley is bound at depth by the relatively impermeable shale units and the river gradient indicates flow from the well location to the mouth of the river at the Pacific Ocean (Dibblee, 1988). Division staff performed analysis of current and historical photos in the areas adjacent to the subject well and observed two saturated pools north and south of the Santa Ynez River that fluctuate with the level of the river, indicating surface and subsurface connectivity. **Therefore, water flowing within the alluvium meets the criteria of a subterranean stream**." (Appendix D, *supra*, pp. 2-4 [emphasis supplied].)

These are just a few of the prior "underflow" decisions and determinations described in the 2021 Stetson Technical Memorandum and 2023 Stetson Underflow Report. (2021 Stetson Technical Memorandum, pp. 2-3, 8; 2023 Stetson Underflow Report, pp. 28-45.)

3. The SWRCB Staff Comments Do Not Consider That "Underflow" Is a Legal Subset of Waters Flowing in Known and Definite Channels.

Also relevant to the issue at hand is the legal nature of "underflow" of the Santa Ynez River as a subset of a subterranean stream flowing in a known and definite channel, which the SWRCB Staff Comments do not take into account. The comments, instead, characterize underflow as merely "an information clarification of the source of water" not defined by the Water Code.[9]

[9] As explained below, as well as in a report prepared by Joseph L. Sax for the State Water Board regarding its authority over appropriations of subterranean stream flows, "underflow" is a recognized legal term,

(SWRCB Staff Comments, p. 3.) As mentioned, the State Water Board has on many occasions determined and confirmed that the lower SYR alluvium consists of river underflow, and, in its certified environmental impact report (2011 FEIR) for Water Rights Order 2019-0148 (regarding the Cachuma Project), the State Water Board once again confirmed that the alluvium at issue consists of river "underflow" and identified many landowners riparian to the river and appropriators who pump from "underflow" of the river. (2023 Stetson Underflow Report, pp. 32-33, Appendix B; 2011 Final EIR, Vol. II – Edited Version of 2011 2nd RDEIR, pp. 3.0-2 through 3.0-7, available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/#feir2011.)

Legal commentators have observed that the term underflow, although "defined in various ways, has been commonly used to refer to subterranean streams." (See, e.g., Littleworth and Garner, *California Water (3rd Ed., 2019)*, p. 77.) State Water Board decisions at times have used the term underflow as a shorthand reference for water beneath the ground in a subterranean stream flowing in known and definite channels. (SWRCB, Decision 1645, p. 13, n. 4.) According to the courts and State Water Board decisions, underflow is legally a subset of a subterranean stream flowing in known and definite channels. (*North Gualala*, p. 1605; *Garrapata*, pp. 6-7, citing *Pomeroy*, pp. 594-595.) While a subterranean stream includes underflow, it is not necessary that subsurface flow be underflow to establish a subterranean stream flowing through a known and definite channel. (*Id*.) The main difference between subsurface flow that is "underflow" and other subsurface flow that is part of a subterranean stream flowing a known and definite channel, is that underflow is in connection with the stream. (*Garrapata*, pp. 4, 7.)

The State Water Board permitting decisions determining and confirming that the subsurface water in the alluvium is "underflow" have already illustrated the existence of a subterranean stream flowing in a known and definite channel. SGMA does not require such determinations to be revisited in further State Water Board proceedings applying the *Garrapata* test before the GSAs can make determinations in characterizing which waters qualify as groundwater subject to regulation under SGMA. Prior State Water Board decisions and orders on the subject are relevant evidence of whether the alluvium subsurface water constitutes underflow as part of a surface water system in a basin. Consistent with its prior 2021 Technical Memorandum, Stetson's 2023 Stetson Underflow Report further reiterates and provides further geologic and other evidence supporting the conclusion that the subsurface water at issue meets the criteria for underflow and a subterranean stream recognized in *Pomeroy* and *Garrapata*. (2023 Stetson Technical Memorandum, pp. 9-21.)

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and there is a substantial body of law, including court cases and State Water Board decisions, that define and classify underflow as a subset of a subterranean stream flowing in a known and definite channel. (Sax, Review of the Laws Establishing the SWRCB's Permitting Authority Over Appropriations of Groundwater Classified as Subterranean Streams and the SWRCB's Implementation of Those Laws, SWRCB No. 0-076-300-0, Final Report (January 19, 2002) ["Sax Report"], p. 2, fn. 4, p. 46.)

4. As the State Water Board Lacks Permitting Authority Over Riparian Diversions, Requiring All GSPs to Presume All Underground Water Is Percolating Groundwater Until the Board Determines Otherwise Would, In Effect, Require GSAs To Forever Manage Riparian Pumping of Subsurface Water including River "Underflow."

The rule proposed by the SWRCB Staff Comments – that all GSAs must presume all subsurface water is percolating groundwater and manage it under SGMA absent a State Water Board *Garrapata* decision to the contrary, would be unworkable and especially problematic due to the fact that most of the pumpers of subsurface water from the alluvium are riparian pumpers who are not subject to the Board's permitting jurisdiction, and likewise not subject to SGMA regulation. Thus, there would be no occasion to apply *Garrapata* to riparian pumpers of underflow.

The State Water Board's own files and water rights reporting system contains substantial evidence of many well owners along the Santa Ynez River pumping river underflow from relatively shallow wells installed in the river alluvium, and, in doing so, exercising riparian rights. (*E.g.,* Appendix B and C to 2023 Stetson Underflow Report.) Unlike the exercise of appropriative rights to surface water or subterranean stream flow, no permit is required from the State Water Board to authorize riparian surface stream diversions. (Water Code, § 1201; Sax Report, *supra*, p. 1, fn. 3; Slater, California Water Law and Policy (2022), § 3.09.) Riparian rights are not limited to surface water diversions. Riparian parcel owners are also entitled to pump "underflow" and other water flowing in a known and definite channel that abuts, is contiguous to or underlies the riparian's land, and like surface diversions such pumping for use on riparian parcels is not subject the Water Board's permitting authority.[10]

Accordingly, for the many riparians pumping underflow of the Santa Ynez River, since no permit or license from the State Water Board is required, there may never be any State Water Board proceeding that addresses or determines whether the percolating groundwater presumption is rebutted by application of the *Garrapata* test or other applicable factors. Accordingly, the practical effect of the Comment's approach would be to require all three GSAs to attempt to manage riparian pumping of river underflow and other subterranean stream water. Such management is squarely outside the scope of the GSAs' authority to manage "groundwater" as defined for purposes of SGMA, and would likely subject GSAs to takings and/or other types of lawsuits from riparian pumpers of river underflow.

[10] Water Code, §§ 1200, 1201; *Pomeroy, supra*, p. 632; *Peabody v. City of Vallejo* (1935) 2 Cal.2d 351, 375-376; *Santa Margarita v. Vail* (1938) 11 Cal.2d 501, 555-556; *Prather v. Hoberg* (1944) 24 Cal.2d 549, 557-562; *North Gualala*, p. 1592-1592, citing *Hanson v. McCue* (1871) 42 Cal. 303, 308-309; Littleworth & Garner, *supra* pp. 43, 162, n. 3; Joseph P. Sax, We Don't Do Groundwater: A Morsel of California Legal History (1-1-2002), 6 U. Denv. Water L. Review 269, 273.

5. *The GSAs Are Committed to Taking Further Action Regarding the Appropriate Characterization of Subsurface Water in the Santa Ynez River Alluvium*

Beyond their initial technical analyses and characterization of the alluvium, the GSAs are committed to fully implementing the GSPs' Project and Management Actions including the following actions:

- Perform additional analysis of the AEM data and other data that has been collected since the GSPs were adopted to confirm the boundaries of the underflow channel upstream of the Lompoc Narrows;
- Continue monitoring and conduct further studies and analysis (i.e., perform additional pumping tests) to study the "known and definite channel" issue more comprehensively and to update the GSPs as necessary to discuss the results of these further analyses;
- Update the Well Registration Program for production wells as discussed in the implementation section of the GSPs with well depth, perforations, and GPS location coordinates;
- Install piezometers at the interface of the groundwater aquifers and the underflow deposits to address data gaps on the interconnection of surface and groundwater in the EMA (Alamo Pintado and Zanja de Cota Creeks) and CMA (Santa Rosa Creek);
- Expand the groundwater level monitoring program in the CMA to better understand the extent of flow, if any, between the regional groundwater aquifer (Buellton Aquifer) and river underflow deposits in the Buellton Reach. Groundwater level monitoring wells were identified as a data gap in the CMA GSP.

The GSAs are also willing to continue their ongoing cooperation with the State Water Board and DWR to ensure that: (1) groundwater/surface water interactions in the lower Santa Ynez River are addressed as needed by the GSAs, (2) State Water Board staff are alerted about new well permit applications received by the GSAs for proposed pumping in the underflow, (3) robust groundwater monitoring and reporting continues, and (4) the GSPs are regularly updated to address the latest available information about the underflow and related issues.

IV. Conclusion.

The Legislature made an express law and policy decision to exclude pumpers of subsurface water flowing in known and definite channels, including riparians and appropriators pumping river underflow, from the SGMA definition of "groundwater" extractions to be managed by GSAs. A critical part of that decision was to vest GSAs with the authority and discretion to characterize the surface and groundwater systems in a basin based on substantial evidence and scientific data. That was the state of the law when the GSPs were submitted to DWR and that is the state of the

law today.[11] The GSAs were duty bound to act in accordance with the Legislature's policy decision regarding the scope of a GSA's management authority as embodied in SGMA, and the three Basin GSAs have done so by thoroughly investigating and appropriately characterizing Santa Ynez River Alluvium subsurface waters above the Lompoc Narrows, based on substantial evidence including best available science, as not being "groundwater" as that term of art is defined by SGMA. If the GSAs had not conducted such investigation and characterization and exceeded their management authority under SGMA, they rightly would be criticized and subject to the many pitfalls of regulatory overreach, including costly and protracted litigation that would undermine immediate efforts that are needed to effectively implement the GSPs.

We appreciate the opportunity to provide information to DWR that we believe is relevant to the issue raised, but perhaps was not considered by the SWRCB Staff Comments.

Finally, recognizing the importance of the issues raised in the SWRCB Staff Comments, the GSAs offer to meet with appropriate DWR and SWRCB representatives to further discuss this matter as needed.

Sincerely,

Brett Marymee, EMA Chair

Cynthia Allan, CMA Chair

Chris Brooks, WMA Chair

Enclosures:
(1) 2021 Stetson Technical Memorandum,
as appended to the WMA, CMA and EMA GSPs; and
(2) 2023 Stetson Underflow Report and
Subterranean Stream Report.

[11] We are not aware of any authority that requires or permits DWR to give deference to an administrative agency's proposed interpretation of a statute (SGMA) in a staff comment letter.

STETSON ENGINEERS INC.

TECHNICAL MEMORANDUM

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TO:	**Santa Ynez River Water Conservation District**	DATE:	**December 2021**
FROM:	**Ali Shahroody** **Curtis Lawler**	JOB NO:	**1126-2**
RE:	**Hydrogeological Basis for Characterization of Water within the Santa Ynez River Alluvium Upstream of the Lompoc Narrows as Underflow of the River in a Known and Definite Channel**		

1 INTRODUCTION

This memorandum documents the hydrogeological basis for the characterization of the water within the Santa Ynez River Alluvium as underflow of the river flowing in a known and definite channel. The area of this underflow is located downstream of Lake Cachuma and upstream of the Lompoc Narrows[1] (Figure 1).[2] The Groundwater Sustainability Plans ("GSPs") that have been developed for the Western, Central, and Eastern Management Areas of the Santa Ynez River Valley Groundwater Basin, referred to as Bulletin 118 Basin No. 3-015 ("Basin"), appropriately characterize this water as underflow of the river within the jurisdiction of and regulated by the State Water Resources Control Board ("State Board"), and not "groundwater" as defined by the Sustainable Groundwater Management Act ("SGMA"). For purposes of SGMA, "groundwater" is defined as "water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water but does not include water that flows in known and definite channels." (Wat. Code, § 10721(g), emphasis added.) Water that flows in known and definite channels is regulated by and subject to the jurisdictional authority of the State Board in the same manner as surface water. (See Wat. Code § 1200 et seq.)

Importantly, SGMA does not require Groundwater Sustainability Agencies ("GSAs") or GSPs to legally establish the distinction between groundwater and surface water in a basin. Instead, GSPs must identify and describe the respective systems, characterize their interrelationship, and explain the basis of those analyses. (See, e.g., SGMA Regulations § 354.18.)In this Basin, the GSPs have reasonably relied upon and utilized the longstanding technical and administrative record that identifies the Santa Ynez River Alluvium above the Lompoc Narrows as a known and definite subsurface channel of the lower Santa Ynez River. In fact, diversion and use of this

[1] This memorandum does not attempt to characterize subsurface water within or downstream of the Lompoc Plain, nor does it make any determination about the particular water rights of any water user.
[2] This underflow area also corresponds to the Above Narrows Area as defined by the United States Bureau of Reclamation ("Reclamation") and to Zone A of the Santa Ynez River Water Conservation District.

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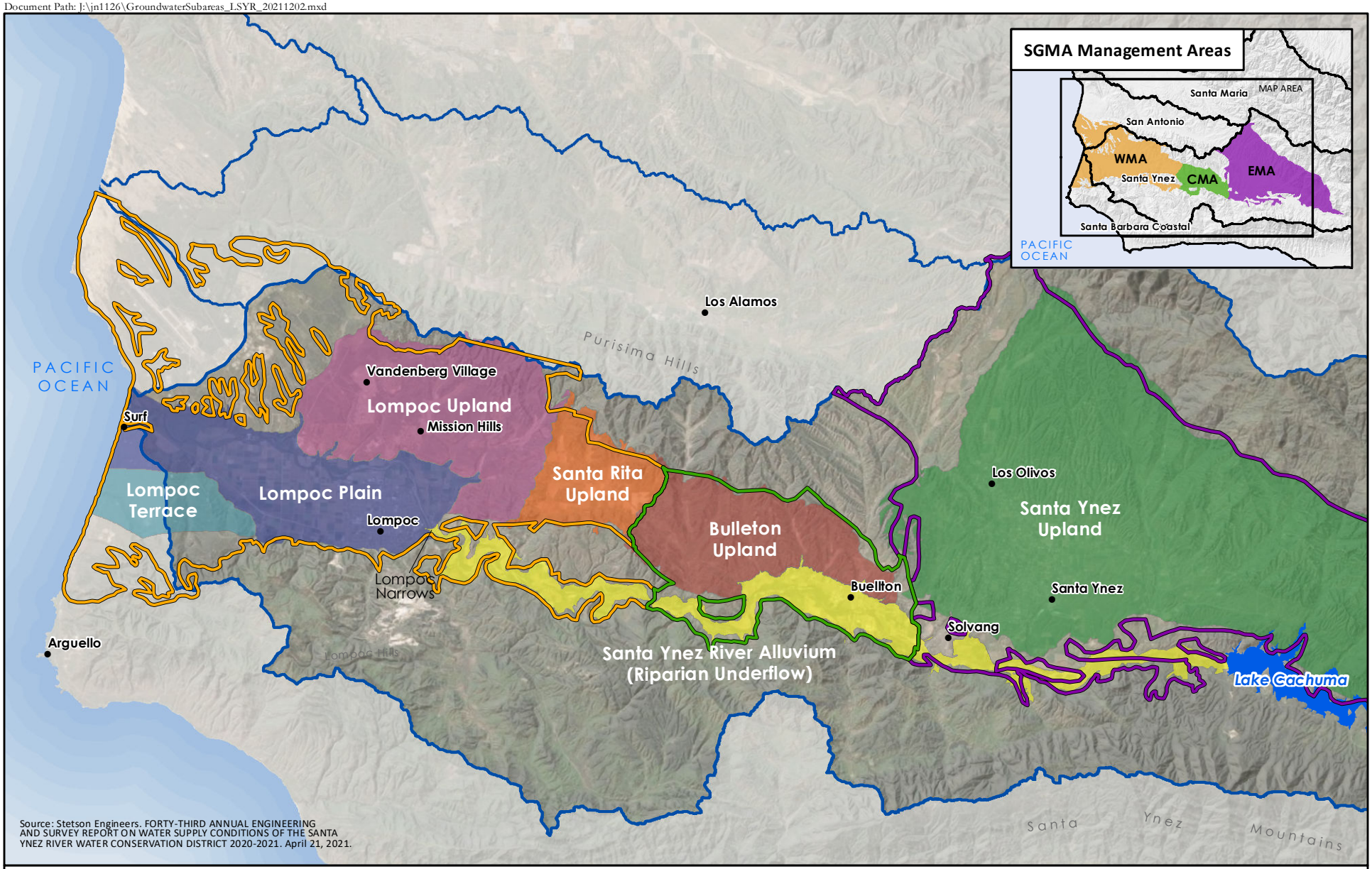

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- Santa Ynez River Watershed
- Central Management Area
- Western Management Area
- Eastern Management Area

GROUNDWATER SUBAREAS AND UNDERFLOW
LOWER SANTA YNEZ RIVER

DRAFT

0 2 4 Miles

N

FIGURE 1

subsurface water have historically been regulated by the State Board, which has characterized it as underflow of the Santa Ynez River since at least Water Rights Decision 886 in 1958. The State Board further reinforced this characterization of this alluvium in Water Rights Decisions 1338 and 1486 when it considered applications and granted permits to divert underflow of the river: "The Santa Ynez River in the reach between Cachuma Dam and Robinson Bridge, where it enters the Lompoc subarea, flows over recent river channel deposits and the younger alluvium that range in width from a few hundred feet to about one mile and in thickness from 40 to 85 feet. The underflow of the river moves slowly through these deposits." (State Board Decision 1338, pp. 3-4, emphasis added.)[2]

State Board Water Rights Order ("WRO") 73-37, as amended by WRO 89-18 and incorporated in WRO 2019-0148, has also defined the Santa Ynez River "Above Narrows" alluvial deposits as underflow, and states in relevant part that water shall be released "from Lake Cachuma in such amounts and at such times and rates as will be sufficient, together with inflow from downstream tributary sources, to supply downstream diversions of the surface flow under vested prior rights to the extent water would have been available for such diversions from unregulated flow." (WRO 73-37, Paragraph 5.) Notably, the downstream diversions referenced in these State Board WROs and Water Rights Decisions are made from wells constructed in the underflow of the Santa Ynez River alluvium. As recognized by the State Board and as further discussed below, the geology of the River-channel Deposits and the Younger Alluvium demarcate a known and definite channel through which this subsurface water flows, with older and less permeable formations forming the bed and banks.

2 DESCRIPTION OF THE SUBSURFACE CHANNEL

The geology of the shallow and water bearing sediments of the Santa Ynez River below Lake Cachuma is discussed in United States Geological Survey ("USGS") Water Supply Papers 1107 and 1467. Along much of the Santa Ynez River below Lake Cachuma, the river overlies River-channel Deposits and the Younger Alluvium. These water-bearing units are located in a river-cut channel through older non-water bearing units of the thick Tertiary aged Monterey Formation (primarily lower permeability clays) and other older units. The River-channel Deposits comprise the materials intermittently transported by the present river. The Younger Alluvium includes quaternary alluvial fill of recent age that extends alongside the Santa Ynez River in the flood plain.

[2] For certain purposes, such as under the Water Conservation District Law, underflow of the lower Santa Ynez River has been referred to as groundwater. (See, e.g., Wat. Code, § 75500 et seq.)

In addition to the State Board record discussed above, the USGS papers provide substantial evidence that reasonably support several technical conclusions:

1. The Santa Ynez River replenishes the River-channel Deposits and Younger Alluvium.
2. Older impermeable formations along the south side of the river form the underflow channel limits on that side. The older formations rise steeply to the south where more rainfall and runoff typically occurs due to the higher elevations and orographic effects.
3. Older impermeable formations along the north side of the river form underflow channel limits on that side. These formations form a bedrock lip that separates older less permeable formations (Paso Robles and Careaga Sand) from the River-channel Deposits and Younger Alluvium adjacent to the Santa Ynez River. There are some additional permeable depositions to the north along tributaries, however the bottom elevations of those depositions are higher than the top of the river channel basin.
4. In the Buellton area, there is limited hydrologic continuity between the Younger Alluvium and the older less permeable formations (Paso Robles and Careaga Sand) which are exposed to the base of the Younger Alluvium. There are extensive clay zones in the upper portion of the Paso Robles and Careaga Sands in this area. This clayey material restricts the hydrologic continuity of Santa Ynez River underflow to the deeper aquifer (see also, Stetson, 1977; Stetson, 1992).

Figure 1 shows the plan view and width of the River-channel Deposits and the Younger Alluvium in the Santa Ynez River Alluvium subarea. Upstream of the Lompoc Narrows, the subsurface channel of the Santa Ynez River ranges from 0.5 to 1.5 miles in width. Figure 2 shows a cross-section of this geology at the Highway 154 Bridge, which is representative of the subsurface channel of the lower Santa Ynez River above the Lompoc Narrows. Throughout the reach from Lake Cachuma to the Lompoc Narrows, the subsurface channel composed of River-channel Deposits and Younger Alluvium ranges from 25 to 150 feet in thickness and is typically 30 - 80 feet thick (Stetson, 1992).

The permeability of the river gravel deposits along the Santa Ynez River ranges from 100 to 700 feet per day with typical values of about 500 feet per day (USGS, 1951). This permeability of the River-channel Deposits and the Younger Alluvium is further indicative of the direct connectivity between the surface and underflow of the Santa Ynez River. In contrast, the permeability of the clays and shales that form the bed and banks for the majority of the subsurface channel would be expected to be less than 0.01 feet per day based on the hydrogeologic properties of clays and shales (Freeze and Cherry, 1979).

