Public Review Draft GSP—
Public Comment Letters

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Matt Whitman SPV GSP Public Draft Comments, Received 7/26/2021

Comment
Page ES-5-It seems to me that the well inventory is misplaced, it should be in Tier 0, and in fact is mostly done. The well inventory in necessary to study and make the decisions on the other Tier 1 actions. To not have this in Tier 0 will cause delays in carrying out Tier 1 actions. This will then cause delays in Tier 2 actions. It is imperative in the case of an undesirable result that management actions that can affect change happen in a timely manner. The well inventory in itself will not affect change in water use, only an understanding of what should be the next step in the process, hence Tier 0.
Page ES-6-Add the word plan in the Tier 2 box-"implement pumping restriction and enforcement plan"
Page 2-15 paragraph 2.1.3-What is the relevance of the "historical San Ysabel creek riparian rights". Does there need to any study to see if the court decision is still relevant to the SGMA plan? Just the statement and figure 2-2 are meaningless without some additional study or explanation why it does not affect SGMA. Some of the area is in the county and some is in the city, does this make a difference.
Paragraph 3.6.3. The interaction between the bedrock and Quaternary deposits and residuum. If we don't know about this interaction then it needs to be studied. There are monitoring wells that were installed specifically to study this interaction. This needs to be done. This is another recommendation for Tier 0 actions. The city has installed the wells, the study of the interaction should begin.
Paragraph 3.8 –same as above . Groundwater Interaction between the crystalline rock and the alluvium needs to be studied as part of Tier 0 actions.
Paragraph 7.6.8-Replacement of the existing City monitoring wells should be a priority. Many of these wells are old and the casings compromised and do not reach the bottom of the alluvium. The data that is currently being used is suspect. New monitoring wells need to be found or drilled. This should be a Tier 0 action as well.
Section 9 projects and management actions.-As I stated many times during the AC meetings, I believe that the groundwater users will have to be enacting their own water reductions prior to Tier 2 actions. Somehow when examining how to reduce pumping in Tier 2, management actions by the water users prior to the mandatory pumping restrictions need to be considered. These type of short or long term water reductions that could be done would be fallowing ground, orchard or vineyard removal to change varieties, or a change in crops. If a water user takes these actions preemptively, the reduced water use should not be used as their baseline when calculating the restrictions planned for Tier 2 actions.
Section 9 planning projects should also include as mentioned above, finishing the well inventory as part of Tier 0. Also under Tier 0 should be beginning the study of the alluvium, residuum, and crystalline deposits using the city installed monitoring wells that are already present in the valley.

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August 10, 2021

San Pasqual Valley Groundwater Sustainability Agency
1600 Pacific Highway
San Diego, CA 92101

Submitted via email: KDanek@sandiego.gov

Re: Public Comment Letter for the San Pasqual Valley Groundwater Basin Draft GSP

Dear Karina Danek,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the San Pasqual Valley Groundwater Basin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.
3. Data gaps **are not sufficiently** identified and the GSP **does not have a plan** to eliminate them.

4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the San Pasqual Valley Groundwater Basin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"

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

Best Regards,

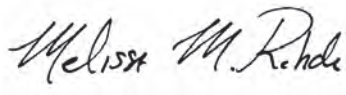
Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

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

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy



Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the San Pasqual Valley Groundwater Basin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes, groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **insufficient**. The DWR DAC mapping tool indicates that there are no DACs in the basin, however this is not stated in the GSP. We commend the GSA for including a map of the density of domestic wells in the basin (Figure 2-8). The GSP should be further improved by including a map of individual domestic well locations and by indicating the population dependent on groundwater for their source of drinking water.

RECOMMENDATIONS

- State definitively that there are no DACs in the basin, instead of being silent on the subject. Indicate what source was used to make the determination (e.g., the DWR DAC mapping tool).
- Include a map of individual domestic well locations and a table of well data showing screen depths. Indicate the population dependent on groundwater for their source of drinking water.
- Describe the occurrence of tribal lands in the basin. The GSP states that there are no tribal lands in the basin, but includes a tribe member from the San Pasqual Tribe on the Advisory Committee. If the San Pasqual Tribe has interests in the basin, describe them in detail.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**. The GSP uses a numerical model to analyze surface water and groundwater interactions. A short description of the ISW analysis is provided in the GSP, but very little detail or background on the approach is given. For example, the location and spatial resolution of groundwater elevation data (e.g., how close the wells are to the streams) behind the numerical model is not provided. Additionally, the temporal resolution of groundwater elevation data (e.g., number of years and seasonality) that parameterizes the numerical model is also unclear.

The GSP states that reaches identified as disconnected are in portions of the basin where depth to groundwater has been greater than 30 feet since 2015. The GSP does not, however, provide justification for the 30 feet criteria provided in the text.

RECOMMENDATIONS

- Overlay the figure of stream surface water depletion (Figure 4-33) with depth-to-groundwater contour maps to illustrate the groundwater depths and groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis. Use depth to groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth and capture the variability in environmental conditions inherent in California's climate.
- For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.
- Describe data gaps for the ISW analysis. Discuss and reconcile these data gaps with specific measures (shallow monitoring wells, stream gauges, and nested/clustered wells) along surface water features in the Monitoring Network section of the GSP.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **incomplete**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). We commend the GSA for including a comprehensive list of the state and federally threatened and endangered species in the basin (Table 1 of Appendix J). However, we found that some mapped features in the NC dataset were improperly disregarded, as described below.

- GDEs were incorrectly removed based on groundwater levels that were greater than 30-ft in 2015, a single point in time. This is a technically incorrect approach since groundwater levels fluctuate over seasonal and interannual time scales due to California's Mediterranean climate and intensifying flood and drought events due to climate change. Justifying the removal of NC dataset polygons solely based on this criterion does not acknowledge that groundwater levels temporally vary and the fact that many plant species within GDEs can access groundwater depths beyond 30-feet or have adapted water stress strategies to deal with intermittent periods of deep groundwater levels. Using this methodology disregards groundwater fluctuations and may result in the omission of ecosystems that are groundwater dependent.
- GDEs were disregarded based on the presence or proximity of surface water. However, partial reliance on surface water does not necessarily prove that the plants and animals do not access groundwater. Many GDEs often simultaneously rely on multiple sources of water (i.e., both groundwater and surface water), or shift their reliance on different sources on an interannual or inter-seasonal basis. Additionally, adverse impacts can occur to GDEs due to pumping that further separates groundwater from surface water.

- The GDE identification process utilized aerial imagery in an incorrect manner. The GSP relied on aerial imagery to detect surface water, and then made the assumption that only GDEs present in inundated or saturated areas were connected to groundwater. This approach is incorrect for two reasons: 1) not all surface water is connected to groundwater, and 2) visually inspecting aerial imagery cannot detect groundwater occurring near the ground surface. GDEs can rely on groundwater for some or all its water requirements, whether or not surface water is present. In California, GDE reliance on groundwater often vary by season, and depend on the availability of alternative water sources (e.g., precipitation, river water, reservoir water, soil moisture in the vadose zone, groundwater, applied water, treated wastewater effluent, urban stormwater, irrigated return flow).

RECOMMENDATIONS

- Provide depth-to-groundwater contour maps, noting the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape.

- Use depth to groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer.

- If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network. While the GSP acknowledges that some locations that may be GDEs are not confirmed as GDEs (and their status is uncertain), they are mapped as non-GDEs. These should be mapped as potential GDEs.

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required[1,2] to be included into the water budget. The integration of these ecosystems into the water budget is **insufficient**. The water budget did not include the current, historical, and projected demands of native vegetation and managed wetlands. The omission of explicit water demands for native vegetation and managed wetlands is problematic because key environmental uses of groundwater are not being accounted for as water supply decisions are made using this budget, nor will they likely be considered in project and management actions.

[1] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[2] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

RECOMMENDATION

- Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including native vegetation and managed wetlands.

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **incomplete**. SGMA's requirement for public notice and engagement of stakeholders[3] is not fully met by the description in the Notice and Communication section of the GSP (Section 1.4). We note the following deficiencies with the overall stakeholder engagement process.

- The opportunities for public involvement and engagement are described in very general terms. They include attendance at public meetings, stakeholder email list, and updates to the San Pasqual Valley GSP website.

- Very little information was provided on the level of engagement of the Advisory Committee and the Technical Peer Review Group. While the members of the Advisory Committee are provided in Table 1-2, the members of the Technical Peer Review Group are not listed.

RECOMMENDATIONS

- Include a robust Stakeholder Communication and Engagement Plan.

- Conduct active and targeted outreach to engage domestic well owners, environmental stakeholders, and tribal stakeholders during the remainder of the GSP development process and throughout the GSP implementation phase. Refer to Attachment B for specific recommendations on how to actively engage stakeholders.

- Describe the occurrence of tribal lands in the basin. Explain the inclusion of a tribe member from the San Pasqual Tribe on the Advisory Committee. The GSP states that there are no tribal lands in the basin, but includes a tribe member from the San Pasqual Tribe on the Advisory Committee. If the San Pasqual Tribe has interests in the basin, describe them in detail.

[3] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results[4] and establishing minimum thresholds[5,6]

Disadvantaged Communities and Drinking Water Users

There are no DACs in the basin, according to the DWR DAC mapping tool. The GSP has taken initial steps to define SMC for domestic wells owners. The GSP analyzes direct or indirect impacts on domestic wells when defining undesirable results for chronic lowering of groundwater levels and degraded water quality by describing impacts to potable supply of drinking water for domestic well users. However, the SMC developed for domestic well owners can be improved with the following recommendations.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Further describe the impact of passing the minimum threshold for domestic well owners. For example, provide the number of domestic wells that would be de-watered at the minimum threshold.

Degraded Water Quality

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for TDS and nitrate on domestic water users.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

Minimum thresholds for chronic lowering of groundwater levels are set to historical low groundwater elevations in proximity to potential GDEs, and are allowed to fall to 50% of the historical range below historical minimums where potential GDEs are not present. Based on the GSP's assessment that historic levels have been sustainable, the GSP states that using these levels as a minimum threshold should not pose a harmful impact to GDEs.

However, the true impacts to ecosystems under this scenario are not discussed. If minimum thresholds are set to historic low groundwater levels and the basin is allowed to operate just above or close to those levels over many years, there is a risk of causing catastrophic damage to ecosystems that are more adverse than what was occurring in 2015, at the height of the 2012-2016 drought. This is because California ecosystems, which are adapted to our Mediterranean climate, have some drought strategies that they can utilize to deal with short-term water stress. However, if the drought conditions are prolonged, the ecosystem can collapse.

[4] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]
[5] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]
[6] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

While ecosystems may have been only water stressed in 2015, they can be inadvertently destroyed if groundwater conditions are maintained just above those 2015 levels in the long-term, since the basin would be permitted to sustain extreme dry conditions over multiple seasons and years.

RECOMMENDATIONS

- When defining undesirable results for chronic lowering of groundwater levels, water quality, and depletions of interconnected surface waters, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results[7] in the basin. Defining undesirable results is the crucial first step before the minimum thresholds[8] can be determined.

- For the interconnected surface water SMC, the undesirable results should include a description of potential impacts on instream habitats within ISWs when defining minimum thresholds in the basin[9]. The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts to environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law[6,10].

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations[11] require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.

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[7] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[8] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[9] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[10] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

[11] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

The integration of climate change into the projected water budget is **insufficient**. The GSP does incorporate climate change into the projected water budget using a climate transient analysis. However, the GSP did not consider multiple climate scenarios (e.g., the 2070 wet and 2070 extremely dry climate scenarios) in the projected water budget. The GSP should clearly and transparently incorporate the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for their basins. While these extreme scenarios may have a lower likelihood of occurring, their consequences could be significant, therefore they should be included in groundwater planning.

The GSP included climate change into key inputs (precipitation, evapotranspiration, and surface water flow) of the projected water budget. However, the GSP does not calculate a sustainable yield based on the projected water budget with climate change incorporated, and in fact does not present a sustainable yield for any time period. If the water budgets are incomplete, including the omission of extremely wet and dry scenarios, and sustainable yield is not calculated, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems and domestic well owners.

RECOMMENDATIONS

- Integrate climate change, including extreme wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Calculate sustainable yield based on the projected water budget with climate change incorporated.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**. Our comments above note data gaps in the monitoring networks for GDEs and ISWs. The lack of monitoring wells and/or the lack of plans for future monitoring threatens GDEs, aquatic habitats, and surface water users. Appropriate monitoring is necessary so that groundwater conditions within GDEs and ISWs are characterized and surface-shallow groundwater interactions are fully integrated into the GSP. GDEs and ISWs will remain unprotected by the GSP without adequate monitoring and identification of data gaps. The Plan therefore fails to meet SGMA's requirements for the monitoring network[12].

[12] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

RECOMMENDATIONS

- Provide maps that overlay monitoring well locations with the locations of domestic wells to clearly identify potentially impacted areas.
- Include plans to reconcile data gaps for GDEs and ISWs in the GSP now, instead of leaving this for a future project to be implemented when a groundwater level trigger is reached. Evaluate how the gathered data will be used to identify and map GDEs and ISWs.
- Determine what ecological monitoring can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**.

The GSP states that because the basin is sustainable, project and management actions will only be implemented as necessary in the future. However, groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for all beneficial users. Environmental beneficial users such as GDEs, aquatic habitats, and surface water users were not sufficiently identified in the GSP. Therefore, potential project and management actions to be implemented sometime in the future may not protect these beneficial users.

The GSP presents tiers for the projects and management actions in Figure 9-2. Tier 0 projects and management actions are to be implemented by the GSA during GSP implementation. Future tiers are triggered by increasingly severe minimum threshold exceedances. The GDE study is proposed as a Tier 1 Project and Management Action. Because of the data gaps noted for GDEs above, this study should be included in the GSP now, not set aside for future implementation.

RECOMMENDATIONS

- For GDEs and ISWs, recharge ponds, reservoirs and facilities for managed stormwater recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document"[13].