In the Buellton area, between Solvang and the Buellton Bend where the subsurface channel River-channel Deposits and the Younger Alluvium are in contact with the older formations of

Components of Subterranean Flow
(aka Surface Flow occurring in Underflow Channel)
at Highway 154 Bridge

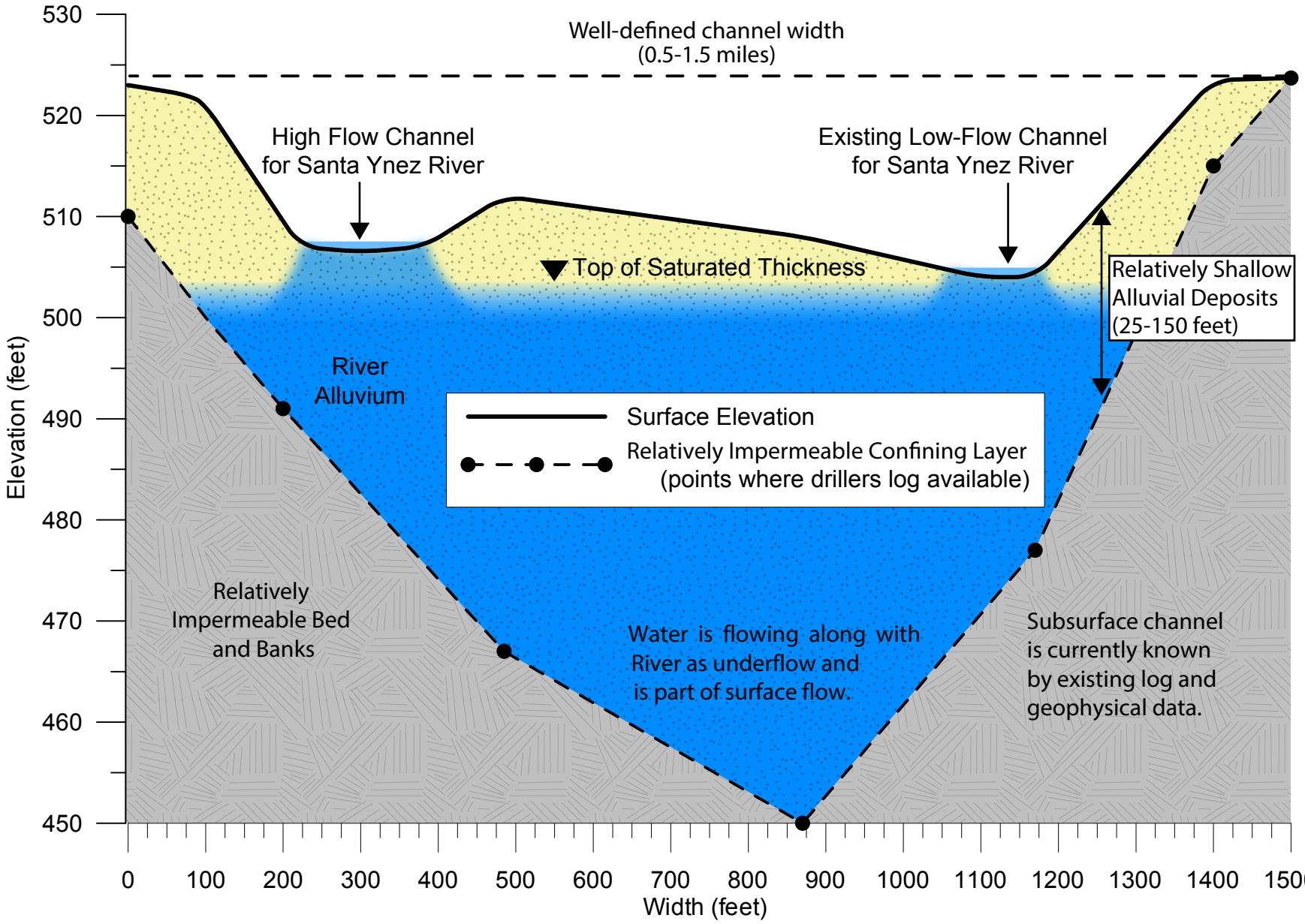

FIGURE 2

Paso Robles and Careaga Sands, the permeability of the bed and banks is estimated to range from 0.1 to 3 feet per day (Stetson, 2020). This permeability is two to three orders of magnitude less than the permeability of the River-channel Deposits and the Younger Alluvium in the subsurface channel and thus relatively impermeable.

3 EVIDENCE OF UNDERFLOW

The direct hydraulic connection between the River-channel Deposits and the Younger Alluvium and the surface flow in the Santa Ynez River upstream of the Lompoc Narrows is evidenced by the high permeability of the river alluvium and responses in water levels of alluvial wells during surface flows. In USGS Water Supply Paper 1107 (USGS, 1951), this area of underflow was described as follows:

> The unconsolidated deposits beneath and adjacent to the river transmit a certain amount of underflow which is not measured at the successive gaging stations. Obviously, however, this underflow is an integral part of the water resources of the river valley.

The hydraulic connection between the subsurface channel deposits and the Santa Ynez River is described in USGS Water Supply Paper 1467 as follows (USGS, 1959, emphasis added):

> The Santa Ynez River in the reach between Cachuma Dam and Robinson Bridge flows on a body of alluvial deposits that ranges in width from a few hundred feet to more than a mile and in maximum thickness from about 40 to about 185 feet. These deposits, *which are in hydraulic contact with the river*, form a ground-water storage reservoir from which water can be pumped to irrigate the agricultural lands adjacent to the river.

As described above, the hydraulic connection between the water level in the subsurface channel deposits and surface flow is so strong that the water levels in the underflow channel are entirely dependent upon flow in the Santa Ynez River. In fact, the existence of a relatively impermeable subsurface channel and a hydrologic connection between surface and subsurface flows in this area have been relied upon by the State Board, to determine when water is to be released from Bradbury Dam to satisfy downstream water rights.

The Santa Ynez River Valley experienced a prolonged drought from 1947 through 1951, followed by storms in early 1952. Figure 3 shows that over the drought and recovery periods the response of wells to surface flow in the Santa Ynez River is immediate and illustrates the direct connection between subsurface water levels and the surface stream. This quick response in water levels in the underflow is also evident after water rights releases from Bradbury Dam during periods when no storms are occurring.

The hydrograph for well 6N/32W- 9A1 located in the Younger Alluvium about a half mile from the river responds quickly to flow in the river similar to the well located in the River-channel

Response to River Flow

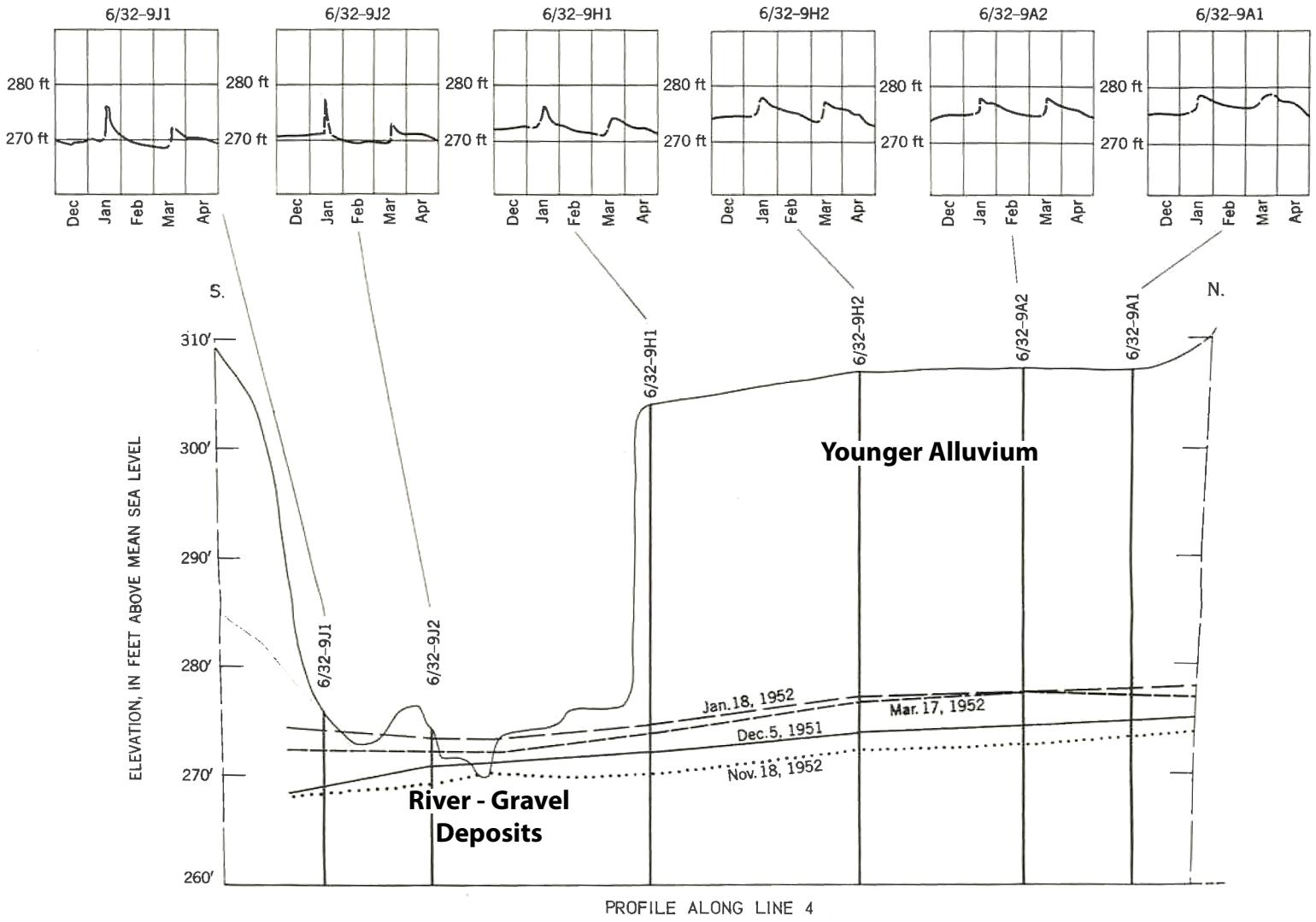

Figure 3 - Underflow Water Level Response to Surface Flow upstream of Buellton Bend in January and March 1952

Source: U.S. Geological Survey. 1959. Wilson. USGS Water Supply Paper 1467.

Deposits, 6N/32W- 9J2. In the USGS Water Supply Paper 1107 (USGS, 1951), the USGS further describes the connection in both geologic formations:

> Thus, throughout its reach from San Lucas Bridge downstream to about 3,000 feet beyond Robinson Bridge, no thick impermeable strata intervene between the bed of the Santa Ynez River and the lower member of the younger alluvium. Accordingly, throughout that reach there is free interchange of water between the river and the lower member of the younger alluvium. Therefore, the lower member contains and transmits river underflow. Also, as its cross-sectional area is much greater than that of the river-channel deposits, the lower member transmits the bulk of that underflow.

4 CONCLUSION

Based on extensive evidence, as well as Stetson's experience of more than 50 years working in the Santa Ynez River Valley for a number of agencies, including work for the State Board, we believe that the water in the River-channel Deposits and the Younger Alluvium downstream of Lake Cachuma and upstream of the Lompoc Narrows constitutes underflow in a definite and known channel with a defined and relatively impermeable bed and banks. This finding is also consistent with the practice of the State Board, which has considered applications and granted permits for diversion of underflow of the Santa Ynez River. (See, e.g., State Board Water Rights Decisions 886, 1338, 1486; State Board WROs 73-37, 89-18, 2019-0148; USGS Papers 1107, 1467.) Accordingly, this water is distinct from "groundwater" as defined by SGMA. In addition to the technical analyses contained in the respective GSPs for the Basin, the information described herein has been used to support the descriptions and analyses of the groundwater system and surface water systems of the Basin in accordance with the provisions of SGMA and the SGMA Regulations.

5 REFERENCES

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FINAL DRAFT

Santa Ynez River Alluvium Underflow and Subterranean Stream Report

Prepared in Response to the April 14, 2023 Comments by State Water Resources Control Board Staff regarding Groundwater Sustainability Plans for the Santa Ynez River Valley Groundwater Basin

Stetson Engineers

August 2023

STETSON
ENGINEERS INC.

August 2023

Cover Photograph: *Santa Ynez River alluvium and outcrop of underlying Monterey Formation. The photograph shows the surface boundary between the channel of alluvium and the relatively impermeable bed and banks. The photograph is along the Santa Ynez River in the Santa Rita Reach. Photograph taken by Miles McCammon, PG, CHG, on October 22, 2019.*

EXECUTIVE SUMMARY

This report is submitted, along with geological data, historical documents (including State Water Board decisions), and other relevant information, as confirmation that the three Santa Ynez River Valley Ground Water Basin (SYRGB or Basin) Groundwater Sustainability Plans' (GSPs') characterization of subsurface water within the Santa Ynez River Alluvium upstream of the Lompoc Narrows as "underflow" and water that flows in a known and definite channel, is supported by substantial evidence, and, accordingly, such subsurface water is not "groundwater" as defined by the Sustainable Groundwater Management Act (SGMA) (Water Code, § 10721, subd. (g)).

The SYRGB is located within central Santa Barbara County in the central coast region of California. The California Department of Water Resources (DWR) identified the Basin as a medium-priority groundwater basin. The eight public water agencies within the SYRGB divided the Basin into three Management Areas (GSAs): the Western Management Area (WMA), Central Management Area (CMA), and Eastern Management Area (EMA). The three GSAs coordinated on developing three Groundwater Sustainability Plans (GSPs) to manage the groundwater in the Basin under SGMA.

In Bulletin 118, DWR derived the Basin boundaries based on a regional-scale historical geological map from 1959. To implement the mandate of SGMA in preparing their GSPs and using the best available information including the best available science,[1] the three GSAs investigated and identified the lateral basin boundaries, principal aquifers (including vertical and lateral extent, hydraulic conductivity, and storativity), aquitards, and surface water systems significant to the management of the Basin. The GSAs' investigation noted that a small portion of the DWR-identified boundaries included the younger alluvial[2] sediments prevalent along the Santa Ynez River. These are geologically young sediments deposited in and on top of a channel formed by historical river flows and bounded by much older, and relatively impermeable, formations that had been uplifted, rotated, compressed, bent, and eroded over geological time.

The GSAs through their consultants, including Stetson Engineers and GSI, conducted hydrogeological investigations for the GSPs using the best available science. Data reviewed included past geologic reports, geologic maps, well logs, aquifer tests, and new fieldwork. From this data, the scientists developed three-dimensional geological models for each GSP and then developed calibrated groundwater flow models. As directed by SGMA regulations (e.g., 23 CCR, § 354.14), the GSPs characterized the groundwater and

[1] Water Code section 113 states: "It is the policy of the state that groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses. Sustainable groundwater management is best achieved locally through the development, implementation, and updating of plans and programs **based on the best available science**." [Emphasis added.]

[2] Alluvial is a geological term that means the loose sediments that are deposited by running water. It comes from the Latin *alluvius*, from *alluere* "to wash against".

surface water systems based on this effort. These investigations determined that subsurface water within the Santa Ynez River Alluvium upstream of the Lompoc Narrows is water located and flowing within a known and definite channel. As a result, each of the three GSAs concluded in their GSPs that this alluvial area is part of the surface water system and did not meet the SGMA Water Code definition of "groundwater."[3]

As discussed in detail below, the GSPs also identified that past and current management of the Santa Ynez River has consistently treated water flowing (aka underflow) in this subsurface channel as part of overall Santa Ynez River flows, treating those subsurface flows as part of the surface flows of the river. The three GSAs included a Technical Memorandum regarding the "Hydrogeological Basis for Characterization of Water with the Santa Ynez River Alluvium Upstream of the Lompoc Narrows as Underflow of the River in a Known and Definite Channel" (the 2021 Stetson Technical Memorandum), as an appendix to each of their GSPs: WMA Appendix 1d-B, CMA Appendix 1d-B, and EMA Appendix K.

The 2021 Stetson Technical Memorandum references the California State Water Resources Control Board ("SWRCB" or "State Water Board") characterization and treatment of subsurface water in the lower Santa Ynez River area alluvium (downstream of Bradbury Dam to the Lompoc Narrows) as "underflow." The information in this report regarding Santa Ynez River Alluvium and underflow supplements the information provided in the 2021 Stetson Technical Memorandum and confirms that the GSPs appropriately characterized the subsurface water within the alluvium in this part of the watershed as water flowing in a known and definite channel. This report further documents that in at least ten (10) independent permitting or other decisions, the SWRCB has explicitly or implicitly determined that diversions from wells along the Santa Ynez River from the Lompoc Narrows up to Bradbury Dam produce water from alluvium underflow. The most recent SWRCB order (2019-0148) relating to the Cachuma Project and requiring releases from Bradbury Dam to replenish the downstream Santa Ynez River Alluvium (also referred to as the Above Narrows area), and other downstream subsurface water in the Below Narrows area, summarizes the long history of SWRCB regulation of river flows for alluvium replenishment and permitting/licensing of alluvium diversions.

The GSAs solicited public comments on individual sections of the draft GSPs as they were each prepared, as well as the completed GSPs. The GSAs addressed all comments submitted and provided the adopted GSPs to DWR in January 2022. Following submission, DWR opened an additional 45-day comment period through April 2022. Approximately one year following the closure of the DWR comment period, in April of 2023, SWRCB staff submitted a comment letter ("SWRCB Staff Comments") to suggest without evidence that water in the Santa Ynez River Alluvium from Bradbury Dam to the Lompoc Narrows is

[3] Water Code Section 10721, subd. (g), states: "'Groundwater' means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but **does not include water that flows in known and definite channels** unless included pursuant to Section 10722.5." [Emphasis added.]

presumptively groundwater, despite the scientific analyses and conclusions in the GSPs. This report focuses on addressing and providing clarification and supplemental information regarding geologic and other relevant data supporting the GSPs' determination that water within the Santa Ynez River Alluvium is flowing in a known and definite channel. Although briefly described below as necessary for context, the legal issues raised in the SWRCB Staff Comments, and the legal standards applied in this report, are more fully addressed in the transmittal letter to which this report is appended.

The April 2023 SWRCB Staff Comments do not consider the full scientific and administrative record used by the GSAs as specifically authorized by SGMA to characterize water flowing in the Santa Ynez River Alluvium. For example, the SWRCB Staff Comments did not review or discuss water levels or any other data described in the GSPs or in the annual reports for the Basin. They also do not address any of the data and analysis provided by the 2021 Stetson Technical Memorandum or GSP modeling. The Comments are inconsistent with nearly all the available geologic and hydrogeologic evidence, as well as past SWRCB actions and decisions in the Santa Ynez River watershed. In summary:

1) The areas in question (Santa Ynez River Alluvium) are where "water that flows in known and definite channels" is not groundwater as defined by SGMA (Water Code, § 10721, subd. (g)). The areas defined in the GSPs as underflow of the Santa Ynez River Alluvium flowing through known and definite channels are supported by the GSAs' and their qualified geologists' and engineers' substantial investigation and fact-gathering process, including the collection and review of geological maps, water level data, well completion reports, conducting studies with new geophysical data, development of a three-dimensional geological model, and development of a calibrated groundwater flow model. All this information is presented in the GSPs.

2) The SWRCB Staff Comments do not provide any scientific data or analysis relevant to hydrogeologic or other conditions prevailing in the Santa Ynez River Alluvium that is contrary to the conclusions in the 2021 Stetson Technical Memorandum. The Comments purport to characterize the entire Santa Ynez River (discussed in the WMA, CMA, and EMA GSPs). In fact, however, the Comments only refer to geological conditions within a small reach of the Santa Ynez River Alluvium near the City of Buellton. As explained below, the Comments do not include any technical information that is contrary to the GSPs' conclusion that subsurface water within the alluvium in the Buellton Reach[4] is underflow or water flowing within a known and definite channel. This Report further addresses the hydrogeologic evidence related to all reaches of the Santa Ynez River.

3) The SWRCB Staff Comments make general statements about consolidation and permeability in the Santa Ynez River Alluvium in the Buellton Reach to assert that a finding that the alluvium is

[4] The Buellton Reach is the area near the City of Buellton and located almost entirely within the CMA. A small portion extends into the EMA (downstream of the City of Solvang). Figure 2 shows the extent of this area.

"relatively impermeable" cannot be made; yet those statements are scientifically incomplete. Indeed, the Comments do not address that the alluvium in the Buellton Reach is 40 to 800 times higher permeability and is relatively unconsolidated, as compared to the geologic materials that underlay the bed and banks of the underflow deposits. Accordingly, the best available science shows that, even if the underflow conditions were not present, the bed and banks are "relatively impermeable"[5] throughout the Santa Ynez River above the Lompoc Narrows, including in the Buellton Reach. The Buellton Reach also needs to be put in the context of the entire underflow channel from Bradbury Dam to the Lompoc Narrows, where the difference between the river alluvium and less permeable adjacent formations is even greater than in this small reach of the entire alluvial channel.

4) SWRCB determinations and orders issued in the Santa Ynez River watershed over the last 75 years have consistently described extractions from the alluvial portion of the Santa Ynez River as "underflow." The SWRCB has continued to use this language in recent (post-2000) determinations and orders, including Water Rights Order No. 2019-0148 and its supporting Environmental Impact Review (EIR, e.g. Appendix B). As described in the accompanying cover letter, the courts and SWRCB have consistently described "underflow" as subsurface flow that is in contact with and flows in the same direction as the associated surface water. And, consistent with these SWRCB and court findings, the hydrogeological evidence and analyses contained in the GSPs for the Basin show that production of water from the Santa Ynez River Alluvium is underflow.

This report confirms the hydrogeologic conditions along the reaches of the Santa Ynez River within the Basin boundaries including the GSPs' characterization of the surface and groundwater systems based on best available science as required by SGMA. In short, based on the GSAs' investigation, the subsurface water flowing with the above the Lompoc Narrows alluvium of the Santa Ynez River is water that flows in a known and definite because it is "underflow," which is not subject to the relative impermeability requirement of the Garrapata Test. However, even if this subsurface water were not underflow, all the physical conditions of the Garrapata Test for underground water to be classified as a subterranean stream flowing in a known and definite channel nevertheless exist in the alluvium above the Lompoc Narrows.

[5] "Relatively impermeable" bed and banks is one condition or element of the four-part test ("Garrapata Test") set forth in the 1999 SWRCB Decision 1639 (In the Matter of Garrapata Water Company: Extraction of Water by Garrapata Water Company From the Alluvium of the Valley of Garrapata Creek, etc.), hereafter the "*Garrapata Creek* Decision." In contrast, as explained below, the relatively impermeable condition is not part of the underflow test, and the subsurface water in the alluvium meets the elements of the underflow test.