[13] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

- For domestic well owners, include discussion of a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.

- For domestic well owners, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSA plans to mitigate such impacts.

- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

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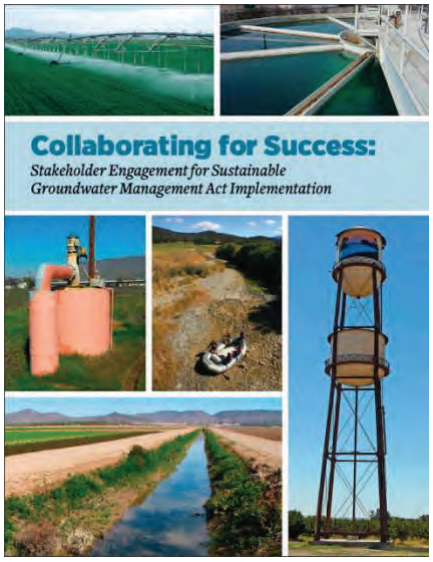
Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

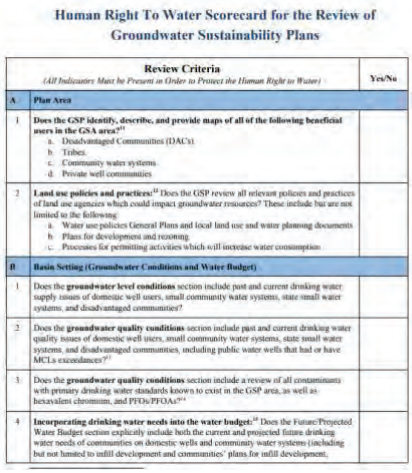
Stakeholder Engagement and Outreach



Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.
- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.
- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

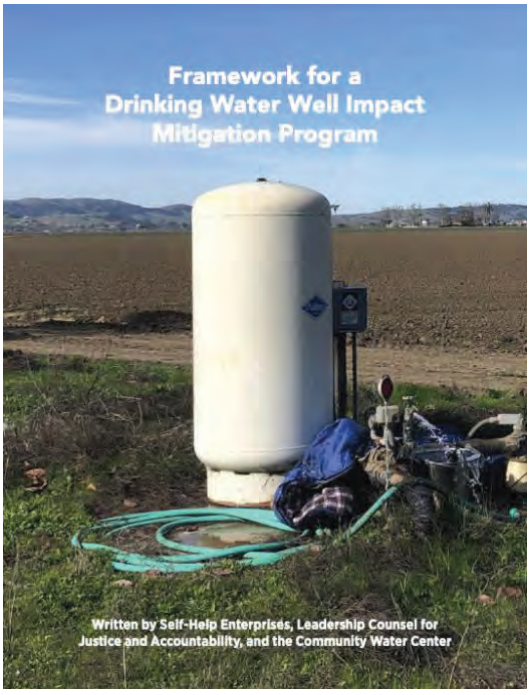


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area?**[61] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems. d. Private well communities	
2	**Land use policies and practices:**[62] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning. c. Processes for permitting activities which will increase water consumption	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[63]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[64]	
4	**Incorporating drinking water needs into the water budget:**[65] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

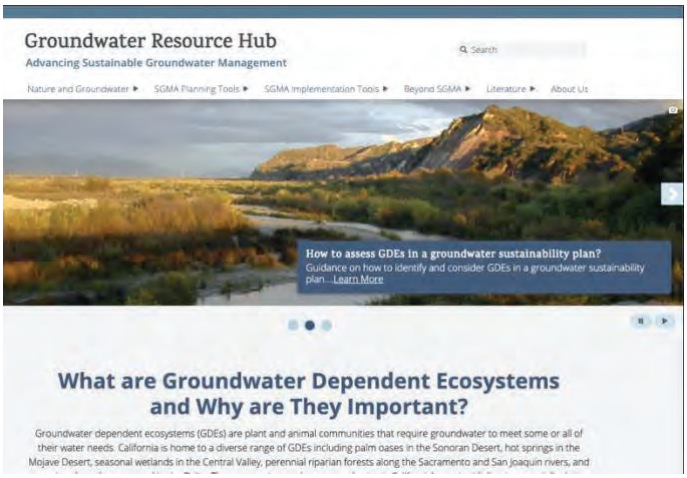
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub



The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database

The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and

availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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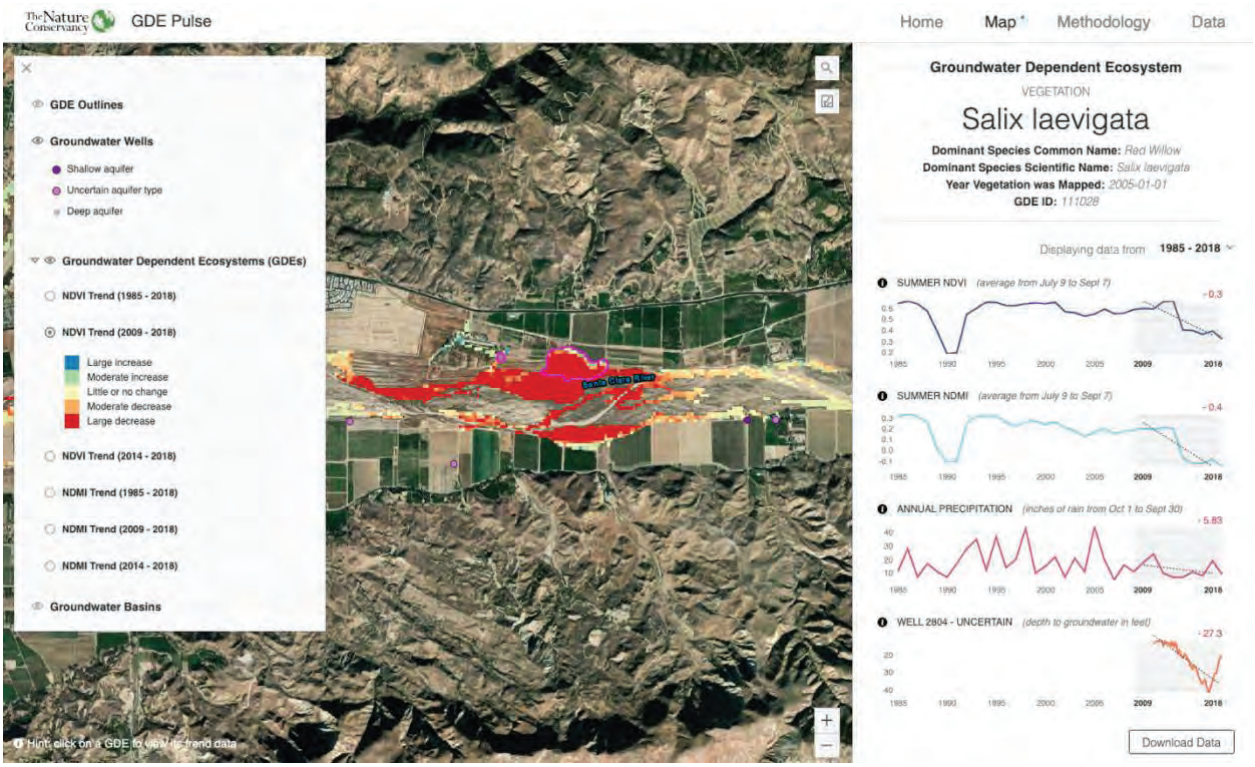
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



GDE Pulse is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

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

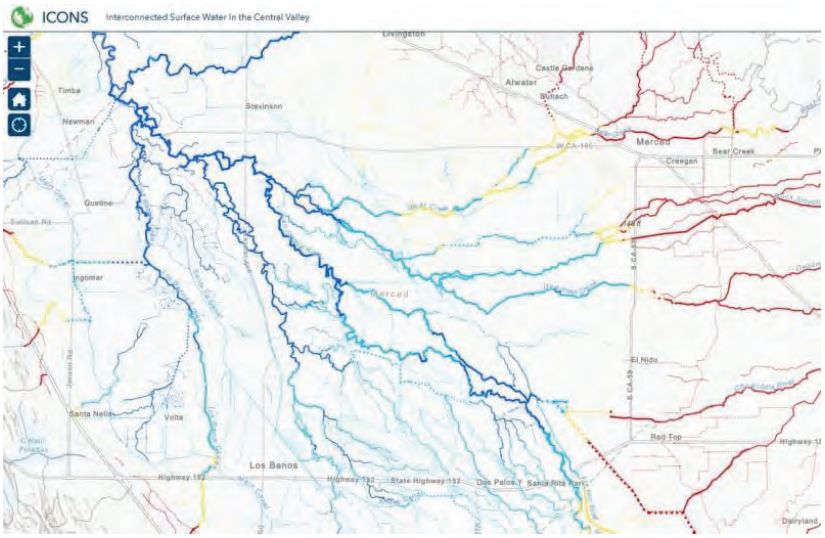
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water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

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

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

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the San Pasqual Valley Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the San Pasqual Valley Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
Agelaius tricolor	Tricolored Blackbird	Bird of Conservation Concern	Special Concern	BSSC - First priority
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas cyanoptera	Cinnamon Teal			
Anas discors	Blue-winged Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya collaris	Ring-necked Duck			
Aythya valisineria	Canvasback		Special	
Butorides virescens	Green Heron			
Chen caerulescens	Snow Goose			
Chen rossii	Ross's Goose			
Egretta thula	Snowy Egret			
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Plegadis chihi	White-faced Ibis		Watch list	
Rallus limicola	Virginia Rail			
Recurvirostra americana	American Avocet			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Vireo bellii	Bell's Vireo			
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Anaxyrus californicus	Arroyo Toad	Endangered	Special Concern	ARSSC
Pseudacris cadaverina	California Treefrog			ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTS				
Libellula saturata	Flame Skimmer			
Pachydiplax longipennis	Blue Dasher			
Perithemis intensa	Mexican Amberwing			

Rhionaeschna multicolor	Blue-eyed Darner			
Tramea lacerata	Black Saddlebags			
PLANTS				
Lemna turionifera	Turion Duckweed			
Salix laevigata	Polished Willow			

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Attachment D

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

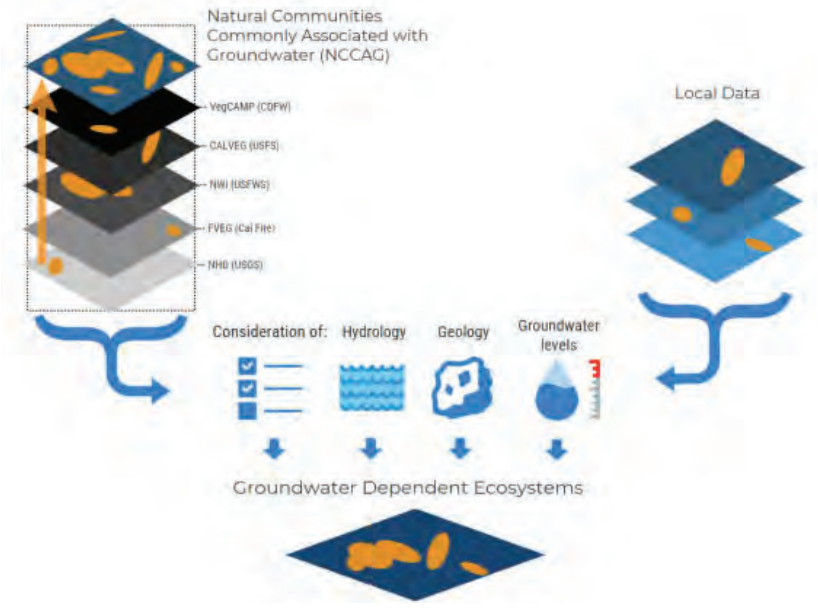

Figure 1. Considerations for GDE identification.
Source: DWR[2]

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

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

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

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

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

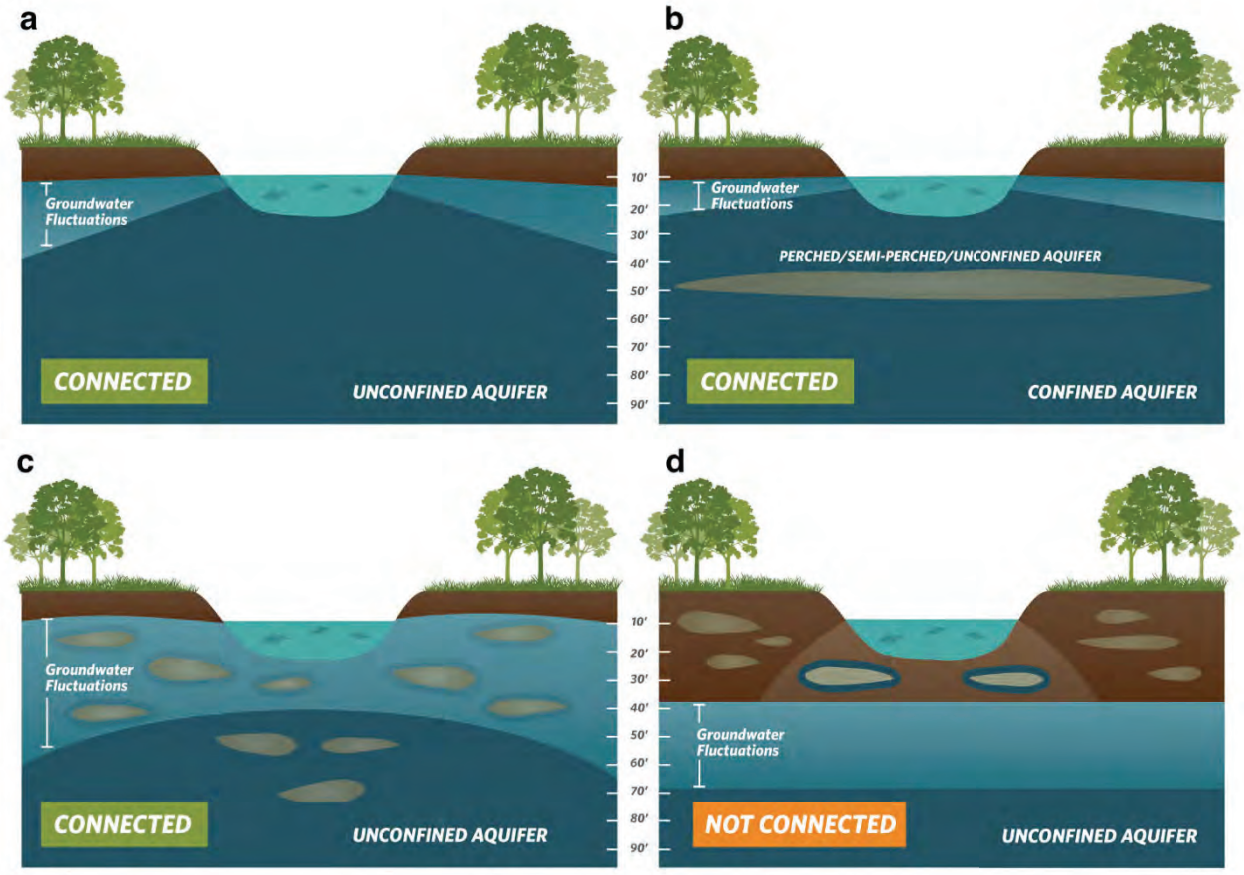

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying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

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

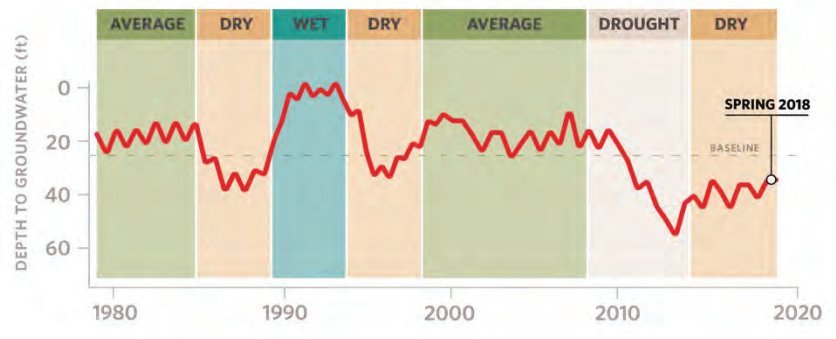

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so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

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

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

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

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

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

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

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

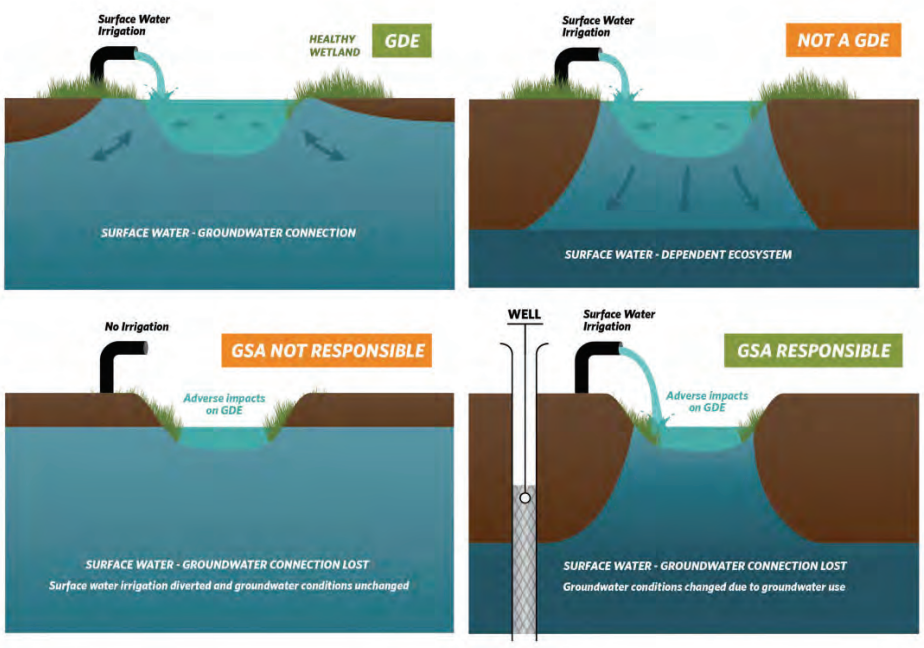

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent.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

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

BEST PRACTICE #4. Select Representative Groundwater Wells

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

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

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

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

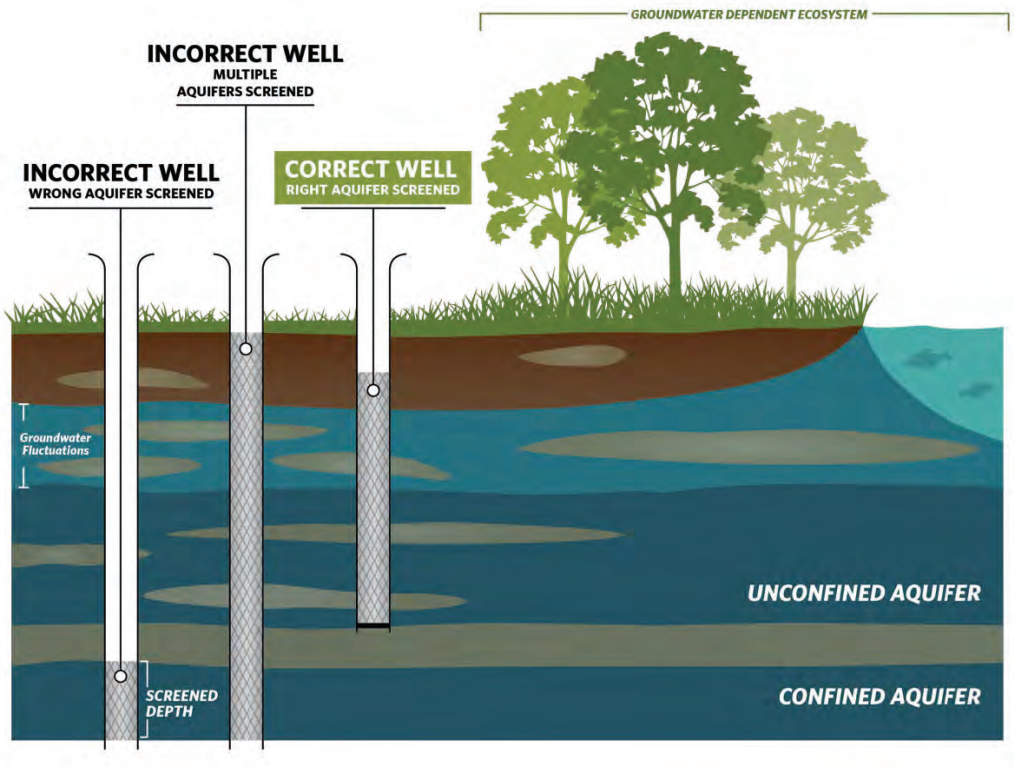

Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

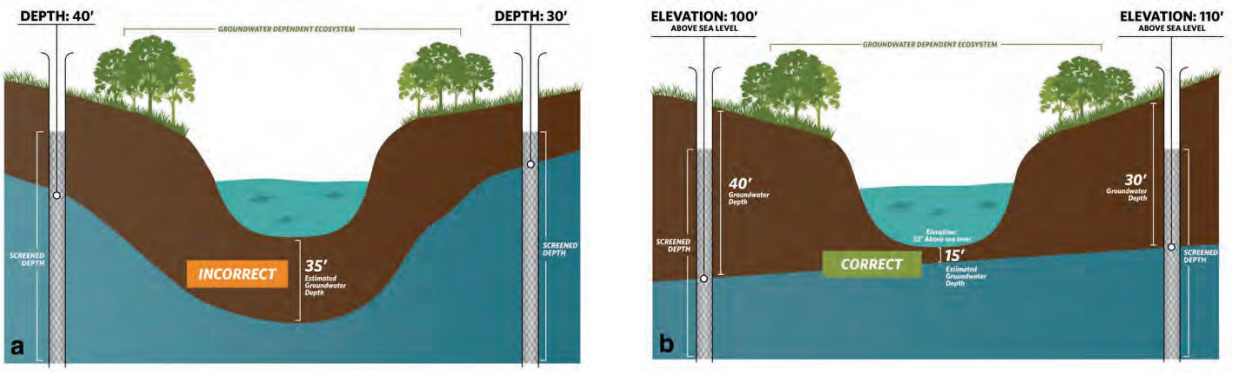

Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

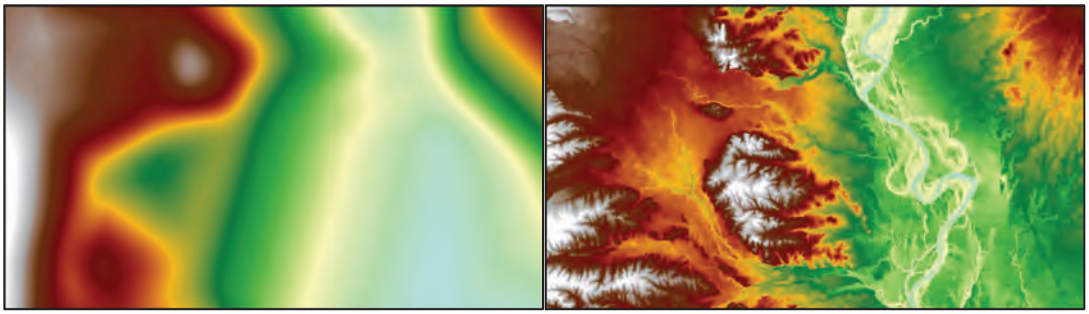

Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation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

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

BEST PRACTICE #6. Best Available Science

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

KEY DEFINITIONS

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

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

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

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

ABOUT US

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

San Pasqual Valley Groundwater Sustainability Plan Comment Tracking Table

Commenter Name	Commenter Organization	Comment Received	Subject	Page # or Figure #	Comment	Date of Core Team response	Brief Description of Response
Frank Konyn	Konyn Dairy	7/8/2021	Basin Definition	GSP Section 2.1	"Where is the definition of the bottom of the basin in section 2.1?"	7/8/2021 via phone, then email to Karina	Suggested response is "The correction will be to copy the definition in section 3.6.3 into section 2.1. It is currently missing from section 2.1."
Frank Konyn	Konyn Dairy	7/8/2021	N/a	p. 110	3rd paragraph typo. "a will" to "a well"		
Frank Konyn	Konyn Dairy	7/8/2021	N/a	p. 140	Section 5.1 typo "approach" is correct spelling		
Frank Konyn	Konyn Dairy	7/8/2021	N/a	p. 148, Fig.	Add abbreviation for TAF to abbreviation list in introduction		
Frank Konyn	Konyn Dairy	7/8/2021	Monitoring Network	p. 110	Two new nested wells need be discussed as well as investigating the relationship between the residuum and the bedrock.		
Frank Konyn	Konyn Dairy	7/8/2021	Jurisdictional Boundary	Fig. 2-5	All County land needs to be shown in the figure. It appears that not all County land is shown in the figure, mainly near Santa		

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From: Lisa Peterson <LPeterson@sdzwa.org>
Sent: Wednesday, August 11, 2021 8:10 AM
To: Danek, Karina <KDanek@sandiego.gov>
Subject: [EXTERNAL] Sna Pasqual GSP
Importance: High

Hi Karina,

I wanted to follow up on two things:

1. I do not have any public comments to share.
2. I have included an excerpt from the draft that I would like some clarification on:
    a. "The single largest contributing source of nitrogen is commercial crop fertilizer use, at 56 percent of the Basin total, followed by landscape fertilizer use at 14 percent. Nitrogen, managed through in-Basin manure applications at Frank Konyn Dairy Inc. and the San Diego Zoo Safari Park, represents a combined 21 percent of the Basin total, with other nonregulated small animal facilities comprising 2 percent of the Basin total." (p. 4-16.)
    b. What is the source of this information? We use minimal amounts of fertilizer and it is contained in our greenhouses and not in any of our habitats.

Thanks,
Lisa

Lisa Peterson (she.her.hers)

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August 12, 2021

Via E-Mail

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RE: Comments on San Pasqual Valley GSP

Dear Ms. Lorance and Ms. Flannery:

I am submitting this letter to provide comments[1] on the draft Groundwater Sustainability Plan for the San Pasqual Valley ("GSP") on behalf of the Rancho Guejito Corporation. As you know, the City of San Diego ("City") and the County of San Diego ("County") entered into a memorandum of understanding ("MOU")[2] to implement the California Sustainable Groundwater Management Act ("SGMA") in the San Pasqual Valley Groundwater Basin ("Basin").

Pursuant to the MOU, the County and the City will act as the Groundwater Sustainability Agency for those portions of the Basin that are within their respective jurisdictions. Unfortunately, despite the split function in the MOU, the City has acted as the lead agency in developing the GSP, and the City's financial interests in the Basin have prevented it from drafting a plan that is fair or

[1] In addition to the comments included in this cover letter, Rancho Guejito has retained the services of two hydrogeology experts to provide peer review of the GSP. Their comments are included as Exhibits 1 and 2 to this letter. They are Dudek, Memorandum re San Pasqual Groundwater Basin GSP Peer Review and Comments, July 21, 2021 (hereinafter "Dudek Memorandum") – attached hereto as Exhibit 1; and Quinlan, Peter, Comments on the Numerical Groundwater Presented in the Draft Groundwater Sustainability Plan for the San Pasqual Valley Basin, August 10, 2021 (hereinafter "Quinlan Memorandum") – attached hereto as Exhibit 2.

[2] Memorandum of Understanding, Development of a Groundwater Sustainability Plan for the San Pasqual Valley Groundwater Basin, June 29, 2017 – attached hereto as Exhibit 3.

equitable to the other landowners. The City has drafted a plan that is so flawed, and so obviously biased in favor of its own interests, that it fails as a management tool.