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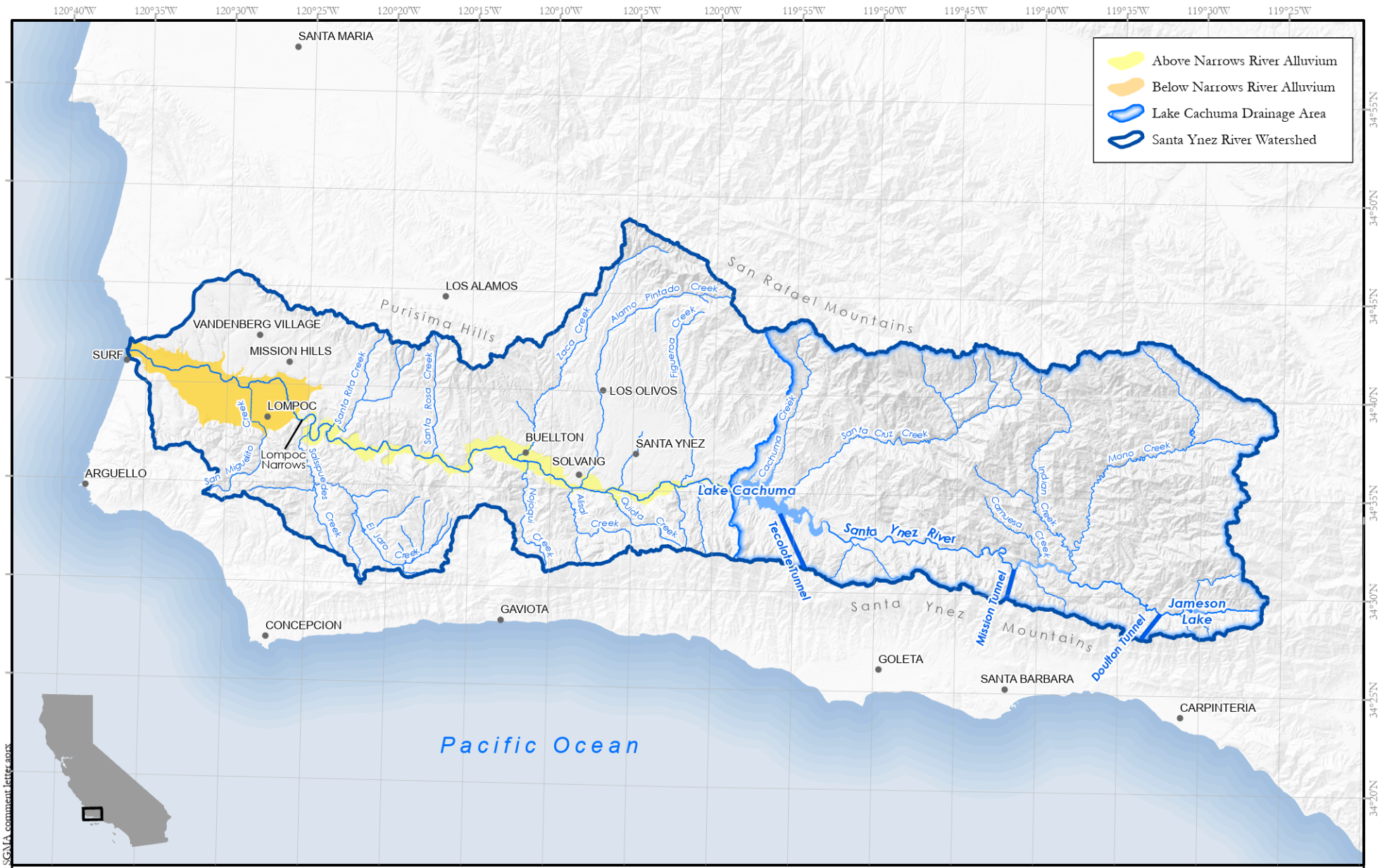
1 INTRODUCTION AND AREA OF INTEREST

Figure 1 is a map of the entire Santa Ynez River watershed showing the major reservoirs and diversions through the Doulton Tunnel, Mission Tunnel, and Tecolote Tunnel. The Lake Cachuma Drainage area includes the areas of the Santa Ynez watershed with the highest annual rainfall rates and represents most of the water that could flow in the Santa Ynez River. The downstream area depleted by Lake Cachuma includes a disadvantaged community (City of Lompoc) and a federally recognized Native American tribe (Santa Ynez Band of Chumash Mission Indians of the Santa Ynez Reservation). Reservoirs and the diversions from these reservoirs to the South Coast have affected water users along the Santa Ynez River since they began. This included the Gibraltar Reservoir in 1920 and Jameson Lake in 1930; and Cachuma Reservoir in 1952.

Owners of riparian[6] land, municipal purveyors, and others access Santa Ynez River surface or subsurface (aka, underflow) water through wells drilled in the Santa Ynez River Alluvium, as depicted in yellow in **Figure 2** (and Figure 1 of the 2021 Stetson Technical Memorandum appended to the GSPs). For more than half of a century, the State Water Resources Control Board ("SWRCB" or "State Water Board") has consistently described subsurface water in the alluvial sediments as Santa Ynez River "underflow" and considered the water legally part of the above surface flows of the Santa Ynez River, dating back at least since the SWRCB Cachuma Water Rights hearings in the 1950s (SWRCB Decision 886), if not earlier. The SWRCB has issued surface water appropriate permits and licenses for wells extracting water from the alluvium, including to the City of Solvang, City of Buellton, and Improvement District No. 1. The SWRCB has also recognized many riparian diverters pumping water from the alluvium. (E.g., Cachuma Project Water Rights Hearing Final EIR (December 2011), pp. 3.0-2, 3.0-3 [Table 3-1a], 3.0-4 to 3.0-7, 4.4-1 [4.4 Above Narrows Alluvial Aquifer], Appendix B.)

[6] Riparian describes the interface between land and a stream. It comes from the Latin *ripa*, meaning 'river bank.'



STETSON ENGINEERS INC.

SANTA YNEZ RIVER WATERSHED
SANTA BARBARA COUNTY

0 3.5 7 Miles

N

FIGURE 1

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1.1 LOWER SANTA YNEZ RIVER REACHES

The alluvium along the lower Santa Ynez River (downstream of Bradbury Dam to the Lompoc Narrows) is, from a technical analysis perspective, most conveniently described by dividing the river into reaches based on the geographic and geologic setting. Conditions that apply and describe any one reach may not be present along the entire river. For this report, we divide the lower Santa Ynez River into five reaches, summarized in **Table 1**. These reaches are based primarily on a description from 1958 SWRCB Decision 886. **Figure 2** is a map showing these areas' general extent and location. The stretch upstream of the Lompoc Narrows to Bradbury Dam, as shown in yellow in **Figure 2,** is the area of interest that the GSPs characterized as constituting water flowing in a known and definite channel. The area is hereinafter referred to as the "Santa Ynez River Alluvium" or "alluvium." **Figure 3** is geologic cross section B-B' from the CMA GSP, typical of the alluvium upstream of the Lompoc Narrows. Additional annotations were added to show and distinguish between the groundwater aquifer formations and the river alluvium. As shown in Figure 3, the Santa Ynez River Alluvium's bed and banks are underlain by non-water bearing Miocene and older formations. This is the typical geological structure for the majority of the bed and banks along the Santa Ynez River in the WMA, CMA, and EMA.

Approximately 29 of the 36 river miles above the Lompoc Narrows are a channel of alluvium bounded on all sides by non-water bearing geological units, with no direct interface with the groundwater aquifer (e.g., **Figure 3**). In most places, the Monterey formation is the non-water bearing geologic unit along and underneath the Santa Ynez River. This reports' cover photograph shows a typical example of this geological contact. From a technical standpoint, the April 2023 SWRCB Staff Comments focus exclusively on a small area of the Basin where both the Careaga Sandstone and Paso Robles Formation partly underlie the Santa Ynez River. Based on the geological maps (discussed in Section 3.1), this characteristic only occurs within the Buellton Reach of the river (Table 1 and Figure 2). Thus, any suggestion by the Comments that the characteristics of the Buellton Reach apply to any other reach is not supportable.

The Buellton Reach is a seven-mile reach of the river that is almost entirely within the CMA. The CMA GSP specifically recognized the Buellton Reach as an area where the groundwater aquifer extended below the Santa Ynez River alluvium. Accordingly, that GSP expressly sets forth an ongoing monitoring program to ensure that the sustainability goals are met for any interconnection of groundwater and surface water and groundwater dependent ecosystems in this area due to potential aquifer seepage into the underflow alluvium channel (e.g., CMA GSP, Figure 3a.3-3). The CMA SGMA annual reporting to date has included the monitoring of the Buellton Reach, which indicates that there are no undesirable results to the surface water and groundwater dependent ecosystems in this reach.

The April 2023 SWRCB Staff Comments were addressed to all three GSPs' management areas, so the entire lower Santa Ynez River is shown in **Table 1** and **Figure 2**. The underflow channel is one subterranean

stream that flows across the entire reach upstream of the Lompoc Narrows (the Headwater, Santa Ynez, Buellton, and Santa Rita reaches in Table 1).

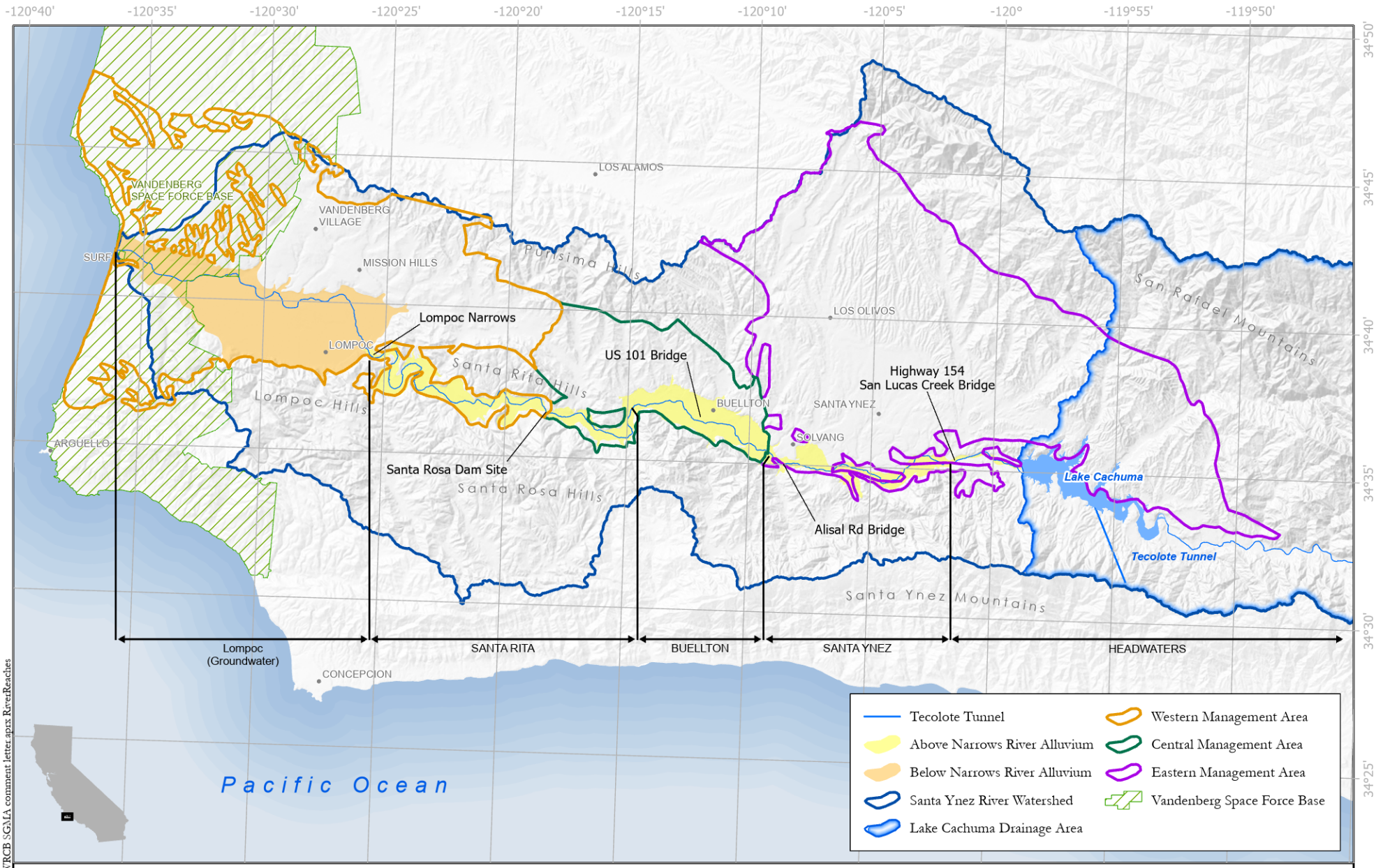
TABLE 1
SUMMARY OF SANTA YNEZ RIVER ALLUVIUM REACHES

Santa Ynez River Reach	Length	Lower Boundary		Management Area	Alluvium Description		
	River Miles	Feature	River Mile [A]		GSP	Typical Width	Description
Headwater	3	San Lucas Creek Bridge (Highway 154 Crossing)	3	EMA	Underflow	500 ft	Thin and underlying by consolidated and essentially non-water-bearing rocks.
Santa Ynez	8.5	2/3 Mile below Alisal Road Bridge	11.5	EMA	Underflow	2,000 ft	Almost completely enclosed by non-water bearing consolidated rocks.
Buellton [B]	7	Buellton Bend	18.5	CMA	Underflow	5,000 ft	Overlies non-water bearing older rocks to the south of the river and Careaga Sandstone to the north.
Santa Rita	17.25	Lompoc Narrows	35.75	CMA / WMA	Underflow	2,500 ft	Enclosed by non-water bearing consolidated rocks.
Lompoc	14	Pacific Ocean [C]	49.75	WMA	SGMA Managed Groundwater Aquifer	15,000 ft	Broad plain, crossing over underlying Careaga Sandstone.

[A] Distance in miles along Santa Ynez River downstream of Lake Cachuma (Bradbury Dam).

[B] The April 2023 SWRCB Staff Comments only discuss where "alluvial deposits are underlain by both the Paso Robles Formation and the Careaga Sandstone […]." The Paso Robles Formation is not extensively present under the alluvium. Where both the Paso Robles Formation and the Careaga Sandstone are present describes only a small portion of the Buellton Reach entirely within the CMA. Upstream of the Lompoc Narrows, the Buellton Reach described above is inclusive of all areas where either formation is present.

[C] The far downstream estuary area within the Vandenberg Space Force Base (formerly Air Force Base) is geologically similar to the Santa Rita Subarea. We include the estuary area in the Lompoc reach for consistency with past studies.



STETSON ENGINEERS INC.

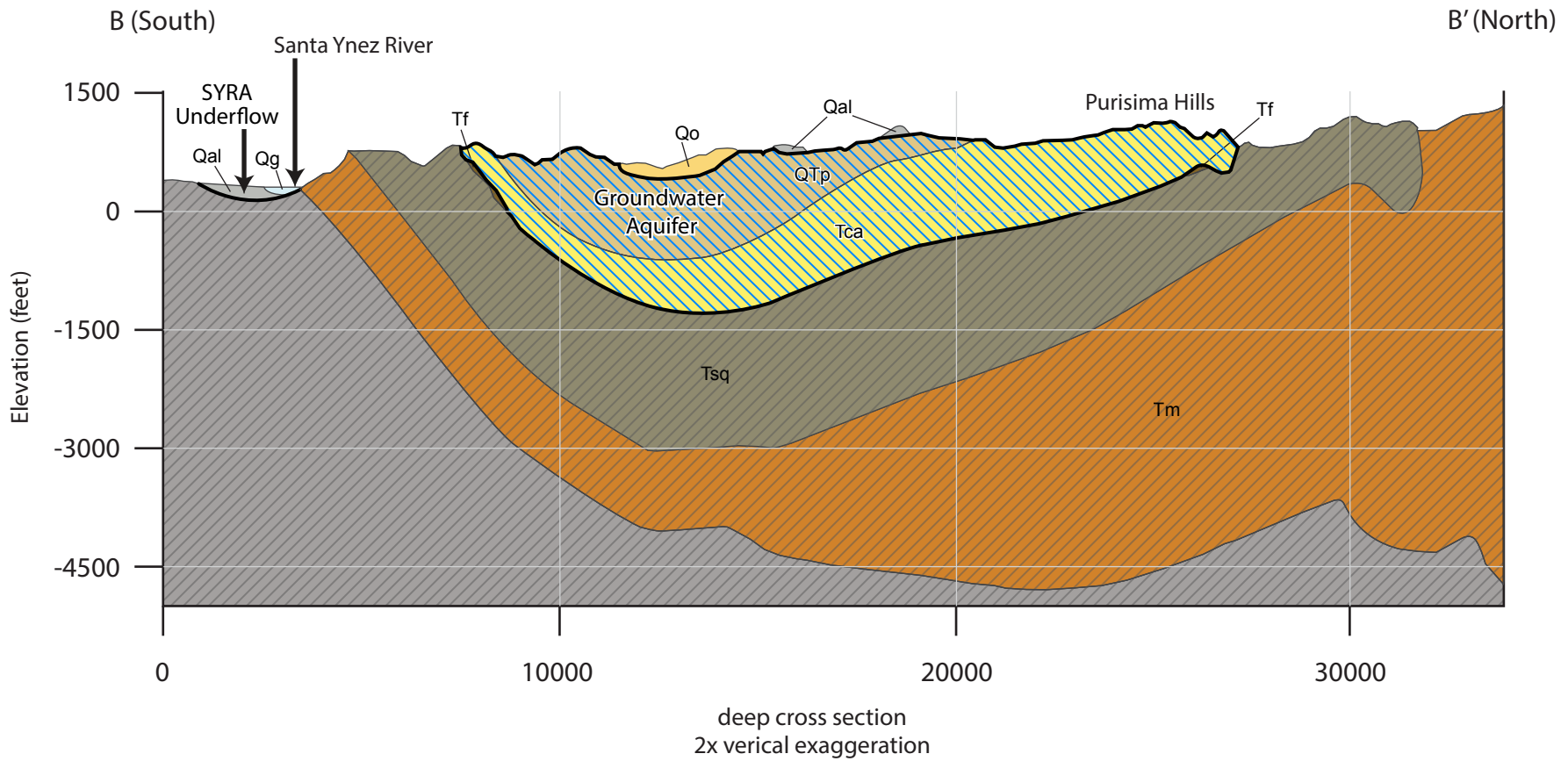
REACHES AND ALLUVIUM
LOWER SANTA YNEZ RIVER, SANTA BARBARA COUNTY

0 2 4 Miles

N

FIGURE 2

Path: i:\jn\1126\April 2023 SWRCB SGMA comment letter aprx RiverReaches



Model Geology

River Deposits

- River-Channel Deposits (Qg)
- Younger Alluvium (Qal)
- Orcutt Sand (Qo)

Aquifer Formations

- Paso Robles Formation (QTp)
- Careaga Sandstone (Tca)

Non-Water Bearing Miocene and older formations

- Foxen Formation (Tf)
- Sisquoc Formation (Tsq)
- Monterey Formation (Tm)
- Tertiary - Older than Monterey

Annotated Cross Section from Central Management Area GSP
Cross sections based on 3D geologic model Geosyntec (2020).

STETSON ENGINEERS INC.

TYPICAL NORTH-SOUTH GEOLOGIC CROSS SECTION UPSTREAM OF LOMPOC NARROWS

FIGURE 3

2 GROUNDWATER, SUBTERRANEAN STREAM, AND UNDERFLOW

This section of the report summarizes the status of subsurface water in the lower Santa Ynez River alluvium above the Lompoc Narrows using the following:

- Criteria for groundwater under SGMA, as defined by California Water Code section 10721,
- The four-part test for subterranean streams flowing in known and definite channels based on the SWRCB's 1999 *Garrapata Creek* Decision, and
- The three-part test for underflow based on the SWRCB's 1999 *Garrapata Creek* Decision which relied on the 1899 *Los Angeles v. Pomeroy* case.

2.1 GROUNDWATER (SGMA STATUTE)

For implementing SGMA, including characterizing surface and groundwater systems, it is essential to understand the specific definition of groundwater[7] the Legislature decided to use for purposes of SGMA which it enacted in 2014. For SGMA, California Water Code section 10721, subdivision (g), defines groundwater as follows:

> ""Groundwater" means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, **but does not include water that flows in known and definite channels**…".
>
> **(Water Code, § 10721, subd. (g), emphasis added)**

SGMA does not cover all potential groundwater that could be accessed from wells. Most of California's subsurface geology does not contain groundwater within an aquifer managed under SGMA. A high proportion of subsurface geology is relatively impermeable, and another high percentage of permeable material consists of streambeds or is otherwise in a known and definite channel. A further high proportion of the geology contains water that is brine or otherwise non-potable. Of the remaining potable groundwater sources, less than 20% of the 515 groundwater basins identified by DWR[8] require a SGMA GSP (DWR 2020).

Because SGMA defined "groundwater" does not include water that flows in a known and definite channel, the GSAs were necessarily required to conduct a systematic investigation of groundwater and surface water systems in their GSPs to differentiate between the two. SGMA explicitly required the GSAs to

[7] This report uses the strict SGMA definition of groundwater whenever possible. We note, however, that certain pre-SGMA documents cited in this report (including the *Garrapata Creek* Decision) sometimes use the term "groundwater" in a less specific sense to mean any water that is located under the surface of the earth including water that is subterranean streamflow.

[8] DWR's SGMA 2019 Basin Prioritization identified 515 groundwater basins in California, of which 94 were in the medium or high priority categories requiring SGMA regulation (DWR 2020).

identify the subsurface boundaries, extents, hydrogeologic properties, and flow.[9] Using "best available science,"[10] the GSAs properly investigated and determined which water within the Basin constituted groundwater (as opposed to surface water) based on direction and authorities provided by SGMA. The Hydrogeologic Conceptual Model chapter of the respective GSPs includes a summary description of the findings for each topic and supports the GSPs' characterization of the subsurface water in the alluvium as water that flows in a known and definite channel.

Flow and the presence of a known and definite underground channel following the course of the river are described at length as part of the discussion under the subterranean stream Garrapata Test (see below, Section 2.2) and underflow identification (Section 2.3). Flow is confirmed by measurements of water levels in wells constructed in the alluvium (Section 2.2.4 and **Appendix A**). The channel is identified by the extent of the alluvium (see Section 2.2.1) which clearly identifies the general course of subsurface flow (see Section 2.2.3), indicating that the channel is known and definite. Evidence shows that subsurface water conditions throughout the alluvial channel upstream of the Lompoc Narrows are correlated to surface flows in the Santa Ynez River and are characteristically different than what is observed in wells located in the groundwater aquifer system outside of the underflow channel.