Based on the deficiencies in the GSP, and the City's clear conflict of interest, we request that the City seek additional time from the California Department of Water Resources ("DWR") to finalize the GSP, and use that time to have the County manage the consulting team to revise the plan in the manner set forth in this letter and its attachments.

The City cannot move forward with the current iteration of the GSP.

1. CITY'S SELF-DEALING IN DEVELOPMENT OF THE GSP VIOLATES SGMA AND DUE PROCESS OF LAW

The GSP fails as a management plan for the Basin because it is so blatantly biased in favor of the City's interests that adoption would violate not only SGMA, but the basic Constitutional requirements of Due Process of Law. This bias was built into the plan by the City to promote the City's water rights over those of other land owners in the Basin, and to protect the City's unlawful diversion of 50% of the natural recharge to the Basin.

The City cannot move forward with adoption of the GSP without major revisions to the plan that address these issues in a fair and equitable manner.

A. *The City's activities in the Basin create an unmitigable conflict of interest*

The City's interests in this Basin are readily apparent. The City owns more than 90% of the land in the Basin. The City leases its property in the Basin to sod farmers, citrus farmers, and dairy operators, and takes a percentage of the profit of each operation.[3] The City's self interest in the Basin is therefore tied directly to the viability of the agricultural operations on its lands. By virtue of these contracts, the City is operating farms in the Basin.

Notably, the City's agricultural operations in the Basin are extremely water intensive. Most recently, the City has been investing in sod farms that use significant volumes of water and essentially export it out of the Basin.[4] The City's other operations are likewise detrimental to the health of the Basin. Specifically, the City leases land to dairy farms and manure sales operations that have caused major damage to water quality in the Basin over the past 50 years. The City has made no effort to clean up the damage caused by these operations. As described more fully below, the GSP utterly fails to manage this issue.

[3] Union Tribune article on agricultural contract with City s– Exhibit 4, attached hereto.

[4] Id.

More importantly, the City owns and operates the Sutherland Reservoir 8 miles upstream of the Basin and the Hodges Reservoir directly downstream of the Basin. These reservoirs are of far greater value to the City than the agricultural operations in the Basin. They are, in fact, the only reason the City owns property in the Basin.

The City constructed Sutherland in the 1950s. The reservoir captures surface water upstream of the Basin for use elsewhere in the City of San Diego. By blocking surface flows downstream, the reservoir diverts 50% of the natural recharge to the Basin.[5] Pursuant to court order, the City is prohibited from storing water in Sutherland Reservoir if water levels on certain properties in the Basin are lower than 20 feet below the ground surface.[6]

As of the date of this letter, water levels are much lower than this threshold throughout the Basin.[7] The City appears to be operating Sutherland Reservoir is violation of a lawful court order.[8] To avoid complying with this requirement, the City began acquiring properties in the Basin. The City was successful in acquiring most of the real estate in the San Pasqual Valley, but did not acquire properties now owned by the County, Rancho Guejito and several other small land owners. The City has tried to use its position as a GSA to protect its interests in the Basin and elevate its appropriative water rights over the overlying and riparian rights of the remaining landowners.

B. *City control over the GSP contract allowed it to hijack the process for its own benefit*

The City used its position as the GSA for the majority of the Basin to take on the role of primary author of the GSP. The City hired and directed the consultants that drafted the Plan. The City ran the technical and public advisory group meetings that provided input on the plan and acted as gatekeeper for all aspects of the plan.[9]

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[5] *Trussell v. City of San Diego* (1959) 172 Cal. App. 2d 597, 599 (hereinafter "*Trussell*"). – Exhibit 5 attached hereto.

[6] Id. at 601 ["city is not entitled to withhold or store the natural flow of Santa Ysabel Creek when the average static water level under respondents' lands and in their wells falls below 20 feet below the surrounding ground surface"]

[7] Draft Groundwater Sustainability Plan for the San Pasqual Valley Groundwater Basin, June 2021 (hereinafter "GSP"), Figure 4-14

[8] *Trussell* at 599.

[9] Although the City entered into a memorandum of understanding with the County providing that the agencies would jointly develop the GSP, the City limited the County's access to the consultants and appears to have provided ultimate direction on all issues. See Exhibit 1.

The City refused to allow those not directly affiliated with the City (including Rancho Guejito) to have direct contact with the City's consultants.[10] At the same time, the City gave open access to its tenants, going as far as to direct the consultants to contact to the City's tenants to receive input and answer questions regarding the GSP.[11] These same tenants engaged in gift-giving with City staff to ensure continued access.[12] So not only did the City ensure that its interests would dominate the development of the GSP, but individual staff members with authority over the consultants accepted gifts from interested parties and in turn provided those parties with preferred access to the consultants who were developing the plan.

The City's self-dealing resulted in actual harm to other landowners in the Basin. Specifically, the City refused to provide equal access to the consultants, and ensured that the consultants drafted the plan in a manner that benefits the City's interests in the Basin.

C. *The City developed a plan that elevates its interests over the rights of other land owners in the Basin*

The City has drafted a plan that would require landowners such as Rancho Guejito to cease pumping and face economic hardship so that the City can continue to deprive the Basin of 50% of the natural recharge, and mismanage the remaining groundwater assets. This is an untenable proposition.

Pursuant to the Court of Appeals decision in *Trussell v. City of San Diego*, the City is prohibited from impounding water in Sutherland Reservoir if groundwater levels fall lower than 20 feet below the ground surface on key parcels in the eastern portion of the Basin. The case defined the Basin for purposes of future regulation and in a manner that is consistent with the definition provided by DWR in Bulletin 118. The case, in conjunction with DWR's definition of the Basin, defines the City's obligations in the Basin and the limits of the City's authority. At every opportunity, the City sought to undermine these parameters. Such behavior would be expected in an adversarial setting, but not when the City has taken on the role of regulator.

The City used its position managing the consultants to corrupt the groundwater model produced for the GSP. The City is now using that model to both justify future expansion of the Basin boundaries and deny its obligation to release water from Sutherland Reservoir if

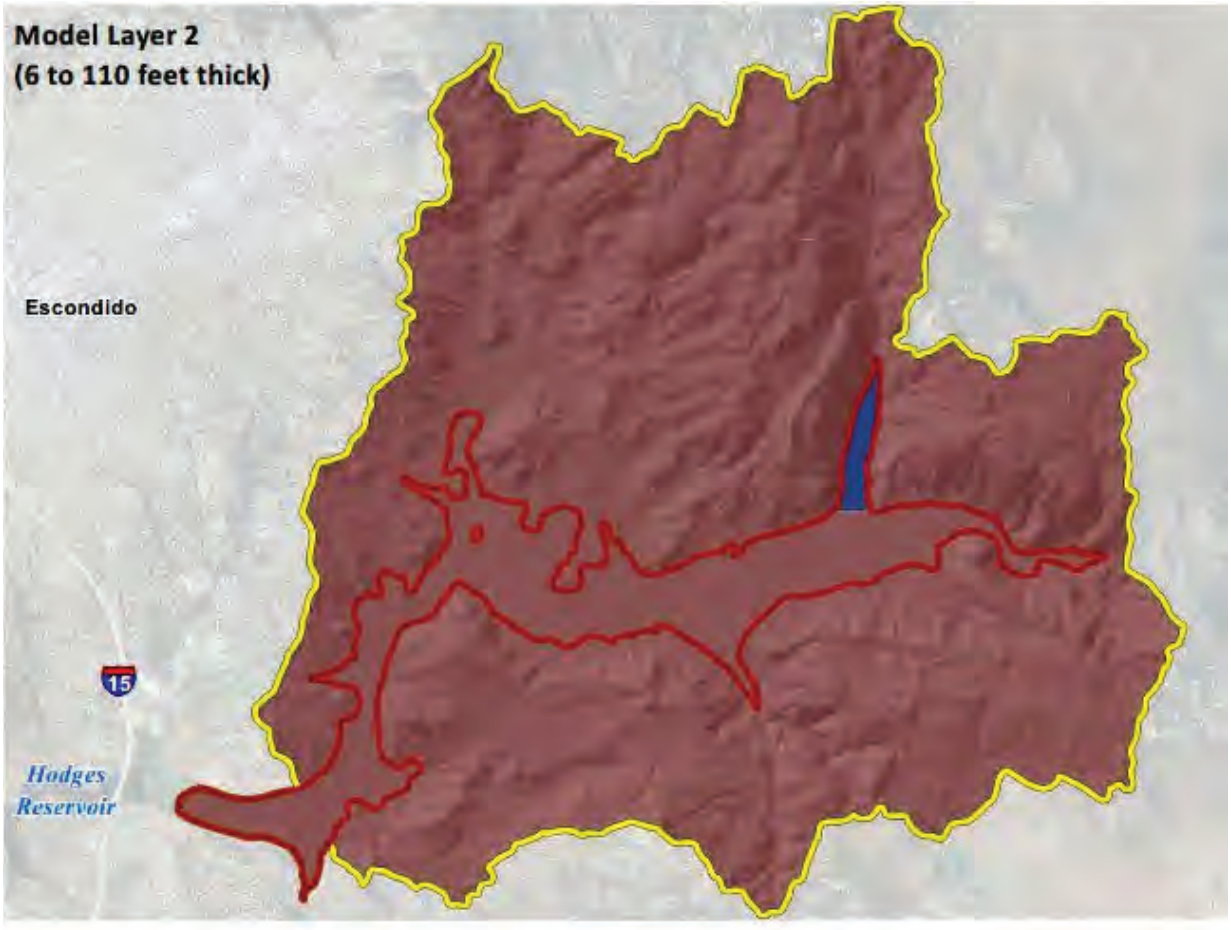
[10] Response from City of San Diego to Rancho Guejito's request to meet with City's consultant to discuss specific concerns with the GSP – exhibit 6 attached hereto.

[11] Email from Sandra Carlson to Woodard and Curren re contacting City lesee Frank Konyn – Exhibit 7 attached hereto.

[12] Email documenting gift from City lesee Frank Konyn to City of San Diego employee – Exhibit 8 attached hereto.

groundwater levels in the Basin decline. The City's consultants bent over backwards to accommodate this false reality.

Rancho Guejito's specific concerns about the GSP are detailed below and in the attachments to this letter. However, one example that is particularly egregious and demonstrates the unlawful bias the City has incorporated into the GSP is shown on page 684 of the appendix to the GSP. In order to obtain the desired outcome for model simulations, the City's consultants found it necessary to imagine a new kind of geology for Rancho Guejito only:



The illustration assumes that only one small portion of the Basin – the section owned by Rancho Guejito Corporation – would have connectivity with the underlying bedrock at levels that are 50 to 100 times higher than the rest of the Basin. There is no rational basis for treating this portion of the Basin differently. The City engaged in an outcome oriented analysis that it hoped would justify its efforts to expand regulatory control over neighboring lands and continue to avoid releasing water from Sutherland Reservoir.

D. *Adopting the GSP in its current form would Violate SGMA and the Due Process requirements of the California and United States Constitutions*

As described in greater detail below, the bias and other flaws that have been built into the GSP violate SGMA and the DWR regulations developed to implement the Act. Because of the City's conflict of interest, adoption would also violate Due Process requirements in the California Constitutions.

When, an administrative agency such as a GSA conducts adjudicative proceedings, the constitutional guarantee of due process of law requires a fair tribunal.[13] A fair tribunal is one in which the judge or other decision maker is free of bias for or against a party."[14] "Of all the types of bias that can affect adjudication, pecuniary interest has long received the most unequivocal condemnation and the least forgiving scrutiny."[15] The state and federal Constitutions forbid the deprivation of property by a judge with a " 'direct, personal, substantial, pecuniary interest in reaching a conclusion against' " a party.[16]

Here the City's interest is pecuniary and then some. The value of water in the arid west cannot be understated. An acre-foot of water is currently valued in the range of $1,000 dollars, That value extends into perpetuity for the renewable, local resource with the value increasing over time. The City has impounded tens of thousands of acre feet of water in Sutherland Reservoir and its tenants pump vast amounts from the Basin every year. The value of the water in the Basin is in the millions of dollars on an annual basis.

The City has been unable to avoid imposing its bias into the GSP. As the GSA adopting the GSP, the City is subject to Constitutional requirements of due process of law. Landowners in the Basin such as Rancho Guejito are entitled to an unbiased plan and an unbiased tribunal. The City cannot move forward with the GSP in its current form without violating these principles.

2. THE CITY HAS ATTEMPTED TO SIDESTEP THE BASIN BOUNDARIES SET BY THE CALIFORNIA COURT OF APPEALS AND DWR

The City has sought for decades to control water resources in the Basin and its tributary watersheds, and has made no secret about its willingness to use any legal means necessary to assert

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[13] *Morongo Band of Mission Indians v. State Water Resources Control Bd.*, (2009) 45 Cal.4th 731, 737. to be clear, adoption of a GSP is quasi-judicial action to which due process requirements attach – a hearing is required by statute, and the plan applies to the rights and interests of a discrete set of individuals. Cal Water Code 10728.4.

[14] Id.

[15] *Haas v. County of San Bernardino*, (2002) 27 Cal.4th 1017, 1025.

[16] Id. quoting *Tumey v. Ohio* (1927) 273 U.S. 510, 523.

control over the water and land use on private property adjacent to the Basin.[17] Rancho Guejito has been on the receiving end of these efforts on multiple occasions.[18]

The City has made it clear that it intends to use the GSP process to take expand its jurisdictional reach via SGMA.[19] This is despite the fact that the Basin has been defined by DWR and court order affirmed by the California Court of Appeals.[20] DWR, the trial court in the *Trussell* case, and the Court of Appeals in the *Trussell* case all found that the Basin is the water bearing gravel and alluvium underlying the San Pasqual Valley; and that it is bounded on the sides and below by the granitic rocks that make up the hills and mountains surrounding the Basin.[21]

The City has sought to undermine that definition by including multiple statements in the GSP about the potential hydrologic connection between the Basin and the underlying granitic rocks and/or outright ignoring the Basin boundary and by incorporating imagined flow between the granite and the Basin into the hydrologic conceptual model and numerical groundwater model used in the GSP.[22]

For example, Figures 2-8 through 2-10 in the GSP purport to show the location of all wells in the Basin. However, the figures include wells that are screened only in fractured bedrock underlying the Basin. Similarly, the GSP relies on data from a series of wells drilled by the United States Geologic Survey to claim that there is significant flow between the Basin and the underlying granite but without hard evidence to support the conclusion.