2.2 SUBTERRANEAN STREAM FLOWING IN A KNOWN AND DEFINITE CHANNEL (*GARRAPATA CREEK* DECISION)

The four-part Garrapata Test referred to in the Comments is derived from the SWRCB's *Garrapata Creek* Decision, which discussed the requisite conditions to establish a "subterranean stream" for purposes of asserting SWRCB jurisdiction over post-1914 appropriative surface water diversions. As explained herein, underflow is a subset of a subterranean stream, and this report confirms that the necessary physical conditions exist to demonstrate that the Santa Ynez River alluvium above the Lompoc Narrows constitutes underflow a subterranean stream as analyzed and concluded in the three GSPs for the Basin.

[9] See 23 CCR sections 354.14(a), 354.18(a), (b), (e).

[10] Water Code Section 113 states: "It is the policy of the state that groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses. Sustainable groundwater management is best achieved locally through the development, implementation, and updating of plans and programs **based on the best available science**." [Emphasis added.]

According to the *Garrapata Creek* Decision:

> "In summary, for groundwater to be classified as a subterranean stream flowing through a known and definite channel, the following physical conditions must exist:
>
> 1. A subsurface channel must be present.
> 2. The channel must have relatively impermeable bed and banks.
> 3. The course of the channel must be known or capable of being determined by reasonable inference.
> 4. Groundwater must be flowing in the channel."
>
> **(*Garrapata Creek* Decision, p. 4)**

The California Court of Appeal has upheld the use of this four-part Garrapata Test to characterize subsurface water as a subterranean stream flowing in a known and definite channel for purposes of Water Code section 1200 (See, *North Gualala Water Co. v. State Water Resources Control Bd.* (*North Gualala*) (2006) 139 Cal.App.4th 1577). **Table 2** summarizes the four Garrapata Test parts for each Santa Ynez River reach. The following subsections discuss the four-part Garrapata Test in detail.

TABLE 2
ALLUVIUM UPSTREAM OF LOMPOC NARROWS
VS SUBTERRANEAN STREAM (GARRAPATA TEST CONDITIONS)

Management Area	Santa Ynez River Reach / Alluvium	Subterranean Stream Garrapata Test				Subterranean Stream
		Subsurface Channel	Relatively Impermeable Bed and Banks	Course of Channel Known	Groundwater Flowing	
EMA	Headwater	Y	Y	Y	Y	**Y**
EMA	Santa Ynez	Y	Y	Y	Y	**Y**
CMA	Buellton	Y	Y	Y	Y	**Y**
CMA / WMA	Santa Rita	Y	Y	Y	Y	**Y**

2.2.1 A Subsurface Channel Is Present

Geology defines the presence of a subsurface channel along the Santa Ynez River, which is a channel eroded by past flows of the Santa Ynez River into the uplifted older geological formations. The geological history, below, describes how the channel developed relative to the bed and banks. Surface mapping identifies the presence of older geological units on both sides of the alluvium. Depth and conditions beneath the current alluvium come from geophysical data over wide areas, and from direct observations of well cuttings (see the Geological Modeling, Section 3.1). Finally, observations of the response of wells in the channel to flow in the river indicate that the channel is not only a geologic feature but a hydrogeologic constraining feature.

The recent geological history of the Santa Ynez River and adjacent geological formations explain the presence of the channel and the alluvium within it. This information is included in the hydrogeologic conceptual model sections of each of the three GSPs (Section 2a.1 in the WMA GSP; Section 2a.1 in the CMA GSP, and Section 3.1.3 in the EMA GSP). Additional discussion of the geological modeling done to develop these sections of the GSPs is in Section 3.

The Santa Ynez River Valley is in a tectonically active area along the margin of the Pacific Plate. **Figure 4** is the geological unit legend from the WMA and CMA GSPs showing the age and name of the geological formations on the near surface. During the Miocene[11] and early Pliocene,[12] the Monterey, Sisquoc, and Foxen were deposited in marine environments. These marine sediments consist of non-water-bearing units of multiple compositions, including claystone, siltstone, or mudstone. After a period of erosion, during the Pliocene, water-bearing aquifer units of the Careaga Sandstone and Paso Robles Formation were deposited. Another period of tectonic uplift and erosion occurred, including tremendous compression resulting in geological folding, followed by the Pleistocene[13] deposition of the Orcutt Sand.

[11] Miocene Corresponds to 23 to 5.3 million years ago (mya)
[12] Pliocene Corresponds to 5.3 to 2.6 mya.
[13] Pleistocene Corresponds to 2.6 mya to 11 thousand years ago (kya)

This was followed by additional uplift and erosion. The Careaga Sandstone and the Paso Robles Formation, which make up the aquifer units, are described as "poorly consolidated to unconsolidated" based on reports by the USGS (Geosyntec, 2020).

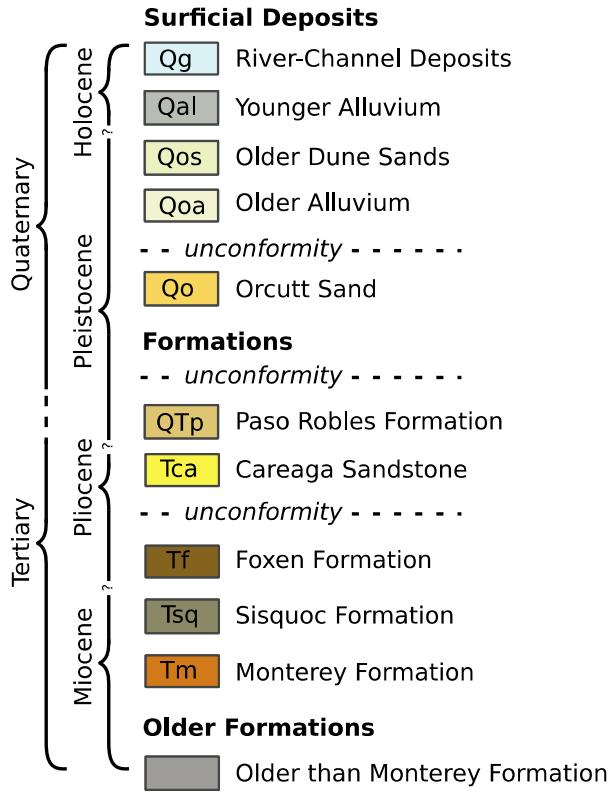


FIGURE 4
SUMMARY OF YOUNGER LOWER SANTA YNEZ RIVER GEOLOGICAL FORMATIONS AND AGES

The Pliocene and Pleistocene are notable as a period of intense glaciation and erosion across North America. Over these millions of years of uplift and erosion during the Pleistocene, the paleo-Santa Ynez River cut its paleochannel. This included cutting into the relatively resistant Monterey formation in several places, including Santa Rita Hills and through the estuary out to the Pacific Ocean. In contrast, the vast Lompoc Plain below the Lompoc Narrows is six times wider, probably due to the paleo-Santa Ynez River cutting the relatively soft Careaga Sand rather than the resistant Miocene formations. Over time, the river dynamics changed due to changes in global climate, including the ending of widespread North American glaciation, resulting in increased sedimentation and deposition of the current river alluvium within this channel. As expected of recently deposited sediments, the USGS described the alluvium as "unconsolidated" without qualifiers (Geosyntec, 2020).

The fact that this geologic channel is present and relevant as a hydrogeologic feature is confirmed through observations of water levels. Water moves through the alluvium in this channel much easier (relatively high permeability) than outside the channel. The water levels in wells within this channel rapidly respond to increases in the above-ground flows. Commonly during dry years, water is released from storage in Lake Cachuma for downstream water rights uses (pursuant to SWRCB D886 and subsequent orders including the recent order, Order 2019-0148), and over the last century there have been multiple examples of this occurring. Reclamation first observed this relationship during a 1957 test conducted after impoundment of the Santa Ynez River above Bradbury Dam (Reclamation, 1970):

> "The Santa Ynez River channel had been dry for about three months prior to the 1957 test releases. During the test period water was released from Cachuma Dam at a rate of 250 cfs… Approximately 100 wells and piezometer pipes were observed for water level data. These observations consisted of depth to groundwater readings taken a few days before the test releases started and observations at least daily from September 25 through October 4 as water progressed downstream…. The test illustrated that on the dry streambed the first flows would percolate at an extremely high rate until continuity was established. The percolation rate then gradually decreased as the groundwater basins become recharge eventually decreasing to zero."
>
> **(*Reclamation*, 1970, p. 27)** [Emphasis added.]

The relationship between the wells located in the known and defined channel within all reaches (Table 3), including the Buellton Reach, and water releases from Lake Cachuma into the Santa Ynez River was also found in the calibrated groundwater flow model of the area (see Section 3.2). In contrast, the water levels in wells located outside the underflow channel do not show this same response to water released from Lake Cachuma.

2.2.2 The Channel Has a Relatively Impermeable Bed and Banks

The relative impermeability is supported by the geology summarized above for all reaches of the alluvium (Section 2.2.1). In the Headwater, Santa Ynez, and Santa Rita reaches of the Santa Ynez River,[14] the alluvium is in a channel over entirely non-water bearing formations and are thus relatively impermeable (Upson and Thomasson, 1951). The Headwater, Santa Ynez, and Santa Rita reaches constitute the majority of the subterranean stream in the Basin, approximately 29 of the 36 river miles above the Lompoc Narrows (Table 1). In most places, this underlying formation is the Monterey Formation. Some other volcanic and shale formations are present, such as underneath the Buellton Bend area of the Santa Rita reach. Along the entire reach above the Lompoc Narrows, the geological formations along and below the Santa Ynez River alluvium are significantly older than the Holocene deposits (Figure 4), and have undergone significant tectonic compression, as indicated by syncline and anticline geologic fold structures. Geological folding occurs because of significant tectonic compression. Compared to the

[14] The Headwater and Santa Ynez reaches are in the EMA. The Santa Rita reach is primarily in the WMA and partly in the CMA (Figure 2).

alluvium age,[15] the bed and banks formations are millions of years older. With age and compression comes a degree of consolidation and significantly reduced permeability.

As noted above, the SWRCB Staff Comments are directed or focused on the relative impermeability or permeability[16] of the Buellton Reach. The Buellton Reach represents a small portion (less than twenty percent) of the length of the Santa Ynez River alluvium which forms a continuous subterranean stream from Bradbury Dam on Lake Cachuma to the Lompoc Narrows. The Comments acknowledge various SWRCB permitting decisions and memoranda that conclude the subsurface water within the alluvium in the Buellton reach is "underflow," sufficient to support the board's permitting and enforcement jurisdiction over the pumping of such underflow. The Comments do not cite contrary evidence or otherwise dispute that the subsurface flow within the alluvium is underflow. Nor do the Comments recognize that underflow is a subset of a subterranean stream flowing in a known and definite channel.

As indicated by the SWRCB Staff Comments, the Buellton Reach is where the river alluvium is partly located over the Buellton Aquifer's percolating water-bearing formations: the Careaga Sandstone and Paso Robles Formation. However, as described above, these formations have undergone significant tectonic compression resulting in a large syncline fold. This was considered by the three GSAs in developing the three GSPs and is not new data.

The relative permeability of the channel and bed and banks in the Buellton Reach has been assessed using several different methods, including pump tests, literature review, and groundwater modeling. Historical groundwater level observations also denote a distinct geologic difference between the river underflow deposits and the Buellton Aquifer in this region, corresponding to this relative difference in permeability. All methods indicate that the Careaga Sandstone and Paso Robles Formation in the Buellton Reach form a relatively impermeable bed and banks compared to the channel of alluvium.

The CMA GSP reviewed pump tests in the alluvium and in the Buellton aquifer and found the typical alluvial hydraulic conductivity in the alluvium was forty times (40x) greater than Buellton Aquifer.[17] Upson and Thomasson (1951) measurements of samples found the "underflow" had a hydraulic conductivity typically sixty times (60x) greater than Careaga Sand.[18] Finally, the calibration of the groundwater model (see Section 3.2) identified a range of hydraulic conductivity of the river alluvium from 40x to 800x greater than the Buellton Aquifer as consistent with the groundwater flow conditions. By comparison, the physical condition at issue in the *Garrapata Creek* Decision was such that it had approximately 40x greater

[15] The most recent USGS map (USGS, 2021) maps the Santa Ynez River alluvium as Holocene, at most 11,700 years old.

[16] Although the Garrapata Test asks whether the bed and banks are "relatively impermeable," the SWRCB Staff Comments argue that "relatively permeable" underlying units (e.g., the Careaga Sand) negates the possibility of satisfying the bed and banks criterion of the Garrapata Test.

[17] Mean of 400 ft/day for alluvium and 10 ft/day for Buellton Aquifer (CMA GSP, p 2a-44).

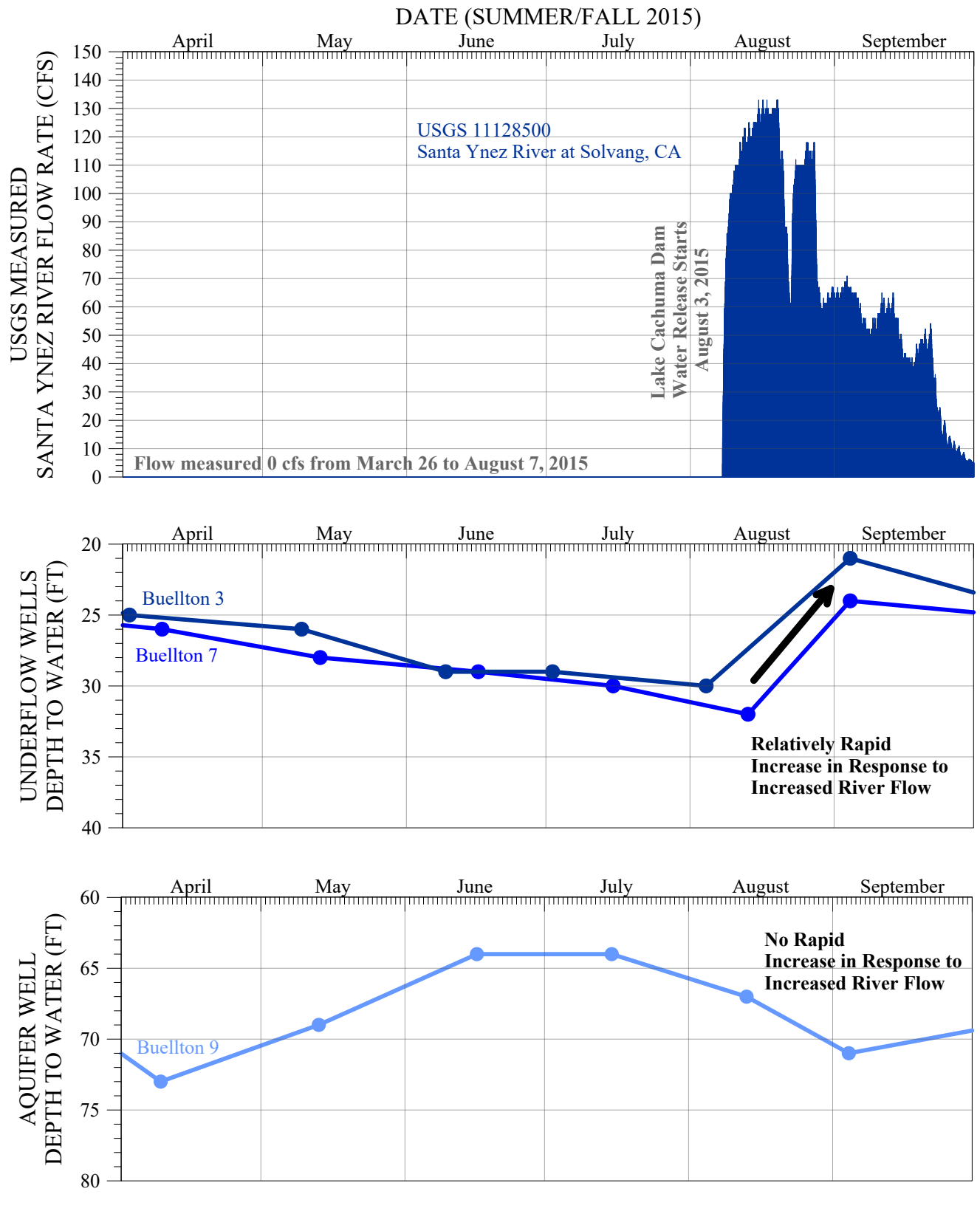
[18] Based on the typical values of 4,000 gallons per day per square foot (g.p.d. per sq. ft.) (Upson and Thomasson (1951), Figure 3, Page 75) for underflow and 70 g.p.d. per sq. ft. (Page 33 and 34) for Careaga Sand. The Careaga Sand was from samples from the Lompoc Plain.

hydraulic conductivity in the "alluvium" than bed and banks.[19] These analyses and data indicate that the Careaga Sandstone and Paso Robles Formation in the Buellton reach form a relatively impermeable bed and banks compared to the channel of alluvium.

The relative impermeability of the bed and banks is further demonstrated by comparing how the changes in river conditions affect wells screened in the underflow versus a nearby well screened in the Careaga Sandstone and Paso Robles Formation aquifer underlying the alluvium (collectively, the Buellton Aquifer). If there were a similar level of permeability, all wells would respond similarly to the same conditions. **Figure 5** compares three wells in the Buellton reach. The two underflow wells screened in the alluvium show a similar pattern of water levels responding to the surface flow that is not observed in the aquifer well. As shown in **Figure 5**, after release of water from Lake Cachuma, the two wells in the underflow in the Buellton reach show a rapid response and increase in water level, but this does not occur in the well screened in the underlying groundwater aquifer. This indicates that the bed and banks in the Buellton Reach are relatively impermeable, which is the same area questioned in the SWRCB Staff Comments.

For the above reasons, the underlying units of Careaga Sandstone and Paso Robles Formation in the Buellton Reach do not negate the relative impermeability between alluvium and bed and banks of the channel. The Buellton Reach, which includes the only geology mentioned in the SWRCB Staff Comments, is a small reach within a longer underflow channel extending from Bradbury Dam to the Lompoc Narrows (Figure 2). Non-water bearing consolidated rock constitutes the bed and banks for the larger portion of this reach, and, as explained below, the evidence is that subsurface water is constantly flowing across the entire reach of the underground channel.

[19] *Garrapata Creek* Decision includes testimony that the "alluvium" has a hydraulic conductivity of 1 to 200 feet per day (ft/day) and "weathered bedrock and fractured bedrock" has a hydraulic conductivity of 0.01 to 5 ft/day. (*Garrapata Creek* Decision, p. 15.) There is a 40x multiplier between 200 ft/day and 5 ft/day.



COMPARISON OF WATER LEVELS IN NEARBY WELLS TO CHANGES IN SANTA YNEZ RIVER FLOW UNDERFLOW SCREENED WELLS VS AQUIFER SCREENED WELL BUELLTON REACH

STETSON ENGINEERS INC.

F:\DATA\1126\1126-51 SGMA Support\2023\2023-04 SWRCB Underflow Letter\Figures\Buellton_Wells_Response\2023-07-26 CMA Buellton Area Well Response.grf 7/25/2023 M. McCammon

2.2.3 The Course of the Channel Is Known or Capable of Being Determined by Reasonable Inference

A reasonable inference of the course of the channel is the extent of the alluvium, which is a continuous and single unit from Bradbury Dam (Lake Cachuma) to the Lompoc Narrows. As described above, the alluvium is recently deposited, unconsolidated material, with much higher permeability than the surrounding formations. Upstream of the Lompoc Narrows for 28 river miles[20] on both sides of the river, the alluvium is underlain by Miocene and older non-water bearing sediments. Along most stretches of the river, this bounding unit is the Monterey Formation, which was deposited in marine conditions. The Buellton Reach area, about 7 river miles in length (**Table 1**), is partially underlain by the Careaga Sandstone and Paso Robles Formation along the north flank and by shale deposits along the south. These formations are much older and relatively impermeable compared to the overlying alluvial sediments. The cover photograph of this report is of the contact between the alluvium and the Monterey formation, which in part shows how this boundary can be recognized in the field.

In addition, as part of fulfilling the requirements of SGMA, the GSAs developed three-dimensional geological models of the area used in the GSPs (see Section 2a.1 in the WMA GSP; Section 2a.1 in the CMA GSP, and Section 3.1.3 in the EMA GSP), which in detail mapped out the three-dimensional shape of the course of this channel using the best available scientific information. The course of this channel is well known to run from Bradbury Dam to the Lompoc Narrows, and the course of the alluvium has also been recognized by the SWRCB, including in its Order 2019-0148 (**Figure 2** of this report is comparable to Figure 3 of Order 2019-0148).

2.2.4 Groundwater Is Flowing in a Channel

Subsurface flow can be determined using multiple methods. One approach is plotting groundwater elevations and groundwater contours. Water flows perpendicular to water elevation contours. The presence of multiple contours indicates that water is flowing in the channel.

Subsurface water elevation contour maps are drawn up based on observations of water levels at wells. Flow is perpendicular to the contour lines. **Table 3** lists the subsurface water elevation contour maps in GSPs and Annual Reports for water year 2021 and water year 2022 that include contours for the underflow of the Santa Ynez River. **Appendix A** is a subsurface water contour map from Reclamation for Spring 1969, which includes the EMA and shows a similar pattern. All these maps indicate a pattern of subsurface water flowing through the channel, generally parallel to the surface flow of the Santa Ynez River.

[20] Including the Headwater, Santa Ynez, and Santa Rita reaches (see Table 1).