There is no flow observed between the alluvium and the bedrock at other wells in the Basin, suggesting that if there were a connection between the bedrock and the alluvium at the USGS well location, little to no vertical flow is actually occurring. Moreover, the granite immediately underlying the Basin has consistently acted as an aquitard not yielded economic quantities of groundwater. Past studies document the way in which the bedrock acts as a barrier to flow between

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[17] *See e.g. Trussell;* Comment letters from City on development of new groves on Rancho Guejito – Exhibit 9 and Exhibit 10, attached hereto.

[18] Id.

[19] GSP pp 2-24 [investigating the Basin Boundary Modification potential for the Basin]; 3-24 [describing intent to study connectivity to areas outside the Basin].

[20] DWR Bulletin 118 (2003 Update) p 9-010; excerpts attached as Exhibit 11 hereto; *Trussell* at 598-99.

[21] Id.

[22] See e.g. GSP p 3-24 ["The SPV Basin is defined in Bulletin-118 (Appendix F), and includes Quaternary Deposits and Residuum. Impermeable bedrock with lower water yielding capacity underlies the Residuum. The interaction of groundwater between fractured bedrock beneath the Quaternary Deposits and the Residuum is not well understood and represents an area of potential improvement that may be investigated by the GSA to further the understanding of the Basin and the interaction of groundwater pumping in and around the Basin."]

the Basin and anything beneath it.[23] The GSP is rife with similar efforts to misconstrue the Basin boundaries.[24]

More than that, in an effort to prove a strong connection, the City has incorporated imaginary characteristics into the numerical groundwater model that would demonstrate large volumes of recharge from the granite underlying the Basin.[25] As noted above, the model assumes that in the small portion of the Basin owned by Rancho Guejito, the volume of water flow between the underlying granite and the Basin is 50 to 100 times greater than elsewhere in the Basin., even though the observed rocks in the area are virtually identical.[26] This kind of assumption is absurd and exposes the outcome oriented approach taken by the City.

3. THE NUMERICAL GROUNDWATER MODEL IS FUNDAMENTALLY FLAWED. IT CANNOT BE USED TO SUPPORT THE GSP, OR ANY OF THE MANAGEMENT MEASURES IN THE GSP, OR ANY FUTURE ITERATION OF THE GSP

DWR Regulations at Title 23 California Code of Regulations section 354.14(a) requires every GSP to "include a descriptive hydrogeologic conceptual model of the basin based on technical studies and qualified maps that characterizes the physical components and interaction of the surface water and groundwater systems in the basin."

There are two fundamental flaws in the numerical groundwater model constructed to represent the hydrogeologic conceptual model in the GSP that appear to have been introduced to protect the City's interests in the Basin – the model assumes an absurdly high level of connectivity between the Basin and the underlying and adjacent granitic rock; and it assumes that most of the recharge to the Basin does not come from surface flows. These assumptions represent the core of the model and have no basis in reality. In fact, they run counter to the known characteristics of the Basin and the rocks surrounding it.[27] The deviation from known hydrologic conditions documented in technical studies and qualified maps is so great that it represents a violation of Section 354.14.[28]

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[23] Dudek, Memorandum p 5; see also USGS, Evaluation of the San Dieguito, San Eiljo and San Pasqual Hydrologic Subareas for Reclaimed Water Use, San Diego County, California, August 1983 (hereinafter "Izbicki") p 87 – attached hereto as Exhibit 12.

[24] See Dudek Memorandum pp 1-2, 4.

[25] Dudek Memorandum, p 1, 3-5, 7

[26] GSP Appendices p 638

[27] See Dudek Memorandum pp 3-5; Izbicki p 87.

[28] Portions of the GSP appear to be based on hydrologic conditions in the Cuyama Basin (Dudek Memorandum p 6). Conditions in the Cuyama Basin could not be more different than those in the Basin. Failure to use data and information relevant to the Basin is a violation of DWR regulations and SGMA.

There is a reason why the City would choose to manipulate the model in this fashion. The outcome of the modeling allows the City to downplay the impact that Sutherland Reservoir has on recharge to the Basin, while at the same time making an argument for regulating groundwater extractions outside the Basin. It is biased and unfit for use as a regulatory tool.

A. *The Model's Assumption that recharge does not come from surface flows is counter to known conditions in the Basin and creates a fundamental flaw in the Model*

Even a lay person would know that the primary source of recharge is from stream flow and precipitation. What is easily observable to the average person has been confirmed routinely in scientific papers – "[a] large fraction of ground water stored in the alluvial aquifers in the Southwest is recharged by water that percolates through ephemeral stream-channel deposits."[29]

USGS' 1983 Report by on the Basin (conducted in conjunction with the County and DWR) confirmed that this is the case on the local level, finding "[r]echarge to the alluvial aquifer originates primarily outside the hydrologic subarea as flow in Santa Ysabel, Guejito, and Santa Maria Creeks."[30]

Nonetheless, the GSP uses estimates of hydrologic conductivity for stream beds that grossly constrained the ability of the aquifer to obtain recharge from surface flow.[31] The difference was in orders of magnitude from what would be expected based on past reports on the Basin and the easily observed conditions in the creek beds in the Basin. Treating the streambeds as having low conductivity (and the resulting limited infiltration) ripples through the model and impacts estimated horizontal and vertical conductivity in all 4 layers of the model.

B. *Limited Recharge from Surface Flow Biased the Model in favor of the City's Interests*

In order to match observed conditions in the Basin, and keep the assumption that surface water recharge was minimal, the model needed to assume that hydraulic conductivity was 100 times higher than what is generally accepted for the rocks in the Basin, and the assumptions were made in specific locations to create the desired result.

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[29] Hoffman et al, USGS Professional Paper 1703, Estimated Infiltration, Percolation, and Recharge Rates at the Rillito Creek Focused Recharge Investigation Site, Pima County, Arizona (2000) – attached hereto as Exhibit 13.

[30] Izbicki, p 87.

[31] Quinlan Memorandum, p 2.

Thus, the figure shown above, which alleged that the vertical hydraulic conductivity was 100 times higher than what would be expected based on the rocks present in the aquifer, and only in the portions of the Basin owned by Rancho Guejito. The assumptions are absurd the resulting simulation is all too convenient an outcome for the City. The model is fundamentally flawed and cannot be used as a management tool in the GSP or for any other purpose unless and until these assumptions are revised.

4. THE GSP'S WATER QUALITY MANAGEMENT MEASURES ARE DEFICIENT

Degraded water quality is a major limitation on full use of the Basin. The GSP does almost nothing to address the high TDS and Nitrogen levels that have been present in the Basin for decades.[32] This is a violation of SGMA, which requires the GSP to monitor and manage groundwater quality in the Basin.[33] DWR Regulations expressly require the GSP to include minimum thresholds to manage for water quality:

> The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.[34]

The levels of total dissolved solids ("TDS") and nitrogen in the western portions of the Basin exceed applicable Basin Plan standards promulgated by the San Diego Regional Water Quality Control Board. The levels are high enough to impair the use of groundwater in large portions of the Basin. In these areas, the water is unfit for human consumption.

The GSP makes no effort to correct this condition. This is not consistent with the requirements of SGMA or the DWR regulations. The primary source of nitrogen and TDS in the

[32] GSP p 4-16; Izbicky p 96.

[33] Cal Water Code §10727.2(d)(2).

[34] 23 Cal Code Regs §354.28(c)(4).

Basin is unclear, but prior investigations determined that dairy operations, nitrogen fertilizer and soil storage are all major contributors.[35]

The GSP attempts to blame surface flow contributions for the presence of high TDS and Nitrogen.[36] But that does not explain the high levels in portions of the Basin that are not near surface streams such as at well SP043.[37] The GSP nonetheless states that Undesirable Results for water quality are not occurring in the Basin currently (even though TDS and Nitrogen exceed Basin Plan standards) because:

> For degraded water quality to be characterized as an undesirable result, it must be associated with groundwater-management activities and the impacts those activities have on water quality. If those activities cause a significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP; that would be considered an undesirable result for degraded water quality.
>
> This direct relationship underscores that undesirable results for water quality must be associated with groundwater pumping and other groundwater-related activities. Water quality impacts caused by land use practices, naturally occurring water quality issues, or other issues not associated with groundwater pumping would not be considered an undesirable result for degraded water quality since those would be outside of GSA authorities.[38]

This statement totally ignores the fact that the City has full control over the land use activities of its tenants, and could very easily impose water quality based restrictions on their operations.[39] More importantly, there is reduced recharge and flow through the Basin caused by

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[35] See City of San Diego, State of the Basin Report Update (Sept., 2015) p 2-6 – excerpts attached hereto as Exhibit 14.

[36] GSP p 4-28 through 30.

[37] GSP Figure 4-30.

[38] GSP p 6-4.

[39] GSP p 4-16 ["The single largest contributing source of nitrogen is commercial crop fertilizer use, at 56 percent of the Basin total, followed by landscape fertilizer use at 14 percent. Nitrogen, managed through in-Basin manure applications at Frank Konyn Dairy Inc. and the San Diego Zoo Safari Park, represents a combined 21 percent of the Basin total"]; see also Exhibit 14 p 2-6 ["with more than 90 percent of the total nitrogen (TN) contributions to the Basin coming from fertilizer and manure use, and given the historical elevated nitrate concentrations in groundwater, effective nutrient management across agricultural and urban landscapes has been identified as an

the construction of the Sutherland Reservoir.[40] One of the best ways to improve water quality and reduce the TDS and Nitrogen levels in the Basin would be to increase the flow into the Basin of water with low levels of both constituents – e.g. to release water from Sutherland Reservoir and allow it to recharge the Basin.

The GSP does not consider this option to correct water quality conditions and it is a fatal flaw in the plan. Undesirable Results are occurring now, and the City has full authority to alleviate the condition. The City has created all of the negative conditions in the Basin through operation of Sutherland Reservoir and mismanagement of its agricultural leases. The City is trying to use the GSP to force the remaining land owners in the Basin to live with the ramifications. That is not fair or equitable and in the case of water quality it is a violation of SGMA. The GSP needs to be revised.

5. MANAGEMENT MEASURES ARE INADEQUATE IN LIGHT OF COURT ORDER DIRECTING CITY TO RELEASE WATER FROM SUTHERLAND RESERVOIR

The primary management measure proposed in the GSP is the reduction of groundwater extractions by users in the Basin.[41] The City of San Diego is under a court order that prohibits it from impounding water in Sutherland Reservoir if water levels in the Basin fall lower than 20 feet below the ground surface elevation in the eastern portion of the Basin.[42] There is no reason why the remaining land owners in the Basin should be asked to subsidize the City's water use by cutting back on their own groundwater use. The City is required to ensure the ongoing health of the Basin and this should be reflected in the GSP.

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important component of Basin water quality management. TDS concentrations in the westernmost well (SP010) range from 604 to 1,050 milligrams per liter (mg/L), which indicates that groundwater is leaving the Basin with TDS concentrations that exceed the recommended secondary maximum contaminant level (MCL) of 500 mg/L and in some instances exceed the WQO of 1,000 mg/L. An analysis of existing historical data indicates that TDS concentrations in the western portion of the Basin have generally increased since 1950"].

[40] *Trusell* at 599 [50% of the recharge has been blocked by construction of the dam].

[41] GSP Figure 9-2. The GSP alleges that reductions in pumping will help improve water quality. Management Actions 2, 10, and 11 state that "Reducing groundwater pumping will help alleviate groundwater degradation associated with lowering of groundwater levels." The GSP has not established an association between groundwater levels and groundwater quality. This statement appears to have been copied from Table 7-2 in the Cuyama GSP, where groundwater elevations may be linked to lower quality groundwater. Unless a similar link is established locally for the San Pasqual Valley Basin, these statements need to be removed from Table 9-3. Groundwater producers in the San Pasqual Valley Basin should not be subject to management actions that have not been demonstrated to produce the desired impact described in the table.

[42] *Trussell* at 599-600.

The GSP needs to be revised to remove pumping reductions as the primary management measure. No property owner in the Basin should be asked to reduce their groundwater use until the City has replenished the Basin as required by the court's decision in *Trussell v. City of San Diego*.

6. FAULTY ANALYSIS OF REPLENISHMENT OPPORTUNITIES

The GSP includes an appendix that purports to analyze the feasibility of recharging the Basin with surface water from Sutherland Reservoir. Unsurprisingly, the analysis is incomplete and biased in favor of the City's interests. And equally unsurprisingly, it showed the releases from Sutherland would not improve groundwater conditions in the Basin.

The feasibility analysis is yet another example of the City attempting to use the GSP to avoid its obligation in the Basin. The following aspects of the analysis demonstrate this bias:

- Additional water releases from Sutherland Dam of 300 AFY were "simulated" for the March to September timeframe. This timeframe includes the warmest months of the year and will simulate conditions under the highest Evapotransportation rates. There is no need to assume that surface water releases would have to occur during this timeframe because this management action would be undertaken during times that the Basin water levels are low, and could use recharge even during the winter months. "Simulating" releases during the winter months would reduce [Evapotransportation] losses, and would also reduce stream losses that would occur between Sutherland and the Basin.

- Exactly what model was used to "simulate" releases is not clear, and the details of the simulations are not provided in the memo.