TABLE 3
WATER ELEVATION CONTOUR MAPS
OF SANTA YNEZ RIVER UNDERFLOW
IN GSA PLANS AND ANNUAL REPORTS

Year	Season	WMA	CMA	
		Santa Rita Reach (WMA)	Santa Rita Reach (CMA)	Buellton Reach
2019	Fall	WMA GSP Figure 2b.1-2	CMA GSP Figure 2b.1-2	
2020	Spring	WMA GSP Figure 2b.1-1	CMA GSP Figure 2b.1-1	
2021	Spring	WMA Annual Report WY2021 Figure 3-2	CMA Annual Report WY2021 Figure 3-2	
	Fall	WMA Annual Report WY2021 Figure 3-3	CMA Annual Report WY2021 Figure 3-3	
2022	Spring	WMA Annual Report WY2022 Figure 3-2	CMA Annual Report WY2022 Figure 3-2	
	Fall	WMA Annual Report WY2022 Figure 3-3	CMA Annual Report WY2022 Figure 3-3	

2.3 UNDERFLOW (POMEROY TEST - *GARRAPATA CREEK* DECISION)

The term "underflow"[21] has been used deliberately in administrative and judicial rulings. Underflow is more narrowly defined than water flowing in subterranean streams. Citing *Los Angeles v. Pomeroy*, the *Garrapata Creek* Decision defines underflow as follows:

> "Underflow was defined in *Los Angeles v. Pomeroy* as having the following physical characteristics:
>
> 1. Underflow must be in connection with a surface stream;
>
> 2. Underflow must be flowing in the same general direction as the surface stream; and
>
> 3. Underflow must be flowing in a watercourse and within a space reasonably well defined. (*Pomeroy*, 124 Cal. at 624 [57 P. at 5941.)
>
> The relationship between subterranean streams and underflow is that both must flow in a watercourse. A watercourse must consist of bed, banks or sides, and water flowing in a defined channel. (M. at 626 [57 P. at 5951.) Thus, underflow is a subset of a subterranean stream flowing in known and definite channels. While a subterranean stream includes underflow, it is not necessary

[21] The words "underflow" or "subflow" are not located or discussed in either the SGMA statue or regulations. As explained in the companion transmittal letter, cases such as *Los Angeles v. Pomeroy* as well as the *Garrapata Creek* Decision have legally recognized "underflow" as a subset of subterranean flow in a known and definite channel.

> that groundwater be under-flow to establish the existence of a subterranean stream flowing through a known and definite channel."
>
> **(*Garrapata Creek* Decision, p. 7)**

Table 4 summarizes which Santa Ynez River reaches meet the *Pomeroy* Test for "underflow." All the areas along the Santa Ynez River which meet the four-part Garrapata Test as a subterranean stream also meet the Pomeroy Test to be characterized as Santa Ynez River underflow. In all these reaches of the Santa Ynez River, water beneath the surface is in connection with the above-ground surface flows of the Santa Ynez River.

TABLE 4
ALLUVIUM UPSTREAM OF LOMPOC NARROWS
VS. UNDERFLOW (POMEROY TEST)

Management Area	Santa Ynez River Reach / Alluvium	Subterranean Stream Garrapata Test	Underflow of Surface Stream (Los Angeles v. Pomeroy)			River Underflow
		Subterranean Stream	Connection with Surface stream	Flow along Stream	Flow in a Watercourse Reasonably Well Defined	
EMA	Headwater	Y	Y *	Y	Y	**Y**
EMA	Santa Ynez	Y	Y*	Y	Y	**Y**
CMA	Buellton	Y	Y*	Y	Y	**Y**
CMA / WMA	Santa Rita	Y	Y*	Y	Y	**Y**

* Seasonal presence of water; typically, during dry years surface stream flow diminishes during parts of the year.

SWRCB permitting decisions and orders examining the subsurface water within the alluvium have characterized the water as underflow of the River, which is a subset of a subterranean stream flowing in a known and definite channel (see Section 4.1).

For example, in Decision 1338 (In the Matter of Application 224233 of Solvang Municipal Improvement District to Appropriate from Santa Ynez River Underflow, […] , and Application 22516 of Buellton Community Services District to Appropriate from Santa Ynez River Underflow, in Santa Barbara County), the SWRCB characterized the subsurface flow within the Santa Ynez and Buellton reaches of the alluvium as "underflow," and based on such characterization, issued permits for wells pumping water from the alluvium in those reaches. Decision 1338 includes, for example, the following findings in this regard (emphasis added):

> "5.The Santa Ynez River in the reach between Cachuma Dam and Robinson Bridge, where it enters the Lompoc subarea, flows over recent river channel deposits and the younger alluvium that range in width from a few hundred feet to about one mile and in thickness from 40 to 185 feet. The **underflow** of the river moves slowly through these deposits [compared to surface flows]. Because of the nature of these alluvial deposits, pumping during the summer season generally lowers the

> water table throughout the valley between Cachuma Dam and the Lompoc plain. However, a winter season of average precipitation and streamflow replenishes the unwatered gravels.
>
> 6.The Solvang Municipal Improvement District (Solvang) proposes to divert water from the **underflow** of the Santa Ynez River within the Santa Ynez subarea. Two wells are presently installed. The Petan Company (Petan) proposes to store water in a reservoir to be constructed on Alisal Creek, a tributary which joins the Santa Ynez River in the same subarea. The **underflow** of the river within the subarea is almost completely enclosed in the recent river channel deposits along the river.
>
> **The Buellton Community Services District (Buellton) diverts water by means of a well which is in the underflow of the Santa Ynez River in the Buellton subarea; in this subarea the river channel deposits lie along the river course and are nearly everywhere flanked by bodies of the younger alluvium**.
>
> 12.The quality of the water contained in the gravels of the Santa Ynez River and the younger alluvium becomes progressively poorer as the **underflow** moves downstream, as indicated by an increase in total dissolved solids (tds) in the water with distance downstream from Cachuma Dam. Although salt balance studies have not been made of the underflow of the river upstream from the Lompoc Plain, the use and reuse of this water in storage to the point where it would be unusable by downstream entities. However, recharge to the **underflow** from precipitation and surface flow is of good quality, and the resulting dilution of the underflow may maintain a satisfactory water quality."
>
> **(D 1338, pp. 3-4, 12 [emphasis added].)**

The County of Santa Barbara has also characterized the alluvium upstream of the Lompoc Narrows as being in direct hydraulic communication with the river's surface flow. As a result, the County has never developed as safe yield for the underflow alluvium as it has for groundwater basins. The General Plan for the County states:

> "The riparian basin cannot be assessed for a perennial yield in the manner of the nonriparian basins in Santa Barbara County. Rather than having a fixed maximum yield determined by net natural recharge and imports (if any), the yield is a direct function of their demand. This is because an obligation exists for replenishment through releases from Lake Cachuma to satisfy prior rights, unless Lake Cachuma is spilling. Hydrologically, the riparian basin is not subject to overdraft because a long-term progressive drop in water levels cannot be accomplished because the average annual flow in the river (i.e. potential...recharge) is greater than the storage volume of the basin."
>
> **(County, 2009, Conservation Element – Groundwater Resources Section, p. 41-42)**

The summary above shows that several agencies have determined that the paleochannel of the Santa Ynez River Alluvium upstream of the Lompoc Narrows is a known and definite channel containing underflow of the Santa Ynez River.

2.4 SUMMARY

A longstanding technical and administrative record developed primarily during the public hearings and water rights decisions and orders of the SWRCB identifies the Santa Ynez River Alluvium above the Lompoc

Narrows as "underflow," a subset of a subterranean stream. As authorized by SGMA, the GSAs' GSPs thoroughly investigated and characterized the subsurface water flowing in the alluvium along the reaches of the Santa Ynez River upstream of the Lompoc Narrows (collectively, Santa Ynez River Alluvium) as being part of the surface water system and not meeting the SGMA definition of "groundwater" because this subsurface water flows in a known and definite channel. Applying the test for underflow, a legal subset of a subterranean stream, it is apparent that the subsurface water in all reaches of the alluvium meets the definition of underflow. Applying the Garrapata Test, the same alluvial reaches of the Santa Ynez River meet the standard of a "subterranean stream" flowing in a known and definite channel. While these alluvial reaches connect with a surface stream and, as a result, water flowing through the Santa Ynez River alluvium is more precisely called "underflow," the Garrapata Test conditions also exist. In either event, the result is the same: based on best available science and information, the GSPs reasonably concluded that the subsurface flow in the alluvium is not "groundwater" as the Legislature defined that term for purposes of SGMA groundwater management.

3 ADDITIONAL GSA DATA COLLECTION AND ANALYSIS SUPPORTING ALLUVIUM SUBSURFACE WATER AS UNDERFLOW AND WATER FLOWING IN A KNOWN AND DEFINITE CHANNEL

Historical studies in the 1970s and earlier provide geological data and other information that supports the GSPs' conclusion that water in Santa Ynez River Alluvium is not groundwater under the SGMA definition and meets the applicable tests for subterranean stream and underflow of a river. Examples of these historical studies include USGS Water Supply Papers 1107 (from 1951) and 1467 (from 1959).

However, as part of developing the GSPs, the GSAs gathered additional data and information and made further analyses which are higher resolution and more detailed than this historical data and information. These recent studies conducted by the GSAs and others additionally support the GSPs' conclusions regarding the existence of a known and definite channel and that the beds and banks of the channel are relatively impermeable.

3.1 GEOLOGICAL MODELING

Geological modeling identifies the three-dimensional extents of the subject geological formations. Regarding the four-part Garrapata Test, the geological model identifies subsurface channels, and the course of the subsurface channels. The geological model also identifies the geological material outside of the channel that make up the bed and banks.

The three GSAs conducted detailed, three-dimensional subsurface models of the geologic units and structures comprising the basin aquifer units and immediately adjacent non-water bearing units. The GSAs developed two model domains: one for the EMA and one for the WMA and CMA. The GSAs modeled both domains in Seequent's Leapfrog™ geological modeling program. Combined, these two domains cover the entire Basin. Geosyntec modeled the WMA and CMA, and GSI modeled the EMA. Both teams coordinated, as required by SGMA, focusing on the areas where the two model domains met.

The modeling effort included merging existing publicly available reports, data abstracted from well-completion reports, and new geophysical survey data. Ground surface elevations were defined using publicly available digital elevation models (DEM). Next, quantitative measurements for geologic units exposed at the ground surface were imported using existing literature and publicly available geologic maps. Contacts between those geologic units (surface between two different rock types) were defined as erosional or depositional, as the designation augments the model assumptions and subsurface interpolations. Once the contacts were defined, the volume between those contacts was filled according to the depositional environment, age of the geologic unit, and localized structure to form a complete

geologic model. Filling out the full three-dimensional shapes of each geological layer in some places required geological interpretation based on Leapfrog's interpolation algorithm and manual manipulation according to professional judgment by the team of geologists and geophysicists.

The source of surface geological mapping data was the mapping by Thomas Dibblee Jr. of the entire Santa Ynez Valley, published at 1:24,000 scale by the Santa Barbara Museum of Natural History. Other geological sources reviewed and included the 1992 USGS "Preliminary geologic map of Santa Maria 30' by 60' quadrangle, California" which is a regional map at 1:100,000 scale, and the 2014 USGS "Gravity, aeromagnetic and rock-property data of the central California Coast Ranges" regional geophysical survey. In August 2021, the USGS published an updated regional (1:100,000 scale) map, which the GSAs reviewed to ensure no significant differences in interpretation before the final GSPs were published.

The GSAs also conducted geophysical surveys to collect additional data about the subsurface. The EMA conducted a towed Transient Electro Magnetics (TEM) survey of the riverbed of the Santa Ynez River over August 18-19, 2020. In November 2020, the three GSAs conducted a larger regional aerial electromagnetic (AEM) survey of the entire Basin (see 3.1.3 below). The EMA received results from both studies and included them in the initial model in 2021, and the WMA and CMA used these results to update the geological model in the summer of 2022.

This effort resulted in developing a complete three-dimensional model of the entire area included in the DWR boundaries of the groundwater basin and the immediate surroundings. From this model, any number of cross-sections of the geology can be drawn, including the areas along the Santa Ynez River. **Figure 6** is an example cross-section from the EMA that shows the predominant relationship of the Santa Ynez River, younger alluvium, and the regional groundwater aquifers of the Careaga Sandstone and Paso Robles Formation in this location (described as the Santa Ynez reach in the earlier Section 1). As the example of Figure 6 shows, the younger alluvial deposits are within a well-constrained "known and definite" channel.

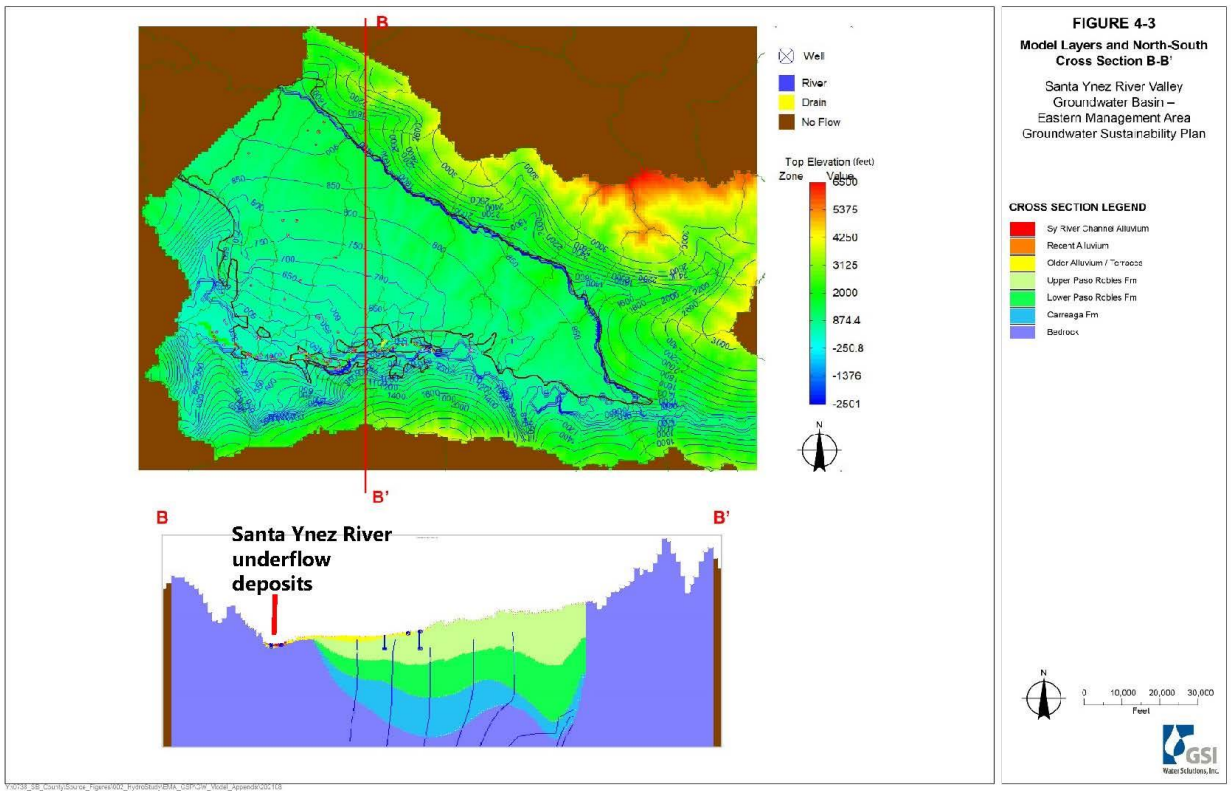


FIGURE 6
GEOLOGICAL CROSS-SECTION FROM THE EMA GEOLOGICAL MODEL
(EXCERPT, EMA GSP FIGURE 4-3)

3.1.1 Well Log and Well Completion Reports

Part of developing the three-dimensional geological model of the Basin was the compilation of well logs and well completion reports noted below. This was a sizable data collection effort bringing together multiple sources of data. The sources of well logs or well completion reports data were combined and considered in the development of the geological model, and further, in part, helped the GSAs' understanding of the geology and hydrology of the river alluvium.

- Well logs or well completion reports by the participating GSA member agencies.
- Department of Water Resources well completion reports. These were primarily for water wells.
- County of Santa Barbara well completion reports filed as part of local permitting. These were primarily for water wells. These were stored as physical hard copies. The GSAs had these well logs scanned and digitized.
- Petroleum and gas well logs are stored by Geologic Energy Management Division. This was formerly the Division of Oil, Gas, and Geothermal Resources (DOGGR).

- Additional well logs were reported in USGS publications.

The result was data for the WMA and CMA from over 2,000 unique well borehole locations, which was used to develop the geological model, with more in the EMA. As a result of this work, the GSAs considered the best available science and information about groundwater and hydrogeology concerning the Santa Ynez River, including characterization of the alluvium.

3.1.2 2021 USGS Regional Geological Map

Late in the development process of the GSPs, the USGS August 2021 (USGS, 2021) released a new regional scale (1:100,000) map that covered the Santa Maria 30' by 60' quadrangle that revised and superseded the earlier 1992 1:100,000 USGS map. The GSAs were able to review this map before publishing the GSPs in January 2022 and found that this geologic map (USGS, 2021) confirmed the hydrogeologic conceptual models in each of the GSPs.

3.1.3 SkyTEM Survey and Model Updates

The three GSAs conducted a larger regional airborne electromagnetic (AEM) survey of the entire Basin using a helicopter borne method by the SkyTEM company. This regional geophysical survey collects electromagnetic data on the ground's resistivity and a magnetic field's strength. These measured properties can be related to the three-dimensional geologic structure and hydrogeology.

The AEM method uses a helicopter towing a hexagonal transmitter loop frame. This transmits at two frequencies (210 Hz and 15 Hz) and measures the response. This combination allows for measurement resistivity to depths of up to 1,000 ft (300 m). Other sensors include measuring the distance to ground, roll, and pitch. Many parallel flight lines were used to provide coverage of the Basin, spacing between the flight lines was generally 820 ft (250 m). Between November 15 to 28, 2020, the GSAs flew approximately 766 miles of AEM lines. Most of the flights were in WMA and CMA, which was 709 miles (1,141 km), with the remaining 57 miles (91.2 km) in the EMA.[22] The flights excluded most parts of the sensitive Vandenberg Space Force Base and built-up areas, including the cities of Solvang, Buellton, and Lompoc.

The results of the AEM surveys were not available for the GSAs at the time of their GSP preparation and those results will be incorporated in the 5-year updates. However, the geophysical consultant, Ramboll, converted the AEM data to resistivity models and presented interpretations of the geophysical data as horizontal slices, depth slices, vertical sections, and borehole information (Ramboll, 2022). Based on this new AEM data (Ramboll, 2022), Geosyntec updated the geologic model elevation data for the CMA and WMA in August 2022, and Stetson updated the MODFLOW Model. This new geophysical data confirms the conclusions from the hydrological conceptual model in the GSPs.

[22] This includes 5.6 miles of repeated lines.

3.2 CALIBRATED GROUNDWATER FLOW MODELING

Groundwater modeling estimates the hydrogeologic properties of the aquifer, and the three-dimensional flow of water. In terms of the Garrapata Test, the groundwater flow model primarily provides information about the relative permeability (or impermeability) of the channel and the bed and banks, and if groundwater is flowing in the channel.

Following the requirements of SGMA and the SGMA Regulations, along with DWR guidance and best practices, the GSAs developed calibrated groundwater flow models for the Basin to inform the water budget.

Three-dimensional groundwater flow modeling tracks how water moves through the subsurface. This modeling incorporates the geological model for the layering and extents and then applies hydrogeologic properties for routing flow. Calibration of the model is a process to ensure that the model can accurately represent the hydrogeologic properties. During calibration, historical inflow data (such as precipitation and streamflow) is fed into the model, and the resulting model water levels are compared against historical water levels. A calibrated model can reproduce the observations, indicating that the model's hydrogeologic properties represent the real world. The calibrated groundwater flow model can then be used to predict the results of future scenarios in the Basin.

The GSAs' modeling used two groundwater flow model domains: a WMA and CMA model domain and an EMA model domain. Both models used versions of the USGS Modular Groundwater Flow (MODFLOW) underlying software code. Both models used the unstructured grid groundwater flow model (MODFLOW-USG). This divides the volume of the Basin into smaller volumes. For each time step, the model calculates the flow between the faces of all adjacent volumes. Each small volume has aquifer properties that describe how flow occurs. This approach conserves the total volume of water in the model. Geology and other vertical changes in hydrogeologic properties are represented using multiple layers.

Groundwater flow modeling required calibration of the permeability of both the Santa Ynez River's younger alluvial deposits and nearby aquifer formations. Water levels for wells in the presumed underflow required high permeability during the calibration process. Furthermore, water level calibration in the Santa Ynez River upstream of the Narrows was extremely sensitive to have an accurate streamflow thalweg[23] elevation. This sensitivity illustrates scientifically that the Santa Ynez River surface flow and underflow act directly in concert. Because of the high permeability of the river alluvium, there is a direct hydraulic connection between the River-channel Deposits and the Younger Alluvium and the surface flow in the Santa Ynez River upstream of the Lompoc Narrows, evidenced by responses in water levels in wells adjacent to the river during surface flows. The permeability of the river gravel deposits along the Santa

[23] Thalweg is the deepest part of a river or stream bed.

Ynez River ranges from 134 to 600 feet per day, with typical values of about 535 feet per day (Upson and Thomasson 1951).[24]

In contrast, the permeability of the clays and shales that form the bed and banks for the majority (approximately 80-90%) of the subsurface channel was calibrated with less than 0.01 feet per day based on the hydrogeologic properties of clays and shales. In the Buellton Reach, between Solvang and the Buellton Bend, the subsurface channel River-channel Deposits and the Younger Alluvium are in contact with the older formations of Careaga Sandstone and Paso Robles Formation in a limited reach, and the permeability of the bed and banks along the north flank is estimated to range from 0.1 to 10 feet per day. This permeability is 40x to 800x smaller than the permeability of the River-channel Deposits and the Younger Alluvium in the subsurface channel in this reach and thus relatively impermeable. Historical groundwater level observations also denote a distinct difference between the river underflow deposits and the Buellton (Groundwater) Aquifer in this region, corresponding to the *relative impermeability* between the sediments that are only around ten thousand years old cut in a defined channel next to the current riverbed and the deposits that are millions of years old that have been folded (i.e., compressed) in a vast regional aquifer.

3.3 SUMMARY

The three GSAs conducted substantial investigations as part of developing the GSPs and, as authorized by SGMA, concluded that the subsurface water within the Santa Ynez River Alluvium is water flowing in a known and defined channel. This investigation used the best available information and science, including reviewing and incorporating past geologic reports, compiling well logs, aquifer tests, new fieldwork, geologic, and hydrogeologic modeling tools, and consideration of most current scientific information about the pertinent hydrogeology to characterize the groundwater and surface water systems including the alluvium. While much of this information was included or summarized in the three GSPs, the SWRCB Staff Comments do not discuss or address this information. The GSPs' conclusions, including that water in the alluvium does not qualify as SGMA-defined groundwater, are also consistent with and supported by legal history including previous State Water Board permitting decisions where the board concluded that the alluvium contains river underflow, as described above and in more detail in the next section.