- Of the 2,100 AFY that reached the Basin, only 187 AFY infiltrated through the alluvial sediments of Santa Ysabel Creek, while the remainder continued flowing in the creek to Lake Hodges, *even though historical groundwater levels in the Basin respond rapidly to wet winter conditions*. This suggests a fundamental disconnect between the model response and the observed hydrogeologic response in the Basin, which in turn suggests that the model does not accurately represent the Basin and needs substantial revision before it can be used to assess the efficacy of projects and management actions.

- The memo states that only 7% of the "simulated" releases from Sutherland Dam would contribute to groundwater storage while the remainder would "be lost to ET or outflow." This number is misleading as it could equally be much higher if the model simulated higher stream bed infiltration rates or higher if releases were

simulated during the winter months, and the water that flows through the model to Lake Hodges was not included as being "lost." Use of a meaningless low percentage of water retained in the Basin is there to bias the reader into assuming that the releases of water are not helpful. This has not been demonstrated by the memo.

- A review of surface water releases from Sutherland Dam that includes reasonable release parameters, a revised numerical model that reflects observed groundwater responses in the Basin, and a detailed explanation of the work conducted is needed. It is anticipated that such a study would indicate the efficacy of surface water releases from Sutherland Dam at providing recharge to the Basin and that this management action should have a higher priority in the GSP.

- On multiple occasions, the City stated that the hydrologic conceptual model would not be used for developing management measures for the Basin. The feasibility analysis states that flows from Sutherland were modeled, presumably using the conceptual model developed for the GSP. The same bias that is built into that model infected the Sutherland analysis and renders it inadequate and incomplete.

Thank you for your attention to this matter. For the reasons set forth herein, we believe that the City and County cannot move forward with the GSP in its current form. The only viable course of action is for the City and County to seek additional time to revise the GSP in accordance with the comments in this letter and its attachments.

Sincerely,

Andre Monette
of BEST BEST & KRIEGER LLP

AM:DAG

Attachments

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Exhibit 1

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MEMORANDUM

To:	Andre Monette, Best, Best and Krieger
From:	Jill Weinberger, Kayvan Ilkhanipour, Dudek
Subject:	San Pasqual Groundwater Basin GSP Peer Review and Comments
Date:	July 26, 2021
cc:	Hank Rupp, Rancho Guejito Corporation

This memorandum transmits the findings of a peer review of the *Groundwater Sustainability Plan* (GSP) for the San Pasqual Valley Groundwater Basin, prepared by Woodard and Curran, and Jacobs, June 2021. This peer review focuses on the GSP's adequacy to support analysis under SGMA. Individual comments are listed in the table below and are referenced to the chapter and section to which the comment applies.

This review identifies four primary areas of concern. First, the draft GSP has several inconsistencies between the hydrogeologic conceptual model of the Basin, which forms the underpinning of the remainder of the document, the numerical groundwater model, undesirable results, and projects and management actions. These inconsistencies must be reconciled before the GSP is submitted to DWR because they call into question the fundamental understanding of the Basin in this GSP. Second, the text of the GSP indicates a clear bias in the water budget assumptions that include large contributions of water from the granite underlying the basin to the alluvial sediments and residuum that compose the basin. This is not supported by the observed groundwater elevations in the Basin, but is brought up in multiple inappropriate sections of the draft GSP. Third, discussion of the undesirable results and projects and management actions in the San Pasqual Valley GSP appear to have language that has been taken from the GSP for the Cuyama Valley Groundwater Basin and has not been adapted to the local conditions. Local control is a central tenant of SGMA, yet local conditions appear to have been ignored in this GSP, which calls into question the efficacy and fairness of the sustainable management criteria and projects and management actions described in this GSP. Fourth, the GSP fails to clearly show and explain the work done to develop the sustainable management criteria and analyses of the projects and management actions. DWR and the stakeholders both expect to see how these critical components of the GSP were developed.

Section	Subsection	Comments
Executive Summary	Plan Area	Cloverdale Creek is not included in the list of creeks that drain the Basin.
Executive Summary	Hydrogeologic Conceptual Model	Is the last sentence a statement confirming the DWR Basin boundary and a separation of the Basin from the bedrock below.
Section 2. Plan Area	2.1.2 Plan Area Setting	Figure 2-1 description is strange without an inset map to show relative location to downtown San Diego. Figure also doesn't show relative portions of City jurisdiction vs County jurisdiction. Suggest deleting first 2 sentences of description or modify figure to show the features described in the 1st 2 sentences.
Section 2. Plan Area	2.1.2 Plan Area Setting	Figure 2-3 description includes "South Coast Hydrologic Region" and "San Dieguito Drainage Basin" neither of which are shown on Figure 2-3.
Section 2. Plan Area	2.1.2 Plan Area Setting	Figure 2-4 does not show City boundary, so description: "Much of the Basin is in the northern portion of the City" is unclear.
Section 2. Plan Area	2.1.2 Plan Area Setting	Figures 2-6 and 2-7 text states "primary land uses in the Basin are native vegetation and agriculture." This should be clarified to "riparian vegetation" as the figures show the broader watershed and include large portions of "native shrub" which is limited within the Basin.
Section 2. Plan Area	2.1.2 Plan Area Setting	The text explaining Figures 2-8 through 2-10 is insufficient and the figures themselves are misleading. Ideally the well maps should only show wells screened within the alluvium and residuum, as these are the only wells located *in the Basin*. In the absence of that, however, the text should explain explicitly that the well density maps include wells screened solely in the bedrock underlying the Basin, and therefore well densities shown on the maps are higher than the actual well densities in the Basin. The text for Figure 2-8 hints at this discrepancy but does not make a clear distinction for the average reader to understand. The text for Figures 2-9 and 2-10 is incorrect. The maps do not show wells "in the Basin" but include all wells in the DWR database. The text should be corrected. Additionally, a note should be added to the figures themselves to clarify that the well densities displayed include wells screened solely in the bedrock underlying the basin and the densities shown are higher than the actual well densities in the Basin. These figures and the associated text are misleading and require correction.
Section 2. Plan Area	Table 2-1. Plan Elements from CWC Section 10727.4	States replenishment of groundwater extractions is not included. Reasoning is that economically viable replenishment has not been "discovered." Need to relate to releases from Sutherland Dam and provide basis for Basin replenishment via releases.

Section	Subsection	Comments
Section 2. Plan Area	Table 2-1. Plan Elements from CWC Section 10727.4	States impacts to groundwater dependent ecosystems are discussed in Section 2. There is no reference to GDEs in Section 2.
Section 3. Hydrogeologic Conceptual Model	3.1 Topography, Surface water bodies, and Recharge	1st paragraph - Discussion of imported water doesn't belong in the introduction to the topography, surface water bodies, and recharge section. This discussion, which seems focused on areas outside of the Basin, should focus on recharge to the Basin from imported water, should be to be moved to relevant section of the GSP, and needs proofreading.
Section 3. Hydrogeologic Conceptual Model	3.1.3 Areas of Recharge, Potential Recharge, and Groundwater Discharge	First paragraph states groundwater flow from bedrock contributes unknown amount of recharge into Basin. What is the basis for the underlying assumption that there is groundwater flow into the basin from the bedrock, as opposed to groundwater flow out of the basin, or a distinct separation between the bedrock and the residuum? The statement in the first paragraph should be removed or revised to say, "the nature of the interaction between the underlying bedrock and the base of the residuum is not currently understood."
Section 3. Hydrogeologic Conceptual Model	Figure 3-3 and 3-4	These figures only show data through 2016. Data is available for 2017 through 2020 for Guejito Creek and Santa Maria Creek. These data would show the creek flows during above average water years in 2017 and 2019.
Section 3. Hydrogeologic Conceptual Model	Sections 3.2 and 3.3 Geologic History and Formations	These sections should be reviewed by a geologist for accuracy. 1st sentence paragraph 1 should read "The crystalline rocks that surround and underlie the Basin were formed during the Cretaceous Period …" the current wording is inaccurate and misleading. There are multiple additional inaccuracies in the discussion of the geologic formations and use of "stratigraphy" in the context of the San Pasqual Valley Basin.
Section 3. Hydrogeologic Conceptual Model	Figure 3-10 / Table 3-1	This figure appears to disagree with figure 3-11, which is illegible in the document, but available online. Figure 3-10 and Table 3-1 identify older alluvial river deposits and colluvial deposits as being the same as residuum. Residuum is weathered in place, while alluvium and colluvium are deposits that have been transported away from their source material. These – by definition – cannot also be residuum. This is an important distinction because the hydrologic properties of the residuum and older alluvium are very different, with residuum typically being far less transmissive than alluvium. This conflation of older alluvium with residuum shows a fundamental misunderstanding of the hydrogeologic conceptual model for this basin and needs to be corrected.
Section 3. Hydrogeologic Conceptual Model	Figure 3-11	The figures are illegible, rendering the keys provided in figures 3-12 through 3-15 useless. The geologic unit abbreviations should be clearly legible on the map.

Section	Subsection	Comments
Section 3. Hydrogeologic Conceptual Model	Figure 3-17 and Figure 3-19	Some of well locations appear to be misrepresented in the plan view and cross section D-D'. Location of LWELL5915 (prev. Well 5) needs to be shifted ~900 feet to the NNW. Location of Rockwood Well 6 needs to be shifted ~650 feet to the NW. Also, LWELL5915 (Well 5) has been destroyed as of Fall 2020. Unsure what well is represented by LWELL5246 in figures.
Section 3. Hydrogeologic Conceptual Model	3.6.3 Bottom of the Basin Boundary	The Basin boundary is clearly defined in the first sentence. However, three sentences later there is an ambiguous statement regarding the interaction of groundwater in fractured bedrock with the overlying residuum and alluvium. This statement indicates a bias that was brought into the hydrogeologic conceptual model and carried through the numerical groundwater model, but is not supported by the water level discussion in section 4 and does not belong in the discussion of the basin boundary. It should be deleted.
Section 3. Hydrogeologic Conceptual Model	3.7 Principal Aquifer	As above comment: *"The amount of water contributed to the Quaternary Deposits and Residuum from Crystalline Rock near the Basin is not known and may be investigated further by the GSA."* This statement is not supported by the water level discussion in Section 4 and does not belong in the discussion of the principal aquifers. A statement regarding the interaction between the bedrock and the alluvial aquifers could be added to a discussion of the data gaps.
Section 3. Hydrogeologic Conceptual Model	3.8 Areas of Potential Improvement	States that the depth to crystalline rock is unknown, however, the cross sections in Figures 3-18 and 3-19 suggest otherwise, and there are a number of wells that have been drilled into bedrock, by both private landowners and the USGS. This should be clarified in the discussion and specific areas should be named where additional data could improve the hydrogeologic understanding of the basin.
Section 4. Groundwater Conditions	4.1 Historical Groundwater Conditions	Last bullet in this section needs proofreading.
Section 4. Groundwater Conditions	4.1.1 Evaluation of the San Dieguito, San Elijo, and San Pasqual Hydrologic Subareas for Reclaimed Water Use, San Diego County, California, 1983	1st sentence is missing a word: "groundwater _____?_____ and groundwater quality in the Basin."

Section	Subsection	Comments
Section 4. Groundwater Conditions	4.2.2 Vertical Gradients	The lowermost intervals for the USGS nested wells: SDSY (screened from 280 ft to 340 ft below land surface) and SDLH (170 to 270 ft bgs) are within the bedrock at their respective locations. There is no vertical gradient observed between the alluvium and the bedrock at well SDSY, close to the mouth of Rockwood Canyon, suggesting that if there were a connection between the bedrock and the alluvium at this location, little to no vertical flow would occur. However, it should be emphasized that the granite immediately underlying the Basin has consistently not yielded economic quantities of groundwater and acts as a barrier to flow between the Basin and anything beneath it. At well SDLH, in the western part of the Basin the observed vertical gradient is directed *downward* suggesting that if there were a connection between the bedrock and the alluvium in that location, the alluvium would recharge the bedrock. As above, the presence of a vertical gradient does not mean that there is flow between the alluvium and the bedrock, but suggests that the statements in section 3 regarding contribution from the granite to the alluvium are not based on the data that should have been used to develop the hydrogeologic conceptual model of the Basin.
Section 4 Groundwater Conditions	4.2 Groundwater Movement and Occurrence	Typo in heading
Section 4. Groundwater Conditions	4.2.3 Change in Groundwater Storage	Figure 4-22 is missing a legend explaining the colors of each bar.
Section 4. Groundwater Conditions	4.6. Interconnected Surface Water Systems	Table 4-1 shows the average annual depletions due to groundwater pumping over the 2005–2019 period. How do they determine the AF depletions listed in the Table? Particularly from creeks listed as disconnected from the regional aquifer, like Guejito Creek. The work done to create this table is not well enough explained.
Section 4. Groundwater Conditions	4.9. Areas of Potential Improvement	The statement that the interaction between DWR defined Basin and bedrock may need improvement because it's not well understood, along with the discussion of aquifer testing should be removed. This statement isn't justified by the data and does not belong in a discussion of the historical groundwater conditions. At the same time there is no discussion of data gaps regarding GDE monitoring sites, or groundwater quality data. This should be added to the areas of potential improvement, based on the data discussed.

Section	Subsection	Comments
Section 6. Undesirable Results	6.3.1 Chronic Lowering of Groundwater Levels	Under the heading "Identification of Undesirable Results", the GSP defines the undesirable result for chronic lowering of groundwater levels: "The undesirable result for the chronic lowering of groundwater levels is considered to occur during GSP implementation when 30% of representative monitoring wells (i.e., 5 of 15 wells) fall below their minimum groundwater elevation thresholds for two consecutive years." This undesirable result language doesn't take into account geographic variation in water levels in this Basin, and appears to be tied to the undesirable results established for the Cuyama Basin which states "This result is considered to occur during GSP implementation when 30% of representative monitoring wells (i.e., 18 of 60 wells) fall below their minimum groundwater elevation thresholds for two consecutive years." (Cuyama GSP, Section 3.2.1 Chronic Lowering of Groundwater Levels - Identification of Undesirable Results). The Cuyama Basin and the San Pasqual Valley Basin are very different basins and undesirable results need to be defined locally, based on the historical data and modeling conducted for the San Pasqual Valley Basin, and taking into account significant and unreasonable impacts to beneficial users and uses of groundwater. In the San Pasqual Valley Basin, 5 representative monitoring wells in the western part of the Basin could be below the minimum threshold, while water levels in the eastern part of the Basin are above the minimum thresholds, yet everyone in the Basin would be subject to implementation of projects and management actions. Local hydrogeology and local understanding of the beneficial uses and users of groundwater in the San Pasqual Valley Basin should be used to develop Basin specific undesirable results. This is a fundamental tenant of SGMA and has not been followed in the development of this GSP.
Section 6. Undesirable Results	6.3.5 Land Subsidence	Rate of land subsidence referenced here (0.028 inches per year) disagrees with rate of land subsidence referenced in section 4 (0.05 *feet* per year). These should be reconciled.
Section 9. Projects and Management Actions	Table 9-3	Management Actions 2, 10, and 11 state that "Reducing groundwater pumping will help alleviate groundwater degradation associated with lowering of groundwater levels." The GSP has not established an association between groundwater levels and groundwater quality. This statement appears to have been copied from Table 7-2 in the Cuyama GSP, where groundwater elevations may be linked to lower quality groundwater. Unless a similar link is established locally for the San Pasqual Valley Basin, these statements need to be removed from Table 9-3. Groundwater producers in the San Pasqual Valley Basin should not be subject to management actions that have not been demonstrated to produce the desired impact described in the table.

Section	Subsection	Comments
Appendix O: Technical Memorandum Re: Projects and Management Actions Screening Process	2. Preliminary Evaluation of Surface Water Recharge	The assessment of the viability of additional surface water recharge via releases of water from Sutherland Dam is unclear, and appears biased in several ways: (1) Additional water releases from Sutherland Dam of 300 AFY were "simulated" for the March to September timeframe. This timeframe includes the warmest months of the year and will simulate conditions under the highest ET rates. There is no need to assume that surface water releases would have to occur during this timeframe because this management action would be undertaken during times that the Basin water levels are low, and could use recharge even during the winter months. "Simulating" releases during the winter months would reduce ET losses, and would also reduce stream losses that would occur between Sutherland and the Basin. (2) Exactly what model was used to "simulate" releases is not clear, and the details of the simulations are not provided in the memo. (3) Of the 2,100 AFY that reached the Basin, only 187 AFY infiltrated through the alluvial sediments of Santa Ysabel Creek, while the remainder continued flowing in the creek to Lake Hodges, *even though historical groundwater levels in the Basin respond rapidly to wet winter conditions*. This suggests a fundamental disconnect between the model response and the observed hydrogeologic response in the Basin, which in turn suggests that the model does not accurately represent the Basin and needs substantial revision before it can be used to assess the efficacy of projects and management actions. (4) The memo states that only 7% of the "simulated" releases from Sutherland Dam would contribute to groundwater storage while the remainder would "be lost to ET or outflow." This number is misleading as it could equally be much smaller if the model simulated higher releases or much higher if releases were simulated during the winter months, and the water that flows through the model to Lake Hodges was not included as being "lost." Use of a meaningless low percentage of water retained in the Basin is there to bias the reader into assuming that the releases of water are not helpful. This has not been demonstrated by the memo. A review of surface water releases from Sutherland Dam that includes reasonable release parameters, a revised numerical model that reflects observed groundwater responses in the Basin, and a detailed explanation of the work conducted is needed. It is anticipated that such a study would indicate the efficacy of surface water releases from Sutherland Dam at providing recharge to the Basin and that this management action should have a higher priority in the GSP.

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Exhibit 2

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Memo
To: Andre Monette, Esq., Best, Best and Krieger
From: Peter Quinlan
August 10, 2021

Comments on the Numerical Groundwater Presented in the Draft Groundwater Sustainability Plan for the San Pasqual Valley Basin

Overview

In general, the reliability of numerical groundwater models is constrained by sparse data. The model constructed to represent the San Pasqual Valley Basin (SPVB) and presented in the Draft Groundwater Sustainability Plan is no different. In mathematical terms, a model based on a paucity of data is underdetermined and whatever model is constructed is characterized by great uncertainty and not uniquely correct. The greater the uncertainty associated with the model, the lower the ability to draw conclusions about how the basin works.

The parameters of vertical and horizontal conductivity and storage coefficient have to be defined for every cell in the numerical model. When no site-specific observed values for these parameters are available, assumed values are incorporated into the model. Very few site-specific observed values of these parameters were available for the alluvium and none for the residuum or granitic rock beneath the basin. In addition, the quantity of recharge to the basin from each source (rainfall, irrigation return flows, infiltration from streams, and subsurface inflows) must be estimated if no quantitative measurements exist. All these inflows had to be estimated in the SPVB numerical groundwater model. Similarly, surface and subsurface boundary outflows, discharge to streams and wells must be estimated if not measurements occur. Of these outflows, there was limited data for well discharge, but not for the other outflows in the SPVB. If a number of the inflows and outflows are well quantified, the model calculations of the remaining inflows and outflows may provide useful estimates. If there are almost no quantitative measurements of inflows and outflows, there can be no certainty about model calculated inflows and outflows on which to base conclusions on how the alluvium, residuum and underlying granitic rock interact.

Models are calibrated to observed historical data, most often observed water levels. The ability of a model with a particular set of assumed parameter values to reproduce observed historical water levels does make that model the uniquely correct representation of the actual basin, merely one of many possible models. Parameter values are typically varied, or tweaked, to get the model to reproduce historical water levels. If the parameters are tweaked in unrealistic

ways, confidence in the model the ability to draw conclusions about the interaction of the basin sediments with the surrounding granitic rock is diminished. Unfortunately, that appears to have occurred in the construction of the SPVB numerical groundwater model. As is discussed below in greater detail, exceptionally low values assumed for the vertical conductivity of the stream beds very likely result in underestimated recharge from streams. Additionally, during calibration, localized assignments of very unusually high vertical conductivity values appear to have been incorporated in very localized areas to create a match with observed water levels in the granitic rock beneath the alluvium and residuum and to accommodate estimated pumping from the granitic rocks underlying the SPVB. These questionable parameter values are not supported by site-specific observations.

The construction of a number of different models with varying assigned values for parameters and inflows and outflows (parameterizations or realizations) can be used to characterize the uncertainty/reliability of the model predictions of future hydrogeologic conditions. Only one realization was prepared for the SPVB, consequently the confidence that we can have in the model predictions is uncertain.

The draft GSP states that the model will not be used to make management decisions, but it is used to estimate the basin water balance and may unduly influence the GSA's conceptual understanding of how the basin works. Furthermore, the model appears to have been used to evaluate the feasibility of recharging the basin by releasing water from Sutherland Reservoir to Santa Ysabel Creek.

In summary, there are enough weaknesses in the current model that it should not be used to evaluate the feasibility of recharging the SPVB by mean of releases from Sutherland Reservoir or draw conclusions about the hydrologic interaction of the alluvium and residuum in the SPVB and the granitic rock outside of it.

Specific Comments

Recharge from Surface Water

The initial estimate of vertical hydraulic conductivity (Kz) for the creek beds was to have been 8.8 X 10e-3 cm/sec (Section 3.4.1, page 3-10), but numerical mass balance errors in the model necessitated reducing the Kz of the stream beds. This reflects a computational limitation of the code in the model rather than a limitation of the infiltration capacity of the stream beds at least in Santa Ysabel and Guejito Creeks. The final Kz of the stream beds was 3.5 X 10e-5 cm/sec which is characteristic of silt (Freeze and Cherry, *Groundwater*, 1979) and is at odds with the fine to coarse sand and gravel observed in the stream beds of Santa Ysabel Creek in the eastern portion of the basin and Guejito Creek. By comparison the Kz assigned to Layer 1 in much of the basin in the calibrated model ranged from 1.76E-03 to 3.53E-03 cm/sec (Figure 4-10), two orders of magnitude greater. The original value of 8.8 X 10e-3 cm/sec would be more appropriate as the Kz for these sediments.

The low Kz assigned to the stream bed is a function of the model computational constraints, not the observed conditions. A result of this modeling compromise, a small fraction of the average surface water inflow (13,907 AFY per Table 4-7) recharges groundwater. The simulated average groundwater recharge from streams is that only 2276 AFY (16%) of model estimated surface water inflow during the historical period.

In contrast, the model simulates that 36% of the total of: 1) precipitation falling within the model, 2) the water applied for irrigation, and 3) septic discharges end up recharging the groundwater. The total annual average precipitation and applied irrigation water amount to 8543 AFY which is much less than the stream inflow at 13,907 AFY, yet in the model it provides more groundwater recharge (3052 AFY versus 2276 AFY). The surface sediments outside of the stream beds are finer-grained and should have a lower Kz than the stream beds, but in this model these finer-grained sediments have assigned Kz values roughly 100 times greater than the stream beds.

If the model code could computationally handle values of Kz for the stream beds more in keeping with the observed sediments, groundwater recharge in the model from stream beds would increase. Other aspects of the model would change as a result. The assignment of the low Kz to the stream beds and the resulting limited infiltration ripples through the model affecting calibration modifications to Kh and Kz in all 4 layers of the model and the estimated subsurface inflows.

The model also underestimates cumulative surface water inflow from Guejito Creek during the 15-year historical period by 10,000 AF (Figure 3-20) which is half of the observed discharge. This also serves to underestimate potential recharge from surface water flows.

As with most models, this one is under-determined; that is, there are insufficient data to constrain assumptions about model parameters, inflows, and outflows. To better understand the water balance of the SPV Basin, it is critical that two new stream gauges be installed along Santa Ysabel Creek, one just upstream of the confluence with Santa Maria Creek and another at the downstream end of the basin. These gauges would improve the understanding of the contributions of the stream flow to groundwater recharge. Additional stream flow monitoring gauges were not identified as a data gap in the draft GSP.

Vertical Hydraulic Conductivity in the Granitic Rock and Residuum

As discussed in sections 4.3.2 and 4.3.6, in order to reproduce the vertical head differences in the east and simulated pumping from the granitic rock, the vertical hydraulic conductivity (Kz) had to be increased in the granitic rock. Indeed, it was increased to be 100 times greater than horizontal conductivity (Kh). Typically the ratio of Kh:Kz is expected to be on the order of 10:1 in alluvium (or 1:1 in lower permeability formations like clay and crystalline rock like granite). While the GSP states that this highly unusual ratio is possible in fractured rock, that implies vertical fracturing and no evidence is cited to justify this unusually high Kz. It is also odd that Kz

in the granitic rock was selectively increased on only a few isolated areas surrounding the USGS monitor wells where there were historical water levels used in calibration. This appears to be an arbitrary localized tweak to match historical water levels. In Rockwood Canyon this highly unusual Kh:Kz ratio of 1:100 was applied to the residuum which is weathered granite having a granular texture and abundant fines in the silt to clay range and unlikely to fracture. The application of this highly unusual Kh:Kz ratio to the residuum is inappropriate. Furthermore, this highly unusual ratio of 1:100 for Kh:Kz was not assigned to the granitic rock in the layers beneath the residuum. The granitic rock is precisely where fracturing could be expected to occur. This clearly looks to be an artifact of calibration rather than the reflection of a well-conceived conceptual model of the basin and surrounding granitic rock. It also makes drawing conclusions about the hydrologic interaction of the alluvial sediments and residuum based on model results highly dubious.

Appendix O Screening Analysis Results

It is not clear, but it appears that the model was used to evaluate the feasibility of releasing water from Sutherland Reservoir to provide recharge to the basin. Predictably the model as constructed with the unrealistically low Kz assigned to the stream beds predicted that only a small percentage of the released water would recharge the basin. If the model more accurately reflected the sandy sediments in the stream beds, more water would have infiltrated. This analysis also estimated that 772 AFY would be lost to evapotranspiration during releases from May to September. However, the draft GSP fails to mention that there would be losses to evaporation from the reservoir even if no water were released to recharge the San Pasqual Valley Basin. The average annual evaporation from Sutherland Reservoir is 52.77 inches /year (4.4 ft/yr). Most of that occurs between May and October, when the analysis indicated that the releases would occur. Sutherland Reservoir has an area of 557 acres when full. If full the annual loss to evaporation would be 2449 AF.

Exhibit 3

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MEMORANDUM OF UNDERSTANDING
DEVELOPMENT OF A GROUNDWATER SUSTAINABILITY PLAN
FOR THE SAN PASQUAL VALLEY GROUNDWATER BASIN

This Memorandum of Understanding for the Development of a Groundwater Sustainability Plan ("GSP") for the San Pasqual Valley Groundwater Basin ("MOU") is entered into and effective this 29 day of June, 2017 by and between the County of San Diego ("County") and the City of San Diego ("City"). The County and the City are each sometimes referred to herein as a "Party" and are collectively sometimes referred to herein as the "Parties."