[24] Hydraulic conductivity is the flow out through cross sectional area with a hydraulic gradient during a period: $\frac{[\Delta\text{Volume}]\times[Height]}{[\Delta\text{Time}]\times[\text{Area}]\times[Distance]}$
If a common base unit of length is used, this becomes $(\frac{[\text{Length}]^3\times[\text{Length}]}{[\text{Time}]\times[\text{Length}]^2\times[\text{Length}]})$, simplified to $(\frac{[\text{Length}]}{[\text{Time}]})$, such as feet per day.

4 REGULATORY HISTORY AND CHARACTERIZATION OF SUBSURFACE WATER IN THE SANTA YNEZ RIVER ALLUVIUM AS UNDERFLOW OR SUBTERRANEAN STREAMFLOW

Water within the Santa Ynez River Alluvium adjacent to the Santa Ynez River historically and consistently has been determined and regulated as "underflow." The use of the term "underflow" by the agencies described in this section further illustrates the status of the alluvium as a subterranean stream in a known and definite channel as used by the SWRCB in the *Garrapata Creek* Decision[25] (see Section 2). The genesis of the underflow categorization of the Santa Ynez River is from the USGS Water Supply Paper 1107, which was utilized in SWRCB Decision 886 (described below).

4.1 STATE WATER RESOURCES CONTROL BOARD

Prior SWRCB actions have determined that the Santa Ynez River contains underflow (a type of subterranean stream), and on that basis the SWRCB asserted jurisdiction over and issued permits and licenses for pumping of River "underflow"[26]. Because the evidence of a subsurface underflow channel consisting of River-channel Deposits and the Younger Alluvium along the Santa Ynez River upstream of the Lompoc Narrows based on the USGS Water Supply Paper 1107 is so substantial, the status of the underflow has been consistently reaffirmed and utilized by the SWRCB as described below.

TABLE 5
SUMMARY OF SWRCB DOCUMENTS
ADDRESSING UNDERFLOW ALONG SANTA YNEZ RIVER

Year	Underflow	Document	Selected Quote or Description
1958	Yes	Decision 886	"The flow and underflow of the Santa Ynez River is for all practical purposes confined to the shallow channel deposits and thin elongated bodies of alluvium along the river."

[25] SWRCB (*Garrapata Creek*) Decision 1639, pg. 7: "Thus, underflow is a subset of a subterranean stream flowing in known and definite channels. While a subterranean stream includes underflow, it is not necessary that groundwater be underflow to establish the existence of a subterranean stream flowing through a known and definite channel."

[26] The SWRCB Staff Comments (April 2023) refer to only one of these previous determinations of underflow by the SWRCB (Decision 1338). In Decision 1338, the SWRCB permitted wells in the same Buellton subarea of the alluvium that the Comments suggest the Garrapata Test is not satisfied, and, in doing so, contrary to Decision 1639, suggests underflow is not a subset of a subterranean stream flowing in known and definite channels. To our knowledge, the SWRCB water rights division is still asserting permitting jurisdiction over wells in that area of the underflow (and others).

Year	Underflow	Document	Selected Quote or Description
1969	Yes	Decision 1338	"The Buellton Community Services District (Buellton) diverts water by means of a well which Is in the underflow of the Santa Ynez River in the Buellton subarea"`
1973	Yes	WRO 73-37	Defined the Santa Ynez River "Above Narrows" alluvial deposits as underflow.
1978	Yes	Decision 1486	"Bureau's permits did not entitle it to object to the proposed appropriations from the underflow of the Santa Ynez River but later appropriations from the surface flow would be junior to that the water right entitlements for the Cachuma Project." Underflow and surface flow are intended equally.
1989	Yes	WRO 89-18	Water shall be released "to supply downstream diversions of the surface flow". There are no direct diversions of surface flow downstream, only pumping of underflow (intended equality).
2003	Yes	Draft Environmental Impact Report Cover Letter	"Maximum diversion of 5 cfs for municipal and industrial purposes from Santa Ynez River underflow."
2011	Yes	Final Environmental Impact Report	Same as above. Describes pumping from wells as "Santa Ynez River Underflow" diversions (FEIR Section 3.1.2 Downstream Water Rights).
2012	Yes	Licenses for Underflow	Appropriative Licenses 13869 and 13870 issued to the Santa Ynez River Water Conservation District, Improvement District No. 1 for pumping from the 4-cfs and 6-cfs well fields for "a right to the use of the waters of Santa Ynez River Underflow."
2019	Yes	SWRCB Staff Memo dated 2/6/2019	"Division staff performed analysis of current and historical photos in the areas adjacent to the subject well and observed two saturated pools north and south of the Santa Ynez River that fluctuate with the level of the river, indicating surface and subsurface connectivity. Therefore, water flowing within the alluvium meets the criteria of a subterranean stream."

Year	Underflow	Document	Selected Quote or Description
2019	Yes	WRO 2019-0148	The environmental documentation references the Santa Ynez surface flow and its "subterranean stream." The Santa Ynez River Hydrology Model utilized in the SWRCB Hearings confirms the underflow characteristics of the alluvium representing the Above Narrows Account and its relation to a live stream status along the Santa Ynez River.

4.1.1 Underflow Defined in SWRCB Decision 886 and Later Water Rights Orders for the Cachuma Project

4.1.1.1 SWRCB Decision 886

On March 25, 1946, the Bureau of Reclamation filed Applications 11331 and 11332 for appropriative direct diversion and storage of Santa Ynez River water for the Cachuma Project. The SWRCB's Decision (D) 886 ordered the issuance of these permits on February 28, 1958.

The evidentiary record for D886 relies heavily on the 1951 United States Geological Survey (USGS) Report, "*Geology and Water Resources of the Santa Ynez River Basin, Santa Barbara County, California"*, which set a precedent for the understanding of the underflow along the Santa Ynez River. This report considers the underflow above the Lompoc Narrows the equivalent of the surface water resources. The Santa Ynez River valley between Lake Cachuma and Lompoc was described as follows (USGS, 1951):

> "The unconsolidated deposits beneath and adjacent to the river transmit a certain amount of underflow which is not measured at the successive gaging stations. Obviously, however, this underflow is an integral part of the water resources of the river valley."
>
> **(USGS, 1951 p. 71)**

D886 acknowledges the existence of an underflow of the river. For example, D886 on page 5 regarding the protestants' diversions states "that approximately 4,100 acres have been irrigated for more than five years last past which are dependent upon the surface flow and underflow of Santa Ynez River" (D886, pg. 5, underline added for emphasis).

The underflow of the Santa Ynez, Buellton, and Santa Rita subareas (Figure 3) is also described in D886 using the criteria of a subterranean stream in a known and defined channel and the additional criteria for underflow of a direct connection with the surface flow. For example, each subarea is described below in an excerpt from D886 (underlines added for emphasis):

Santa Ynez subarea:

> "The flow and underflow of the Santa Ynez River within this subarea is almost completely enclosed in the shallow aquifers by consolidated rocks."
>
> **(Decision No. D 886 p. 18)**

Buellton subarea:

> "In the subarea as a whole the chief water bearing formations are the relatively shallow river channel deposits and deposits confluent with the water of the river."
>
> **(Decision No. D 886 p. 18)**

Santa Rita subarea:

> "The river then flows westward through a deep winding broad valley enclosed laterally by impermeable consolidated rocks, with the exception of Salsipuedes Creek drainage basin on the south, to the gap known as the Narrows. Along the Santa Ynez River, groundwater occurs in the deposits in and lying along the river, and the static level is in large part determined by the river stage."
>
> **(Decision No. D 886 p. 19)**

Each of these descriptions of the subsurface water along the Santa Ynez River above the Lompoc Narrows is consistent with criteria established later by the SWRCB for subterranean streams and underflow as stated in the 1999 *Garrapata Creek* Decision (Section 2).

4.1.1.2 SWRCB Water Rights Order 73-37

An extensive evidentiary record was developed for SWRCB Water Rights Order 73-37. During these SWRCB hearings, the boundary of the underflow above the Lompoc Narrows was established for Reclamation's permit for the Cachuma Project (see Appendix A). Toups Engineers specifically submitted evidence during the SWRCB hearings leading up to Order 73-37 (Toups, 1972) on the characteristics of the underflow of the Santa Ynez River, which is summarized by Stetson (1977 and 1992) as follows:

1. The Santa Ynez River replenishes the River-channel Deposits and Younger Alluvium.

2. Older impermeable formations along the south side of the river form the underflow channel limits on that side. The older formations rise steeply to the south where more rainfall and runoff typically occurs due to the higher elevations and orographic effects.

3. Older impermeable formations along the north side of the river form underflow channel limits on that side. These formations form a bedrock lip that separates older less permeable formations (Careaga Sandstone and Paso Robles Formation) from the River-channel Deposits and Younger Alluvium adjacent to the Santa Ynez River. There are some additional permeable depositions to

the north along tributaries, however the bottom elevations of those depositions are higher than the top of the river channel basin.

4. In the Buellton Reach, there is limited hydrologic continuity between the Younger Alluvium and the older less permeable formations (Careaga and Paso Robles) which are exposed to the base of the Younger Alluvium. There are extensive clay zones in the upper portion of this area. This relative impermeability of the Careaga Sandstone and Paso Robles Formation in this area of the Buellton reach significantly restricts the hydrologic continuity of Santa Ynez River underflow to the deeper aquifer.

Again, these descriptions of the subsurface water in 1972 along the Santa Ynez River above the Lompoc Narrows are consistent with meeting criteria established later by the SWRCB for subterranean streams and underflow as stated in the 1999 *Garrapata Creek* Decision (Section 2). Accordingly, SWRCB WRO 73-37 established the Above Narrows area, which is demarcated by the underflow deposits above the Lompoc Narrows, whose storage levels are directly dependent on the surface flow of the Santa Ynez River. As explained below, the criteria for the making of downstream releases from the Cachuma Project to replenish the entire alluvium area (Above Narrows Area) (WRO 73-37, as modified by WRO 89-18 and 2019-0148) necessarily depend on the existence of a close connection between the river surface and subsurface flow and relative impermeability of the bed and banks of the underlying channel.

4.1.1.3 SWRCB Water Rights Order 89-18 and 2019-0148

Importantly, the latest water rights order for the Cachuma Project, WRO 2019-0148, distinguishes the subsurface water along the Santa Ynez River into Above Narrows (underflow) and Below Narrows (percolating) basins (Figure 2) based in part on the legal surface verses groundwater distinctions as presented by downstream protestants and understood by the SWRCB in the evidentiary hearings leading up to the decisions. The WRO 73-37, as amended by WRO 89-18 and incorporated in WRO 2019-0148, states that water shall be released "from Lake Cachuma in such amounts and at such times and rates as (a) will be sufficient, together with inflow from downstream tributary sources, to supply downstream diversions of the surface flow under vested prior rights to the extent water would have been available for such diversions from unregulated flow" (Paragraph 5, [emphasis added]). As presented by the downstream parties during the SWRCB Cachuma water rights hearings, all diversions by prior rights (riparian and appropriative) are made by wells from the underflow of the Santa Ynez River within the boundary of its alluvium. D886 and subsequent orders on the Cachuma Project also acknowledge separate overlying rights, which would be from percolating groundwater (i.e., below the Lompoc Narrows). For example, page 8 from WRO 2019-0148 states:

> "Water rights downstream of Bradbury Dam consist of appropriative and riparian rights to divert water from the Santa Ynez River and overlying and appropriative rights to divert groundwater from groundwater basins that, under natural conditions, the river would recharge.[5]
>
> Footnote 5: The Final Environmental Impact Report, prepared in connection with this order, lists known water right holders in Table 3-1a. (FEIR, Vol. II, p. 3.0-3.)"
>
> **(WRO 2019-0148 p. 8)**

Again, as related to the river area above the Lompoc Narrows, there are no direct surface flow diversions from the Santa Ynez River; only by wells pumping river underflow out of the alluvium. So, when the latest WRO 2019-0148 discusses diverting water from the Santa Ynez River, the SWRCB is necessarily referring to the underflows of the Santa Ynez River. This is clear from footnote 5 of WRO 2019-0148, which refers to Table 3-1a of the SWRCB's 2011 Final Environmental Impact Report for the Cachuma Project hearings. Table 3-1a explicitly refers to the Santa Ynez River "underflow" and distinguishes water within the alluvium from "groundwater" pumpers in the Lompoc Basin downstream of the Narrows.

The SWRCB's 2011 Final EIR for the project described in WRO 2019-0148 references the Santa Ynez surface and its "subterranean stream" in relation to the permits and licenses issued on the Santa Ynez River Alluvium (**Appendix B**). Regarding the extent of the subterranean stream, the attached excerpts from the 2011 Final EIR for the Cachuma Project indicate that the underflow throughout all Subareas of the "Santa Ynez River Alluvial Basin" [2019-0148, Figure 3 (green), p. 150] (Santa Ynez, Buellton, Santa Rita) above the Lompoc Narrows include a "subterranean stream" and, accordingly, the SWRCB has issued permits and licenses to pump the underflow within all such Subareas. The 2011 Final EIR also distinguishes such underflow of the River within the Alluvial Basin from pumpers of "Groundwater" from the Lompoc Basin and upland basins.

4.1.2 Appropriative Water Rights Permits for Underflow

Post-1914 appropriative diversions from a subterranean stream or underflow, flowing in a known and defined channel, require a water rights permit or license from the SWRCB (Water Code section 1200). Conversely, pumping percolating groundwater does not require a permit from the SWRCB. Thus, the jurisdiction and issuance of appropriative water rights permits by the SWRCB for alluvium wells indicates that subsurface water flows in a known and defined channel. The attached table (Appendix B) lists examples of where the SWRCB has issued permits or licenses for pumping alluvium underflow. This table is from the 2011 Final EIR for the Cachuma project that is the subject of the SWRCB's recent WRO 2019-0148. Further discussions on these orders, permits, and licenses related to the underflow of the Santa Ynez River are discussed below.

4.1.3 SWRCB Decision 1338

In 1966, the City of Solvang, the City of Buellton, and the Petan Company submitted applications for the right to appropriate water from the Santa Ynez River watershed. After the hearings in Decision 1338,

SWRCB approved these applications in 1969. The title of SWRCB Decision 1338 explicitly calls out underflows as listed below (underline added for emphasis), with the term underflow appearing 12 times throughout the document.

> "In the Matter of Application 22423 of Solvang Municipal Improvement District to Appropriate from Santa Ynez River Underflow, Application 22454, of Petan Company to Appropriate from Alisal Creek, and Application 22516 of Buellton Community Services District to Appropriate from Santa Ynez River Underflow, in Santa Barbara County"

Please see Section 2.3 for additional citations.

4.1.4 SWRCB Decision 1486

In 1974, the Santa Ynez River Water Conservation District, Improvement District No. 1. submitted applications for the right to appropriate underflow of the Santa Ynez River. After hearings in Decision 1486, SWRCB approved these applications in 1978. Like Decision 1338, the title of SWRCB Decision 1486 specifically calls out underflow, with the term underflow appearing 19 times throughout the document with reference to the source of water to be diverted.

4.1.5 2015 SB-88

In 2015 the legislature passed Senate Bill (SB) SB-88,[27] requiring all but minimal **surface** water diverters to report the volume of diversions to the SWRCB. There are no direct surface water diversions. Along the lower Santa Ynez River all diversions are from the subsurface via well from the river underflow. Consistent with previous SWRCB decisions and orders on the Santa Ynez River, landowners in the Santa Ynez River Alluvium have received communications from the SWRCB on filing the SB-88 required information. SWRCB staff performed training services for SB-88 during local public meetings in 2019. In January 2022 as part of the SB-155 update[28], SWRCB mailed letters out to well owners pumping Santa Ynez River underflow who had previously been identified as surface water diverters. **Appendix C** contains a redacted copy of one of SWRCB's letters sent to an alluvial well owner with instructions for SB-88 reporting.

4.1.6 2019 SWRCB Enforcement Memorandum

SWRB decisions, orders, and issuance of permits and licenses have remained consistent on the topic of Santa Ynez River underflow moving through River-channel deposits and younger alluvium upstream of the Lompoc Narrows, including in the Buellton reach. A recent SWRCB staff memorandum from February 6, 2019, prepared for enforcement purposes, treated the Santa Ynez River underflow in the Buellton Reach

[27] Senate Bill No. 88. Water. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB88 (Accessed 2023-07-03)

[28] Senate Bill No. 155. Public resources trailer bill. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB155 (Accessed 2023-07-03)

as surface water (**Appendix D**). The SWRCB memorandum applied the four-part Garrapata Test, identified that all four parts were met, and concluded, "Groundwater being pumped from the subject well adjacent to the Santa Ynez River near the town of Buellton does meet the criteria of a subterranean stream." The memorandum further concluded that, "Since the alluvium interval is screened, and the water flowing through the alluvium meets the criteria for a subterranean stream, as explained below, the water extracted from the subject well is, therefore, within the permitting authority of the State Water Board." (Appendix D, p. 3.)

4.2 UNITED STATES BUREAU OF RECLAMATION AND DOWNSTREAM WATER RIGHTS RELEASES

The SWRCB decisions about the Santa Ynez River reference that Applications 11331 and 11332 were initially filed by United States of America through the Bureau of Reclamation, Regional Office, Region 2, Sacramento on March 25, 1946. As the permittee of the Cachuma Project water rights and participant in the SWRCB hearings for Decisions and Orders 1338, 1486, and 2019-0148, Reclamation has always been aware of underflow existing in the river channel deposits and the younger alluvium in the reach between Cachuma Dam and Robinson Bridge.

On October 7, 1949, Reclamation executed a water rights contract with the Santa Ynez River Water Conservation District regarding then planned Lake Cachuma. This contract obligated Reclamation to release a "live stream" from Lake Cachuma if water was flowing into Lake Cachuma (Reclamation, 1949). As described in the contract, a "live stream" meant visible surface flow at several points downstream along the Santa Ynez River (footnotes added):

> "A live stream, as the term is used in this contract, shall be deemed to exist in the Santa Ynez River whenever there is a visible stream of water flowing on the surface of the river at San Lucas Bridge, at the Mission Bridge near Solvang,[29] at the U. S. Highway 101 Bridge near Buellton, at what is known as Santa Rosa damsite,[30] which is near the east end of what is known as Santa Rosa park, at Robinson's Bridge, near Lompoc, and there is a surface flow in the river of not less than one cubic foot of water per second at the "H" Street Bridge, which is north of Lompoc."
>
> **(Reclamation, 1949 p. 4)**

The February 28, 1958 SWRCB Decision 886 (above, Section 4.1.1.1) ordered that these live stream releases through Lake Cachuma continue. The subsequent July 5, 1973 SWRCB Order WR 73-37 (above, Section 4.1.1.2) identified that "increased percolation and conservation of inflow to the Santa Ynez River downstream from the dam" would be better served by allowing water to be retained temporarily. That would allow releases to be timed based on when it would best benefit the downstream uses of the river. A concise description of this is found in a 1999 Reclamation report, as follows:

[29] This is 0.75 mile upstream of the EMA/CMA boundary. This was a bridge, dismantled on August 23, 1953, at the location of what is now the Alisal Road bridge.

[30] This is the CMA/WMA boundary.

> "These water rights and their associated releases from Lake Cachuma are principally structured by creating two accounts, and accruing credits (storing water) for the above and below Narrows areas, in Lake Cachuma. Releases from the Above Narrows Account (ANA) are made at Bradbury Dam for the benefit of downstream water users between the dam and the Lompoc Narrows. Releases from the Below Narrows Account (BNA) are conveyed to the Narrows for the benefit of water users in the Lompoc basin. Carriage water used in delivering the BNA water from the Bradbury Dam to the Narrows is deducted from the ANA."
>
> **(Reclamation, 1999 pp. 2-79)**

Notably, Reclamation ties the release of 'live stream' surface water to monitoring wells in the Santa Ynez River alluvium. A 2010 Reclamation report, "Inventory of Wells for the Cachuma Project, Santa Barbara County, California – 2009," includes a relatively recent map (see Figure 1 in that report) of the well locations used. That report contains nodal system boundaries, which are based on the same geology shown in Figure 2 of this report.

This water rights accounting approach relies on the existence of a subterranean stream with underflow. If the water released were flowing into and beyond the beds and banks of the subterranean channel, Reclamation, by practical necessity, would need to conduct additional accounting for this 'loss.' The nodal system describes a channel, with known extents, a course of flow, and subsurface flow. Since this subterranean stream is tied to a stream course, this is underflow. Reclamation has found that this is sufficiently well-defined to use it for making practical operational decisions about water rights for decades. Credits for the Above Narrows Account are based on observations of live stream, which recognizes the direct connection between the underflow deposits and the surface flow. This has been the case for over half a century.

4.3 SUMMARY

The SWRCB has consistently determined and regulated the Santa Ynez River Alluvium adjacent to the Santa Ynez River as "underflow." SWRCB Finding #5 in Decision No 1338 provides the clearest definition by the SWRCB of the underflows as the "The Santa Ynez River in the reach between Cachuma Dam and Robinson Bridge" in the "recent river channel deposits and the younger alluvium". The recent SWRCB Order 2019-0148 recognizes that water rights downstream of Bradbury Dam consist of appropriative and riparian rights to divert water from the Santa Ynez River above the Lompoc Narrows and overlying and appropriative rights to divert groundwater below the Narrows. The SWRCB FEIR recognizes water diversions from alluvium wells as occurring from subterranean flow and underflow. Indeed, there are no direct diversions of surface flow below Lake Cachuma, only pumping of subsurface underflow.

5 DISCUSSION AND CONCLUSIONS

The substantial scientific information relied upon by the GSPs to characterize Santa Ynez River Alluvium subsurface flow as part of the surface water system, and not SGMA-defined groundwater was not addressed or considered by the SWRCB Staff Comment Letter of April 2023. This report, including reference to the 2021 Stetson Technical Memorandum appended to each of the three GSPs, clarifies and supplements the body of substantial evidence relied upon by the GSPs to characterize the Basin's groundwater and surface water systems, including the Santa Ynez River Alluvium (underflow). Scientifically, per the underflow definition under *Los Angeles v. Pomeroy* and *Garrapata Creek*, this Report confirms that the water flowing in the alluvial deposits of the Santa Ynez River above the Lompoc Narrows is in a defined channel (Figure 2), which is connected to the river (Figure 5) and flowing in the same direction as the river (Table 4, Appendix A), and thus "underflow." This Report further confirms of the subsurface water within the alluvium along the Santa Ynez River upstream of Lompoc Narrows has always been regarded as underflow by the SWRCB (Table 6).

Although we have confirmed and conclude that the subsurface flow in all reaches of the alluvium above the Lompoc Narrows is underflow based on existence of all relevant physical conditions, this report also evaluates those conditions in light of the four-part Garrapata Test for all reaches of the Santa Ynez River above the Lompoc Narrows. The physical conditions for a "subterranean stream" flowing in a known and definite channel, as set forth in the *Garrapata Creek* Decision, exist within all reaches of the alluvium above the Lompoc Narrows. This combined with the substantial record of SWRCB decisions and orders regarding underflow along the Santa Ynez River supports the GSAs' conclusion that subsurface water within the Santa Ynez River Alluvium above the Lompoc Narrows is water flowing in a known and definite channel and, therefore, not groundwater as defined by the SGMA statute.

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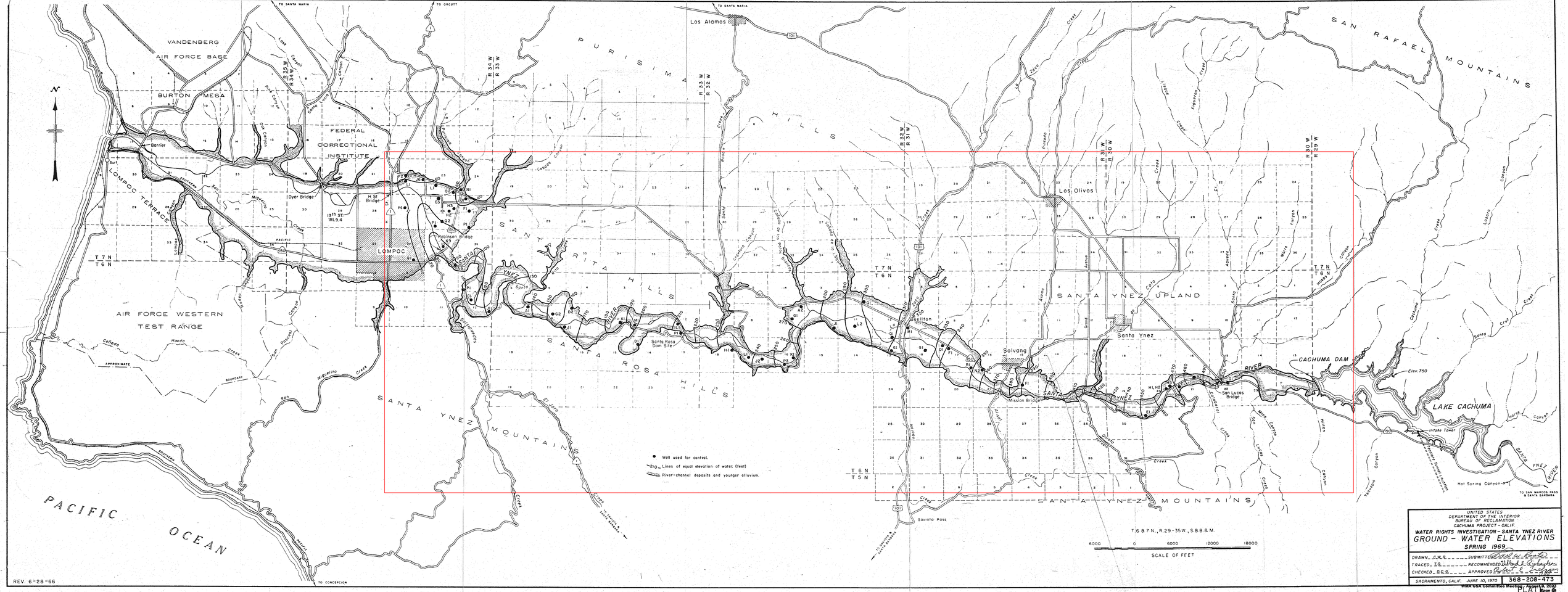
Appendix A

EXCERPT FROM RECLAMATION 1970 REPORT SHOWING 1969 GROUNDWATER FLOW CONTOURS



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CACHUMA PROJECT - CALIF.

WATER RIGHTS INVESTIGATION - SANTA YNEZ RIVER

GROUND - WATER ELEVATIONS

SPRING 1969

DRAWN C.M.R. — SUBMITTED
TRACED I.O. — RECOMMENDED
CHECKED B.C.B. — APPROVED

SACRAMENTO, CALIF. JUNE 10, 1970

368-208-473

BA-.. MAP 368-208-412

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WRA USA Committee Meeting August 9, 2023
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Appendix B

EXCERPT FROM SWRCB FINAL EIR

VOLUME II - EDITED VERSION OF 2011 2ND RDEIR

NOTE: ORIGINAL DOCUMENT INCLUDES STRIKEOUTS AND UNDERSCORES INDICATING EDITS FROM 2ND RDEIR (APRIL 2011) TO DECEMBER 2011.

Biological Opinion issued by NMFS (discussed in **subsection 2.4**, above), and the Lower Santa Ynez River Fish Management Plan (discussed in **subsection 2.5**, above). The proposed project entails potential modification of the releases required under Order WR 94-5, and potential imposition of other requirements, taking into consideration the requirements of the Biological Opinion and Fish Management Plan, and the instream flow requirements advocated by CalTrout (discussed in **subsection 3.2.2**, below).

Project Objectives

The *State CEQA Guidelines* (Sec. 15124(b)) indicate that the EIR, as part of the project description, should contain "a statement of objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project."

The objectives for the project are:

- Protecting public trust resources, including but not limited to steelhead, red-legged frog, tidewater goby, and wetlands, in the Santa Ynez River downstream of Bradbury Dam, to the extent feasible and in the public interest, taking into consideration: (1) the water supply impacts of measures designed to protect public trust resources, and (2) the extent to which any water supply impacts can be minimized through the implementation of water conservation measures;

- Protecting senior water right holders from injury due to changes in water quality resulting from operation of the Cachuma Project, including water quality effects in the Lompoc Plains groundwater basin that impair any senior water right holder's ability to beneficially use water under prior rights; and

- Protecting senior water right holders from injury due to a reduction in the quantity of water available to serve prior rights.

3.1.2 Downstream Water Rights

Downstream water rights consist of appropriative and riparian rights to divert from the Santa Ynez River surface or subterranean stream, and groundwater diversion from groundwater basins that under natural conditions would be recharged by the river.

Known water right holders are listed ~~below~~in **Table 3-1a, Existing and Claimed Water Rights and Diversions Along the Santa Ynez River**

Table 3-1a
Existing and Claimed Water Rights and Diversions along the Santa Ynez River

Location	Application ID	Permit ID	License ID	Water Right Type	Status	Holder Name	Date	Face Amount	County	Source
Bradbury Dam to Alisal Bridge (Solvang)	S015195_01	_	_	Statement of Diversion and Use	Claimed	John V. Crawford	11/19/1999	1000 acre-ft/yr	Santa Barbara	Santa Ynez River
	S020791_01	_	_	Statement of Diversion and Use	Claimed	Palmer Gavit Jackson Trust	04/19/2011	778 acre-ft/yr	Santa Barbara	Santa Ynez River
	S020793_01	_	_	Statement of Diversion and Use	Claimed	Palmer Gavit Jackson Trust	04/19/2011	778 acre-ft/yr	Santa Barbara	Santa Ynez River
	A004007	1831	1261	Appropriative	Licensed	Anne V. Crawford-Hall	2/10/1933	1,219.90 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A012601	7436	10415	Appropriative	Licensed	Santa Ynez River Water Conservation District, ID No. 1	7/21/1948	515 acre-ft/yr	Santa Barbara	Santa Ynez River
	A011331	11308	_	Appropriative	Permitted	U.S. Bureau of Reclamation	3/19/1958	347,397.80 acre-ft/yr	Santa Barbara	Santa Ynez River
	A011332	11310	_	Appropriative	Permitted	U.S. Bureau of Reclamation	3/19/1958	311,198.90 acre-ft/yr	Santa Barbara	Santa Ynez River
	A022423_02	15878	_	Appropriative	Permitted	City of Solvang	03/15/1966	3600 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A024578_01	17733	_	Appropriative	Permitted	Santa Ynez River Water Conservation District, ID No. 1	03/22/1974	2220 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A024579_01	17734	_	Appropriative	Permitted	Santa Ynez River Water Conservation District, ID No. 1	02/28/2001	3400 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	S008667			Statement of Diversion and Use	Inactive	Patricia Lee Myers	04/22/2009	0 acre-ft/yr	Santa Barbara	Santa Ynez River
Alisal Bridge to 101 Bridge (Buellton)	S020792_01	_	_	Statement of Diversion and Use	Claimed	Palmer Gavit Jackson Trust U/A 2/25/88	04/19/2011	778 acre-ft/yr	Santa Barbara	Santa Ynez River
	S020794_01	_	_	Statement of Diversion and Use	Claimed	Palmer Gavit Jackson Trust U/A 2/25/88	04/19/2011	778 acre-ft/yr	Santa Barbara	Santa Ynez River
101 Bridge to Pacific Ocean	S015121_01	_	_	Statement of Diversion and Use	Claimed	Mary Jane M. Edalatpour	11/02/1999	76 acre-ft/yr	Santa Barbara	Santa Ynez River
	S015229_01	_	_	Statement of Diversion and Use	Claimed	Alan H. Mercer	06/07/2000	50 acre-ft/yr	Santa Barbara	Santa Ynez River
	S016616_1	_	_	Statement of Diversion and Use	Claimed	Georgia S. Gammie Weister Trust	06/07/2010	1 acre-ft/yr	Santa Barbara	Santa Ynez River
	S016934_1	_	_	Statement of Diversion and Use	Claimed	Mary Jane M. Edalatpour	06/08/2010	3 acre-ft/yr	Santa Barbara	Santa Ynez River
	S016935_1	_	_	Statement of Diversion and Use	Claimed	Mary Jane M. Edalatpour	06/08/2010	118 acre-ft/yr	Santa Barbara	Santa Ynez River
	S016948_1	_	_	Statement of Diversion and Use	Claimed	Allison Gammie Hill, et. Al.	06/15/2010	1 acre-ft/yr	Santa Barbara	Santa Ynez River
	S016951_1	_	_	Statement of Diversion and Use	Claimed	John S. Hill	06/15/2010	8.6 acre-ft/yr	Santa Barbara	Santa Ynez River
	S017091_1	_	_	Statement of Diversion and Use	Claimed	Miller Merritt Trust	07/01/2010	11 acre-ft/yr	Santa Barbara	Santa Ynez River
	S017100	_	_	Statement of Diversion and Use	Claimed	Miller Merritt Trust	7/1/2010	7.5 acre-ft/yr	Santa Barbara	Santa Ynez River
	S017124_1	_	_	Statement of Diversion and Use	Claimed	Miller Merritt Trust	07/01/2010	162 acre-ft/yr	Santa Barbara	Santa Ynez River
	S017145_1	_	_	Statement of Diversion and Use	Claimed	Bruce A. Steele	07/01/2010	59 acre-ft/yr	Santa Barbara	Santa Ynez River
	S017151_1	_	_	Statement of Diversion and Use	Claimed	Bruce A. Steele	07/01/2010	0 acre-ft/yr	Santa Barbara	Santa Ynez River
	S020795_01	_	_	Statement of Diversion and Use	Claimed	Palmer Gavit Jackson Trust	04/19/2011	701 acre-ft/yr	Santa Barbara	Santa Ynez River
	A002394A	1276	001313A	Appropriative	Licensed	N Edalatpour	06/17/1921	53 acre-ft/yr	Santa Barbara	Santa Ynez River
	A002394B	1276	001313B	Appropriative	Licensed	Gene Shaw	1/23/1969	50 acre-ft/yr	Santa Barbara	Santa Ynez River
	A003927A	_	000932A	Appropriative	Licensed	Michael P. O"Brien	05/03/2002	146 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A003927B	_	000932B	Appropriative	Licensed	John M. Sundheim	05/03/2002	36 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A003927C		000932C	Appropriative	Licensed	Daniel H. Gainey Truct	05/03/2002	36 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A022423_01	15878	_	Appropriative	Permitted	City of Solvang	03/15/1966	3600 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A022516_01	15879	_	Appropriative	Permitted	City of Buellton	07/01/1966	1385 acre-ft/yr	Santa Barbara	Santa Ynez River Underflow
	A023960_01	17447	_	Appropriative	Permitted	Santa Ynez River Water Conservation District	01/06/1972	40000 acre-ft/yr	Santa Barbara	Santa Ynez River
Additional Statement not in eWRIMS										
	_	_	_	_	Claimed	Gildred Trust	_	27.12 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin
	_	_	_	_	Claimed	Petersen Family Properties,	_	10.9 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin
	_	_	_	_	Claimed	Petersen Family Properties	_	0.01 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin
	_	_	_	_	Claimed	Petersen Family Properties	_	0.80 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin
	_	_	_	_	Claimed	Petersen Family Properties	_	10.80 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin
	S0004237	_	_	_	Claimed	Pitts	_	2.12 cfs from Mar 1 to Oct 31	Santa Barbara	Santa Ynez River Alluvial Basin
	_	_	_	_	Claimed	Slavik Trust	_	14.0 acre-ft/yr	Santa Barbara	Santa Ynez River Alluvial Basin

Source: SWRCB, eWRMIS data base, October, 2011.
Note: information on this table is also provided in body of the ER text.

Appropriative Diverters – Above Narrows

The following have licenses and permits:

- **City of Solvang, Permit 15878 (Application 22423)**. Maximum diversion of 5 cfs for municipal and industrial purposes from Santa Ynez River underflow. The City has two wells located in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin. Production from 1997-1999 ranged from 879 to 1,053 afy, at a maximum diversion rate of 1.8 cfs. The permit expired in 1990 and the City filed a petition for a time extension with the SWRCB, which was denied; the City has filed a petition for reconsideration, and the SWRCB's ~~denied the extension in 2010 and the City has requested reconsideration. The's~~ action is still pending.

- **City of Buellton, Permit 15879 (Application 22516)**. Maximum diversion of 3.1 cfs for municipal and industrial purposes with an annual diversion limit of 1,385 afy. The City has three wells in the Santa Ynez River. Buellton petitioned the SWRCB to modify its place of use and add a new well to the permit. Action on the petition is being consolidated with Buellton's request for a license for its maximum annual use in 1996 of 2.7 cfs, with an annual diversion limit of 557 afy.

- **SYRWCD, ID #1, Permit 17733 (Application 24578)**. Maximum diversion of 4 cfs, from Santa Ynez River underflow, with an annual diversion limit of 2,220 af. Water diversion facilities include wells that are located in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

- **SYRWCD, ID #1, Permit 17734 (Application 24579)**. Maximum diversion of 6 cfs, from Santa Ynez River underflow, with an annual diversion limit of 3,400 af. Water diversion facilities include wells located in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

- **SYRWCD, ID #1, License 10415 (A12601)**. Maximum diversion of 1.73 cfs, from Santa Ynez River underflow, with an annual diversion limit of 515 af. Water is diverted from an infiltration gallery in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

- **Edalatour, License 1313A (Application 2394A)**. Maximum diversion of 0.52 cfs with an annual diversion limit of 53 afy. Water is diverted from the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Mercer et al (Shaw), License 1313B (Application 2394B)**. Maximum diversion of 0.30 cfs with an annual diversion limit of 50-afy limit. Water is diverted from the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **O'Brien, et al. (Sundheim, Gainey), Licenses 932A, 932B and 932C (Applications 3927A, 3927B and 2927C)**. Total diversion of 0.81 cfs, split as follows. License 932A allows diversion of 0.51 cfs with a diversion limit of 146 afy. License 932B allows diversion of 0.11 cfs with a diversion limit of 36 afy. License 932C allows diversion of 0.19 cfs with a diversion limit of 36 afy. Water is diverted from the Santa Rita East Subarea of the Santa Ynez River Alluvial Basin.

- ~~C~~**Wright and Torres, License 790 (Application 4034)**. ~~Maximum diversion of 0.62 cfs. Diversion is from Santa Rita West Subarea of the Santa Ynez River Alluvial Basin.~~

- ~~C~~rawford-Hall ~~and San Lucas Ranch~~**, License 1261 (Application 4007)**. Maximum diversion of 2.5 cfs from the Santa Ynez River. Water is diverted from the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

Appropriative Diverters – Below Narrows

The following have permits:

- **SYRWCD, Permit 17447 (Application 23960)**. Maximum diversion of 100 cfs (40,000-afy limit) from the Santa Ynez River for groundwater storage. Diversion works consisting of sand dikes in the stream course were destroyed by high runoff in 1983 and have not been replaced. SYRWCD has petitioned to change its project, and petitioned for a time extension. SWRCB action on the petitions is being held in abeyance based on SYRWCD's proposal, as CEQA lead agency, to complete environmental documentation for the petitions after the SWRCB certifies the final EIR for the Cachuma Project. Water is diverted from the Eastern Plain Subarea of the ~~Santa Ynez River Alluvial~~Lompoc Basin.

Riparian Diverters – Above Narrows

The following have provided statements of diversion and use:

- **Crawford, Statement S015195**. Claims the right to divert 1.37 cfs for irrigation and stockwatering, with a maximum annual use of 1000 af. The season of diversion is from May 1 to October 31 for irrigation and January 1 to December 31 for stockwatering. Diversion is from Santa Ynez River Subarea of the Santa Ynez River Alluvial Basin.

- **Edalatpour, Statement S015121.** Claims a right to divert 76 acre-ft/yr for domestic and irrigation use year-round from the Santa Ynez River.

- **Edalatpour, Statement S016934.** Claims a right to divert 3 acre-ft/yr for domestic use year-round. Water is diverted from a well in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Edalatpour, Statement S016935.** Claims a right to divert 118 acre-ft/yr for irrigation year-round. Water is diverted from a well in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Hill, et al, Statement S016948.** Claims a right to divert 1.0 acre-ft/yr for domestic and livestock watering purposes year-round. Water is diverted from a well 0.25 mile south of the Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Hill, Statement S016951.** Claims a right to divert 8.6 acre-ft/yr for domestic and irrigation purposes year-round. Water is diverted from a well 0.25 mile south of the Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Mercer, Statement S015229**. Claims the right to divert 0.65 cfs for domestic and irrigation purposes, with a maximum annual diversion of 50 af. The season of diversion for irrigation is May 1 to October 31. The season for domestic uses is year-round. Diversion is from Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Merrit Trust, Statement S017091.** Claims a right to divert 11 acre-ft/yr for domestic, livestock watering, and irrigation purposes year-round. Diverted from a well 0.1 mile from the Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Merrit Trust, Statement S017100.** Claims a right to divert 7.5 acre-ft/yr for domestic and livestock watering purposes year-round. The water is diverted from a well located 0.1 mile from the Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Merrit Trust, Statement S017124.** Claims a right to divert 162 acre-ft/yr to irrigation April through November. Water is diverted from a well 0.1 mile from the Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

- **Myers, Statement S008667**. Claims the right to divert 0.117 cfs for irrigation from May 1 to September 30. Diversion is from the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin. (Inactive).

- **Palmer-Gavit Jackson Trust S020791, S020792 S020793 and S020792**. Claims a right to divert 778 acre-ft/yr for domestic and irrigation use from the Santa Ynez River.

- **Pitts, Statement S004237**. Claims the right to divert 2.12 cfs from March 1 to October 31. Diversion is from Santa Rita East Subarea of the Santa Ynez River Alluvial Basin.

- **Steele, Statement S017145.** Claims a right to divert 59 acre-ft/yr for year-round irrigation. Water is diverted from a well in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Steele, Statement S017151.** Claims a right to divert 0.52 acre-ft/yr for domestic and livestock watering purposes year-round. Water is diverted from a well adjacent to the Santa Ynez River in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Weister Trust, Statement S016616.** Claims a right to divert 1 acre-ft/yr for livestock watering. The season of diversion is year-round. Water is diverted from a well located 0.25 mile south of Santa Ynez River in the Buellton Subarea of the Santa Ynez River Alluvial Basin.

The following statements have been received by the SWRCB but not yet entered into the electronic Water Rights Information Management System (e-WRIMS):

- **Gildred Trust.** Claims a right to divert 27.12 acre-ft/yr for domestic and pasture irrigation year-round. The water is diverted from a well in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

- **Palmer Gavit Jackson Trust.** Claims a right to divert 1,020 acre-ft/yr for irrigation use on riparian land. The water is diverted from five wells located in the Solvang and/or Santa Ynez Subareas of the Santa Ynez River Alluvial Basin. The Trust has filed another Statement of Diversion (April 14, 2011) for the five wells for the years 2000 through 2010.

- **Petersen Family Properties.** Claims a right to divert 10.9 acre-ft/yr for sand and gravel washing year-round. Water is diverted from a well in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Petersen Family Properties.** Claims a right to divert 0.01 acre-ft/yr for irrigation year-round. Water is diverted from a well in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Petersen Family Properties.** Claims a right to divert 0.80 acre-ft/yr for domestic use year-round. Water is diverted from a well in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Petersen Family Properties.** Claims a right to divert 10.80 acre-ft/yr for water truck fill and dust control year-round. Water is diverted from a well in the Solvang Subarea of the Santa Ynez River Alluvial Basin.

- **Slavik Trust.** Claims a right to divert 14.0 acre-ft/yr for domestic, livestock watering, and irrigation year-round. The water is diverted from a well in the Santa Ynez Subarea of the Santa Ynez River Alluvial Basin.

Riparian Diverters - Below Narrows

- No riparian diverters exist below the Narrows with Statements of Water Diversion and Use on file with the SWRCB.

Groundwater Pumpers

The following pump groundwater:

- City of Lompoc, Vandenberg Village Community Services District, Mission Hills Community Services District, and private landowners pump from the Lompoc Basin, which includes the Lompoc Uplands and Lompoc Terrace (both hydrologically connected to the river) and the Lompoc Plain, which receives direct recharge from the river.

- Groundwater also is pumped from upland basins along the Santa Ynez River that are not hydrologically connected to the river. Private landowners, small mutual water companies, SYRWCD, ID #1, City of Buellton, and the City of Solvang pump from the Santa Ynez Upland Basin, Buellton Upland Basin, and Santa Rita Upland Basin for municipal, industrial and irrigation uses within the SYRWCD. Extractions from these upland basins are not considered downstream water rights for the purposes of this EIR.

3.1.3 Public Trust Resources

As discussed in **subsection 1.4.1**, rights to use water are subject to the Public Trust Doctrine. Public trust resources for this project include the following resources that occur at Cachuma Lake and/or along the Santa Ynez River downstream of Bradbury Dam:

- Endangered southern steelhead trout occur along the lower river;

- Other native fish, amphibians, reptiles, birds, and mammals occur along the river and at the lake;

Appendix C

STATE WATER RESOURCES CONTROL BOARD. ACTION REQUIRED: REMINDER TO REPORT YOUR 2021 WATER USE INFORMATION. JANUARY 2022.

January 2022

ACTION REQUIRED:
REMINDER TO REPORT YOUR 2021 WATER USE INFORMATION

You are receiving this letter because the Division of Water Rights currently has you on record as the Primary Owner for the water right(s) included in the attachment to this notice. If you have an agent on record, the agent will receive a reminder notice as well; please coordinate your reporting efforts to avoid duplication. All water right holders are required to submit an online report of water diversion and use for their water use between January 1, 2021 through September 30, 2021 (even if no water was diverted or used during this period). See information below regarding changes to water use reporting dates and deadlines, how to report your water use, how to contact us for questions, and the latest information about drought conditions that may impact water availability in the coming year.

What are the changes to the reporting periods and deadlines in 2022?

- A new law (Senate Bill 155) modified the water use reporting periods from calendar year to water year (October 1 – September 30) and consolidated the reporting deadlines.
- **All diverters must report their water use by April 1st, regardless of the type of right or claim. If your previous reporting deadline was in July, your reporting deadline has been changed. EVERYONE must report by April 1, 2022. Additional deadline changes will occur in 2023 (see table below).**
- At this time, you must report water use for the **January 1, 2021 through September 30, 2021** period by **April 1, 2022**. Refer to the table below for the deadlines and reporting periods for the next three reporting periods.

Deadline	Reporting Period
April 1, 2022	January 1, 2021-September 30, 2021
February 1, 2023	October 1, 2021-September 30, 2022
February 1, 2024	October 1, 2022-September 30, 2023

ATTACHMENT

Report your 2021 water use information online at: https://rms.waterboards.ca.gov

Water Right ID	Password	Primary Owner
		; Ranch Domestic
		Ranch #3 Rivers
		s Ranch #2 Simons

Oct 2021 – Sept 202

[SUMMARY OF FINAL SUBMITTED VERSION]

Well #3 (River)

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR REPORTING PERIOD

October 1, 2021 to September 30, 2022

Primary Owne
Statement Numbe
Date Submitted: 01/07/2023

Water is used under	Riparian Claim
Year diversion commenced	1934

Purpose of Use	
Irrigation	

Irrigated Crops			
	Multiple Crops	**Area Irrigated (Acres)**	**Primary Irrigation Method**
Vegetables	No	70	Sprinkler

Special Use Categories	
Are you using any water diverted under this right for the cultivation of cannabis?	No

Amount of Water Diverted and Used			
Month	**Amount directly diverted (Acre-Feet)**	**Amount diverted or collected to storage (Acre-Feet)**	**Amount beneficially used (Acre-Feet)**
2021			
October	9.27	0	9.27
November	7.28	0	7.28
December	0	0	0
2022			
January	7.31	0	7.31
February	11.58	0	11.58
March	12.36	0	12.36
April	13.01	0	13.01
May	16.85	0	16.85
June	23.53	0	23.53
July	19.24	0	19.24
August	24.69	0	24.69
September	18.3	0	18.3
Total	163.42	0	163.42
Type of Diversion	Direct Diversion Only		
Comments			

Water Diversion Measurement	
Required to measure as of the date this report is submitted	Yes

Is diversion measured?	Yes
An alternative compliance plan was submitted to the division of water rights on	
A request for additional time was submitted to the division of water rights on	

Measurement ID number	
This Device/Method was used to measure water during the current reporting period	Yes
Briefly describe the measurement device or method	watermeter - insertion - paddlewheel
Nickname	
Type of device / method	Flow meter (propeller)
Device make	Seametrics
Serial number	03376
Model number	IP110
Approximate date of installation	06/01/2017
Additional info	
Approximate date the measuring device was last calibrated or the measurement method was updated	11/15/2022
Estimated accuracy of measurement	1.5%
Description of calibration method	
Describe the maintenance schedule for the device/method	Calibrated every 5 years or as needed
Information for the person who last calibrated the device or designed the measurement method	
Name	
Phone number	
Email	
Qualifications of the individual	California-licensed contractor authorized by the State License Board for C-57 well drilling or C-61 Limited Specialty/D-21 Machinery and Pumps
License number and type for the qualified individual above and/or any other relevant explanation	License #
Type of data recorder device / method	Data logger (digital)
Data recorder device make	Seametrics
Data recorder serial number	03342
Data recorder model number	FT450
Data recorder units of measurement	Acre-Feet
Frequency of data recording	
Additional data recorder info	
I am required to report my diversion or storage data by telemetry as of the date this report is submitted	No
I report my diversion or storage date by telemetry to the following website	

Measurement Attachments			
Measurement ID Number	**File Name**	**Description**	**Size**
No attachments			

Measurement Data Files			
Measurement ID Number	**File Name**	**Description**	**Size**

No data files

Maximum Rate of Diversion	
Month	**Rate of Diversion**
2021	
October	
November	
December	
2022	
January	
February	
March	
April	
May	
June	
July	
August	
September	

Water Transfers	
Water transfered	No
Quantity transfered (Acre-Feet)	
Dates which transfer occurred	/ to /
Transfer approved by	

Water Supply Contracts	
Water supply contract	No
Contract with	
Contract number	
Source from which contract water was diverted	
Point of diversion same as identified water right	
Amount (Acre-Feet) authorized to divert under this contract	
Amount (Acre-Feet) authorized to be diverted in 2022	
Amount (Acre-Feet) projected for 2023	
Exchange or settlement of prior rights	
All monthly reported diversion claimed under the prior rights	
Amount (Acre-Feet) of reported diversion solely under contract	

Credits Claimed			
	Conservation	**Reclaimed Water Use**	**Conjunctive Groundwater Use**
Claimed? (Yes/No)	No	No	No
2021			
October			
November			
December			
2022			
January			
February			

March			
April			
May			
June			
July			
August			
September			

Conservation Supporting Information	
Description of conservation methods	
Description of baseline water use and time period	
Description of conservation calculation methods	
Conserved water used?	

Additional Remarks

Attachments		
File Name	Description	Size
No Attachments		

Contact Information of the Person Submitting the Form	
First Name	
Last Name	
Relation to Water Right	Diverter of Record

Contact Information of the Person Submitting the Form	
First Name	
Last Name	
Relation to Water Right	Diverter of Record

Information on Certification and Signatory	
Name of Person Signing and Certifying the Report	
Date of Signature	01/07/2023

[SUMMARY OF FINAL SUBMITTED VERSION]

OCT 2021 – Sept 2022 Well # 1 Domestic

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR REPORTING PERIOD

October 1, 2021 to September 30, 2022

Primary Owner
Statement Number
Date Submitted: 01/07/2023

Water is used under	Riparian Claim
Year diversion commenced	1935

Purpose of Use	
Domestic	3 persons, small garden

Special Use Categories	
Are you using any water diverted under this right for the cultivation of cannabis?	No

Amount of Water Diverted and Used			
Month	**Amount directly diverted (Acre-Feet)**	**Amount diverted or collected to storage (Acre-Feet)**	**Amount beneficially used (Acre-Feet)**
2021			
October	0.108	0	0.108
November	0.108	0	0.108
December	0.108	0	0.108
2022			
January	0.108	0	0.108
February	0.108	0	0.108
March	0.108	0	0.108
April	0.108	0	0.108
May	0.108	0	0.108
June	0.108	0	0.108
July	0.108	0	0.108
August	0.108	0	0.108
September	0.108	0	0.108
Total	1.296	0	1.296
Type of Diversion	Direct Diversion Only		
Comments			

Water Diversion Measurement	
Required to measure as of the date this report is submitted	No
Is diversion measured?	No
An alternative compliance plan was submitted to the division of water rights on	
A request for additional time was submitted to the division of water rights on	

Measurement Attachments			
Measurement ID Number	File Name	Description	Size
No attachments			

Measurement Data Files			
Measurement ID Number	File Name	Description	Size
No data files			

Maximum Rate of Diversion	
Month	Rate of Diversion
2021	
October	
November	
December	
2022	
January	
February	
March	
April	
May	
June	
July	
August	
September	

Water Transfers	
Water transfered	No
Quantity transfered (Acre-Feet)	
Dates which transfer occurred	/ to /
Transfer approved by	

Water Supply Contracts	
Water supply contract	No
Contract with	
Contract number	
Source from which contract water was diverted	
Point of diversion same as identified water right	
Amount (Acre-Feet) authorized to divert under this contract	
Amount (Acre-Feet) authorized to be diverted in 2022	
Amount (Acre-Feet) projected for 2023	
Exchange or settlement of prior rights	
All monthly reported diversion claimed under the prior rights	
Amount (Acre-Feet) of reported diversion solely under contract	

Credits Claimed			
	Conservation	Reclaimed Water Use	Conjunctive Groundwater Use
Claimed? (Yes/No)	No		No
2021			

October			
November			
December			
2022			
January			
February			
March			
April			
May			
June			
July			
August			
September			

Conservation Supporting Information	
Description of conservation methods	
Description of baseline water use and time period	
Description of conservation calculation methods	
Conserved water used?	

Additional Remarks

Attachments		
File Name	**Description**	**Size**
No Attachments		

Contact Information of the Person Submitting the Form	
First Name	
Last Name	
Relation to Water Right	Diverter of Record

Contact Information of the Person Submitting the Form	
First Name	
Last Name	
Relation to Water Right	Diverter of Record

Information on Certification and Signatory	
Name of Person Signing and Certifying the Report	
Date of Signature	

Appendix D

GARRAPATA TEST FOR SUBTERRANEAN STREAMS ABOUT A BUELLTON WELL. ZACHARY MAYO, PG, ENGINEERING GEOLOGIST, STATE WATER RESOURCES CONTROL BOARD. FEBRUARY 6, 2019. SUBTERRANEAN STREAM DETERMINATION, BUELLTON, SANTA YNEZ RIVER, SANTA BARBARA COUNTY.

State Water Resources Control Board

TO: James Bishop
Engineering Geologist
Cannabis Cultivation Regulatory Program
Central Coast Water Board
James.Bishop@waterboards.ca.gov

FROM: Zach Mayo, Engineering Geologist
Sacramento Valley Enforcement Unit
Division of Water Rights

DATE: FEB 0 6 2019

SUBJECT: SUBJECT: SUBTERRANEAN STREAM DETERMINATION, BUELLTON, SANTA YNEZ RIVER, SANTA BARBARA COUNTY

This memorandum concerns one groundwater well near the Santa Ynez River in Santa Barbara County. The well is screened at a single gravel and sand interval and is drawing water from underflow of the Santa Ynez River from course grained alluvium. The well is located southeast of the town of Buellton and is drilled into alluvium underlain by Espada Formation, Sisquoc Shale, and Monterey Shale (Upson and Thomasson, 1951; Dibblee, 1966; and Dibblee, 1988). Division staff has been tasked with performing research and interpreting local geology to make a subterranean stream determination for the well. Groundwater is presumed to be percolating groundwater unless it can be shown that the water from a subterranean stream, which is within the permitting authority of the State Water Board.

GARRAPATA 4-PART TEST FOR SUBTERRANEAN STREAMS

For groundwater to be classified as a subterranean stream flowing through a known and definite channel, the following physical conditions must exist:

1. A subsurface channel must be present;
2. The channel must have relatively impermeable bed and banks;
3. The course of the channel must be known or capable of being determined by reasonable inference; and
4. Groundwater must be flowing in the channel.

INTRODUCTION

Division staff has been asked by the Central Coast Regional Water Board Cannabis Cultivation Regulatory Program to perform a subterranean stream analysis on a single well that is located

between the towns of Buellton and Solvang along the south bank of the Santa Ynez River. The subject well is producing water that is being diverted to storage to be eventually used for cannabis cultivation. There are three 5,000-gallon storage tanks that the water is being diverted to. Division staff has performed this analysis in order to determine if the subject well is drawing water from a subterranean stream, to determine if the well owner is complying with the Cannabis Cultivation Policy, and if they are required to obtain a Cannabis Small Irrigation Use Registration (SIUR) water right.

GEOLOGY

The Buellton area lies adjacent to the Santa Ynez River on Quaternary alluvium that is underlain by Vaqueros Sandstone, Sespe Formation, and Espada Formation to the south and Paso Robles Formation, Careaga Sandstone, and Sisquoc and Monterey Shale to the north (Figure 1; Upson and Thomasson, 1951; Dibblee 1966; Dibblee, 1988). Vaqueros Sandstone is early Miocene aged sandstone and pebble conglomerate and the Sespe Formation is predominantly Oligocene aged sandstone with siltstone, claystone, and conglomerate (Figures 1 and 2; Dibblee, 1988). The Espada Formation is a late Jurassic to early and middle Cretaceous aged series of well-bedded argillaceous to sandy shales with thin interbeds of hard arkosic sandstone (Figures 1 and 2; Dibblee, 1988). The Espada Formation has no defined sequence of beds with shale making up approximately 90 percent of the formation, sandstone about 10 percent, and limestone and conglomerate a small fraction of 1 percent (Dibblee, 1966). The Quaternary alluvium is comprised of stream-channel sands and gravels (Figures 1 and 2; Dibblee, 1988). To the north, the Santa Ynez River is bound by the topographic high of foothills and structural anticlines which are locally comprised of Quaternary alluvium and alluvial terrace deposits underlain by Paso Robles Formation, Careaga Sandstone, Sisquoc Shale, and Monterey Shale (Figures 1 and 2; Dibblee, 1988). The Paso Robles Formation is a nonmarine weakly consolidated conglomerate of sand and clay and the conglomerate is composed largely of Monterey Shale detritus. The Careaga Sandstone is a shallow marine regressive unit composed of locally pebbly sandstone. The Sisquoc Shale is a marine diatomaceous shale unit that is late Miocene in age and the Monterey Shale is a siliceous and cherty shale that is early to late Miocene in age (Figures 1 and 2; Dibblee, 1988). To the south, the Santa Ynez River is bound by a structural anticline that plunges to the west and exposes the Espada Formation near the well location (Figures 1 and 2; Dibblee, 1988).

GROUNDWATER WELL

Division staff evaluated a single 12-inch groundwater well (the Hart B well) southeast of the town of Buellton that was completed in 2005 (Figure 1). This well is reported to be drilled to approximately 52-feet below ground surface (bgs) with a cement seal to 23-feet bgs. The well location is approximately 400-feet south to southwest of the Santa Ynez River. The well completion report for this well reported a production volume of 50 gallons per minute (gpm) during a pump test, no time duration of the test or drawdown was reported on the well completion report.

The subsurface geological log of the Hart B well completion report shows alluvium to a depth of approximately 42-feet bgs, clay from approximately 42 to 50-feet bgs, and shale bedrock from 50 to 52-feet bgs. The well is screened using 6-inch PVC casing at a single interval from 28 to 49-feet bgs. The alluvium interval is logged as large gravel and sand from 0 to 42-feet bgs on the well completion report.

SUBTERRANEAN STREAM ANALYSIS

Groundwater being pumped from the subject well adjacent to the Santa Ynez River near the town of Buellton does meet the criteria of a subterranean stream. The well is screened from approximately 0 to 42-feet bgs and is drawing water from a subsurface channel in alluvium that is bounded by relatively impermeable shale rock formations to the north and south. Since the alluvium interval is screened, and the water flowing through the alluvium meets the criteria for a subterranean stream, as explained below, the water extracted from the subject groundwater well is, therefore, within the permitting authority of the State Water Board.

GARRAPATA 4-PART TEST

Subsurface Channel

The subsurface channel is bounded by hills of shale bedrock to the north and south of the Santa Ynez River valley. Relatively impermeable shale bedrock is mapped in the foothills north and south of the Santa Ynez River with the bedding mapped with opposing dips (anticlines) indicating the formations intersect at some depth below the Santa Ynez River forming a valley filled with Quaternary Alluvium.

Impermeable Bed and Banks

The Santa Ynez River is bound to the north by Sisquoc and Monterey Shale and is bounded to the south by Espada Formation (Dibblee, 1988). These older and deeper shale formations are exposed to the north and south of the Santa Ynez River and form also the relatively impermeable bed and banks of the subterranean stream. The quaternary alluvium mapped within the river valley is described as coarse-grained river and stream bed deposits (Figure 2) indicating high porosity material that is significantly more permeable than the shale bedrock.

Alluvium

The well log provided to the Division shows that the depth of the water bearing alluvium is approximately 42-feet below ground surface (bgs). Clay is logged below the water bearing alluvium from approximately 42 to 50-feet bgs; however, clay rich soils are typically not productive water bearing units. The depth to static water level is logged at 24-feet bgs and the well is constructed with a screened interval from approximately 28 to 49-feet bgs. The water in the alluvium of the valley of the Santa Ynez River is part of a subterranean stream flowing through a known and definite channel.

Flowing Water

Well data within the area between Solvang and Buellton indicates varying water levels between approximately 20-feet bgs to approximately 45-feet bgs and depth to shale varying between approximately 40-feet bgs to 60-feet bgs. Topography indicates that the Santa Ynez River flows from east to west and has a mean annual discharge of between 11.0 and 25.8 cubic feet per second (cfs) over the last three years; according to the United States Geological Survey (USGS) National Water Information System. The water flow measurements were taken from a USGS stream gauge approximately 1.8 miles upstream near the town of Solvang. Water flow levels are maintained by releases made from Lake Cachuma (Santa Barbary County 2011 Groundwater Report). The alluvium within the river valley is bound at depth by the relatively

impermeable shale units and the river gradient indicates flow from the well location to the mouth of the river at the Pacific Ocean (Dibblee, 1988). Division staff performed analysis of current and historical photos in the areas adjacent to the subject well and observed two saturated pools north and south of the Santa Ynez River that fluctuate with the level of the river, indicating surface and subsurface connectivity. Therefore, water flowing within the alluvium meets the criteria of a subterranean stream.

Figure 1: Geologic Map

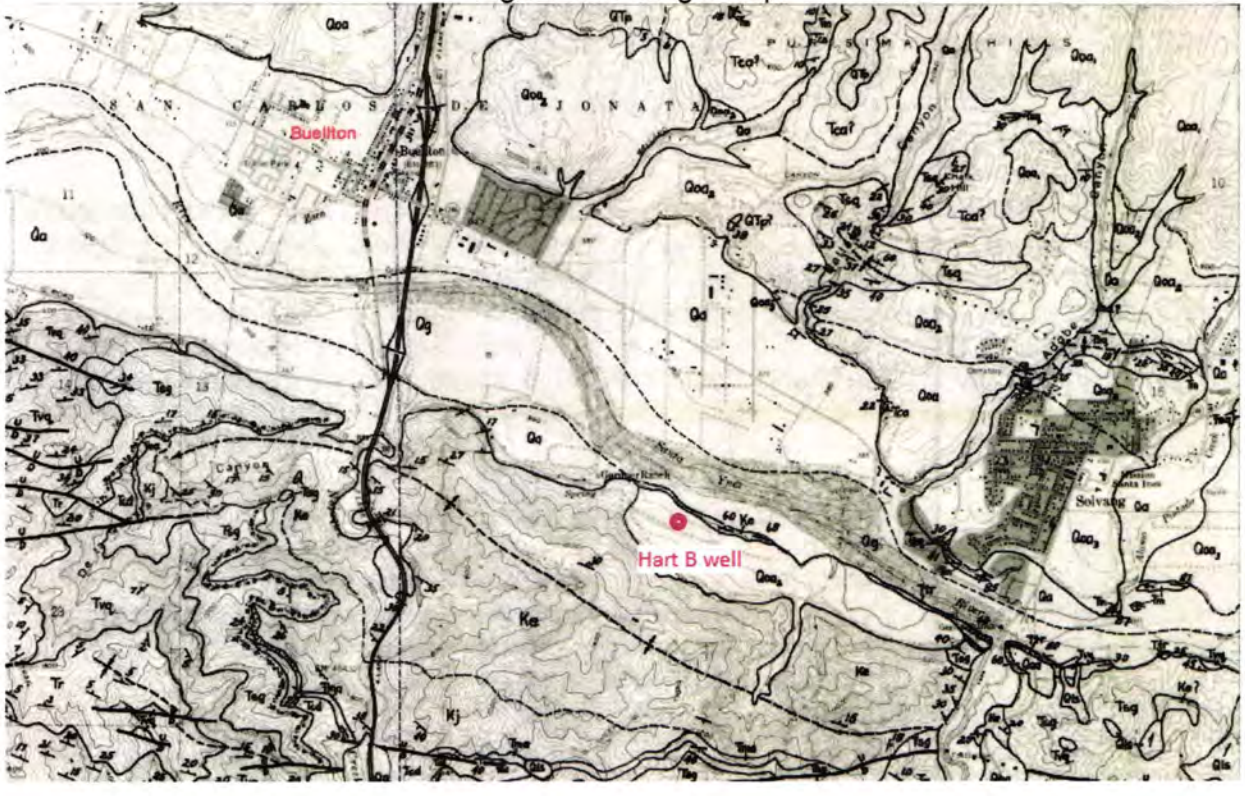
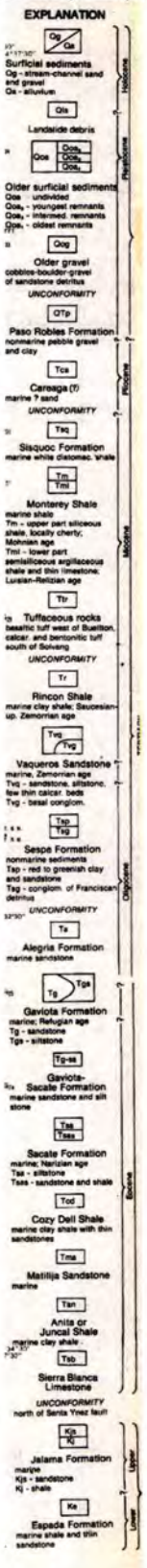


Figure 2: Map Explanation



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