RECITALS

WHEREAS, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("Act") found at California Water Code Section 10720, *et seq*;

WHEREAS, Act went into effect on January 1, 2015;

WHEREAS, Act seeks to provide sustainable management of groundwater basins, enhance local management of groundwater; establish minimum standards for sustainable groundwater management; and provide local groundwater agencies the authority and the technical and financial assistance necessary to sustainably manage groundwater;

WHEREAS, the Parties have each declared to be a Groundwater Sustainability Agency ("GSA") overlying portions of San Pasqual Valley Groundwater Basin ("San Pasqual Basin"), identified as Basin Number 9.10, a Bulletin 118 designated (medium-priority) basin;

WHEREAS, each Party has statutory authorities that are essential to groundwater management and Act compliance;

WHEREAS, Section 10720.7 of Act requires all basins designated as high- or medium-priority basins designated in Bulletin 118 be managed under a GSP or coordinated GSPs pursuant to Act;

WHEREAS, Section 10720.7 of Act requires that all basins designated high- or medium- priority basins designated in Bulletin 118 that are not critically overdrafted basins be managed under a GSP by January 31, 2022;

WHEREAS, the Parties intend to eliminate overlap of the Parties by forming a multi-agency GSA (San Pasqual Valley GSA) over the entire San Pasqual Basin (Attachment A) and collectively developing and implementing a single GSP to sustainably manage San Pasqual Basin pursuant to section 10727 *et seq.* of Act;

WHEREAS, the Parties wish to use the authorities granted to them pursuant to the Act and utilize this MOU to memorialize the roles and responsibilities for developing the GSP;

WHEREAS, it is the intent of the Parties to complete the GSP as expeditiously as possible in a manner consistent with Act and its implementing regulations;

WHEREAS, it is the intent of the Parties to cooperate in the successful implementation of the GSP not later than the date as required by the Act for the San Pasqual Basin;

WHEREAS, the Parties wish to memorialize their mutual understandings by means of this MOU; and

NOW, THEREFORE, in consideration of the promises, terms, conditions, and covenants contained herein, the County of San Diego and the City of San Diego hereby agree as follows:

I. Purposes and Authorities.

This MOU is entered into by the Parties for the purpose of establishing a cooperative effort to develop and implement a single GSP to sustainably manage the San Pasqual Basin that complies with the requirements set forth in the Act and its associated implementing regulations. The Parties recognize that the authorities afforded to a GSA pursuant to Section 10725 of the Act are in addition to and separate from the statutory authorities afforded to each Party individually. The Parties intend to memorialize roles and responsibilities for GSP implementation during preparation of the GSP.

II. Definitions.

As used in this Agreement, unless context requires otherwise, the meanings of the terms set forth below shall be as follows:

1. "Act" refers to the Sustainable Groundwater Management Act.
2. "Core Team" refers to the working group created in Section III of the MOU.
3. "Cost Recovery Plan" refers to a component of the Plan that includes an evaluation of fee recovery options and proposed fee recovery alternative(s) available to GSAs pursuant to Sections 10730 and 10730.2 of SGMA.
4. "City" refers to the City of San Diego, a Party to this MOU. The City has designated the Deputy Director for Long-Range Planning and Water Resources Division, Public Utilities Department or their designee(s), as the City department representative to carry out the terms of this MOU for the City.
5. "County" refers to the County of San Diego, a Party to this MOU. The County has designated the Director, Planning & Development Services, or his designee(s), as the County department representative to carry out the terms of this MOU for the County.
6. "DWR" refers to the California Department of Water Resources.
7. "Effective Date" means the date on which the last Party executes this Agreement.
8. "Executive Group" refers to the group created in Section III of the MOU.
9. "Governing Body" means the legislative body of each Party: the City Council and the County Board of Supervisors, respectively.
10. "Groundwater Sustainability Plan ("GSP")" is the basin plan for the San Pasqual Basin that the Parties to this MOU are seeking to develop and implement pursuant to the Act.
11. "Memorandum of Understanding ("MOU")" refers to this agreement.
12. "Party" or "Parties" refer to the City of San Diego and County of San Diego.

13. "GSP Schedule" includes all the tasks necessary to complete the GSP and the date scheduled for completion.

14. "State" means the State of California.

III. Agreement.

This section establishes the process for the San Pasqual Basin GSP Core Team, Executive Group and Stakeholder Engagement.

1. Core Team Structure
    a. Details of Core Team structure (number of members and interests represented) will be determined during GSP development.
    b. The Core Team will be coordinated by a City designated person. The City designated person will be responsible for developing the scope of work, schedule, and budget for GSP development for consideration by the Core Team's members.
2. Establishment and Responsibilities of the GSP Core Team ("Core Team").
    a. The Core Team will consist of representatives from each Party to this MOU working cooperatively together to achieve the objectives of the Act, and is coordinated by the City. Core Team members serve at the pleasure of their appointing Party and may be removed/changed by their appointing Party at any time. A Party must notify all other Parties to this MOU in writing if that Party removes or replaces Core Team members.
    b. The Core Team shall develop a coordinated GSP. The GSP shall include, but not be limited to, enforcement measures, a detailed breakdown of each Parties responsibilities for GSP implementation, anticipated costs of implementing the GSP, and cost recovery mechanisms (if necessary).
    c. The Core Team shall develop a stakeholder engagement plan (Engagement Plan), which shall detail outreach strategies to involve stakeholders and other interested parties in the preparation of the GSP.
    d. Each member of the Core Team shall be responsible for keeping his/her respective management and governing body informed of the progress towards the development of the GSP and for obtaining any necessary approvals from management/governing body. Each member of the Core Team shall keep the other members reasonably informed as to all material developments so as to allow for the efficient and timely completion of the GSP.
    e. Each Core Team member's compensation for their service on the Core Team is the responsibility of the appointing Party.
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    a. The Executive Group shall consist of representatives, typically directors, general managers, or chief executives, from each Party.
    b. The Executive Group for San Pasqual discussions will be coordinated by a City

representative.

c. The Executive Group's primary responsibilities are to provide information and individual advice to the Core Team on matters such as: progress on meeting goals and objectives, progress on implementing actions undertaken pursuant to the MOU and resolving issues related to those actions, and formulating measures to increase efficiency in reaching the MOUs goals. Executive Group members also provide direction and oversight regarding activities that should be undertaken by their Party's representative(s) on the Core Team.

d. The Executive Group shall develop and approve a "Guiding Principles" document, which will provide a foundation for collaborative discussion, planning, operational values, and mutual understandings among members of the Core Team. Prior to beginning GSP preparation, the "Guiding Principles" will be prepared and included as part of this MOU through reference.

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a. The Core Team will establish a meeting schedule and choice of locations for regular meetings to discuss GSP development and implementation activities, assignments, milestones and ongoing work progress.

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c. Attendance at all Core Team meetings may be augmented to include staff or consultants to ensure that the appropriate expertise is available.

d. The Core Team agrees to host a minimum of one Executive Group Meeting per calendar year prior to Plan adoption. The purpose of such meetings will be to discuss, review, and resolve details and issues brought forward from the Core Team regarding the development of the Plan and other related activities.

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1. To provide for consistent and effective communication between Parties, each Party agrees that a single member from each Party's Core Team will be their central point of contact on matters relating to this MOU. Additional representatives may be appointed to serve as points of contact on specific actions or issues.

2. The Core Team shall appoint a representative from the City to communicate actions conducted under this MOU to DWR and be the main point of contact with DWR. The appointee shall not communicate formal actions or decisions without prior written approval from the Core Team.

3. Informal communications between the Parties and DWR are acceptable.

V. Roles and Responsibilities of the Parties.

1. The Parties are responsible for developing a coordinated GSP that meets the requirements of the Act.

2. The Parties are each responsible for implementing the GSP in their respective

jurisdictional areas (see attached map of jurisdictional areas)

3. The Parties will jointly establish their roles and responsibilities for implementing a coordinated GSP for the San Pasqual Basin in accordance with the Act.
4. The Parties will jointly work in good faith and coordinate all activities to meet the objectives of SGMA compliance. The Parties shall cooperate with one another and work as efficiently as possible in the pursuit of all activities and decisions described in the MOU.
5. As part of the Engagement Plan, and prior to GSP preparation, the Parties agree to explore the option of an advisory committee comprised of diverse social, cultural, and economic elements of the population and area stakeholders within the San Pasqual Basin. If implemented, the advisory committee makeup and structure will be determined prior to GSP development with input from local stakeholders.
6. Each of the Parties will provide expertise, guidance, and data on those matters for which it has specific expertise or statutory authority, as needed to carry out the objectives of this MOU. Further development of roles and responsibilities of each Party will occur during GSP development.
7. After execution of this MOU as soon as reasonably possible, the Core Team shall develop a timeline that describes the anticipated tasks to be performed under this MOU and dates to complete each task ("GSP Schedule"); and scope(s) of work and estimated costs for GSP development. The GSP Schedule will allow for the preparation of a legally defensible GSP acceptable to the Parties and include allowances for public review and comment, and approval by Governing Bodies prior to deadlines required in the Act. The GSP Schedule will be determined at the beginning of GSP development and will be referred and amended as necessary to conform to developing information, permitting, and other requirements. Therefore, this GSP Schedule may be revised from time to time upon mutual agreement of the Core Team. Costs shall be funded and shared as outlined in Section VI.
8. The Core team shall be coordinated by the City and its Executive Group member. Core Team members will collaborate to meet sustainability objectives as defined in SGMA and apply the Guiding Principles developed by the Executive Group prior to developing the GSP.
9. The Core Team shall work in a manner that seeks to achieve full agreement (consensus) amongst the Parties. In the event that the Core Team has attempted, in good faith, to resolve the matter on its own and is unsuccessful, the Core Team agrees to seek resolution through Executive Group Meetings.

VI. Contracting and Funding for GSP Development.

1. The Parties shall mutually develop a scope of work, budget, and Cost Recovery Plan for the work to be undertaken pursuant to this MOU. The GSP Cost Recovery Plan shall be included and adopted in the final San Pasqual Basin GSP. The budget shall be determined prior to any financial expenditures or incurrence of any financial obligations related to consultant costs.
2. The City shall hire consultant(s) to complete required components of the GSP. The

contracting shall be subject to the City's competitive bid process.

3. The Parties agree that consultant costs for GSP development shall be proportionately based on the jurisdictional area of each Party in the San Pasqual Basin such that the City shall pay 90 percent of any consultant cost(s) to prepare a GSP for the San Pasqual Basin while the County shall pay the remaining 10 percent. Compensation for each member's representatives on the Core Team shall be borne by the Party. The Parties shall enter into a cost reimbursement agreement for the preparation of the Plan.
4. Specifically, to fulfill the requirements of the Act, the Core Team will collaboratively agree upon a scope of work for the consultants needed to prepare the GSP. The scope of work and budget shall include only what is required by the Act. In the event that one or more stakeholders requests a non-essential component or additional detail in the scope of work, the Parties will discuss the request, and if appropriate, any deviation from the 90/10 split will be agreed upon in writing prior to execution of that task.
5. The Parties agree that each Party will bear its own staff costs to develop the GSP.

VII. Approval.

1. The Parties agree to make best efforts to adhere to the required GSP Schedule and will forward a final San Pasqual Basin GSP to their respective Governing Body for approval and subsequent submission to DWR for evaluation as provided for in Act.
2. Approval and amendments will be obtained from the County Board of Supervisors prior to submission to the City Council.
3. Each Governing Body retains full authority to approve, amend, or reject the proposed GSP, provided the other Governing Body subsequently confirms any amendments. Both Parties also recognize that the failure to adopt and submit a GSP for the San Pasqual Basin to DWR by January 31, 2022, risks allowing for State intervention in managing the San Pasqual Basin.
4. The Parties agree that they will use good-faith efforts to resolve any issues that one or both Governing Bodies may have with the final proposed GSP for the San Pasqual Basin in a timely manner so as to avoid the possibility of State intervention. An amendment to this MOU is anticipated upon acceptance of the San Pasqual Basin GSP by both Governing Bodies.

VIII. Staffing.

Each Party agrees that it will devote sufficient staff time and other resources to actively participate in the development of the GSP for the San Pasqual Basin, as set forth in this MOU.

IX. Indemnification.

1. Claims Arising From Sole Acts or Omissions of City.
The City of San Diego ("City") hereby agrees to defend and indemnify the County, its agents, officers and employees (hereinafter collectively referred to in this paragraph as "County"), from any claim, action or proceeding against County,

arising solely out of the acts or omissions of City in the performance of this MOU. At its sole discretion, County may participate at its own expense in the defense of any claim, action or proceeding, but such participation shall not relieve City of any obligation imposed by this MOU. The County shall notify City promptly of any claim, action or proceeding and cooperate fully in the defense.

2. Claims Arising From Sole Acts or Omissions of the County.
The County hereby agrees to defend and indemnify the City of San Diego, its agents, officers and employees (hereafter collectively referred to in this paragraph as 'City') from any claim, action or proceeding against City, arising solely out of the acts or omissions of County in the performance of this MOU. At its sole discretion, City may participate at its own expense in the defense of any such claim, action or proceeding, but such participation shall not relieve the County of any obligation imposed by this MOU. City shall notify County promptly of any claim, action or proceeding and cooperate fully in the defense.

3. Claims Arising From Concurrent Acts or Omissions.
The City of San Diego ("City") hereby agrees to defend itself, and the County hereby agrees to defend itself, from any claim, action or proceeding arising out of the concurrent acts or omissions of City and County. In such cases, City and County agree to retain their own legal counsel, bear their own defense costs, and waive their right to seek reimbursement of such costs, except as provided in paragraph 5 below.

4. Joint Defense.
Notwithstanding paragraph 3 above, in cases where City and County agree in writing to a joint defense, City and County may appoint joint defense counsel to defend the claim, action or proceeding arising out of the concurrent acts or omissions of County and City. Joint defense counsel shall be selected by mutual agreement of City and County. City and County agree to share the costs of such joint defense and any agreed settlement in equal amounts, except as provided in paragraph 5 below. City and County further agree that neither Party may bind the other to a settlement agreement without the written consent of both City and County.

5. Reimbursement and/or Reallocation.
Where a trial verdict or arbitration award allocates or determines the comparative fault of the Parties, City and County may seek reimbursement and/or reallocation of defense costs, settlement payments, judgments and awards, consistent with such comparative fault.

X. Litigation.

In the event that any lawsuit is brought against, either Party based upon or arising out of the terms of this MOU by a third party, the Parties shall cooperate in the defense of the action. Each Party shall bear its own legal costs associated with such litigation.

XI. Books and Records.

Each Party shall have access to and the right to examine any of the other Party's pertinent books, documents, papers or other records (including, without limitation, records

contained on electronic media) relating to the performance of that Party's obligations pursuant to this MOU, *providing that* nothing in this paragraph shall be construed to operate as a waiver of any applicable privilege. The Parties shall keep the information exchanged pursuant to this section confidential to the greatest extent allowed by law.

XII. Notice.

All notices required by this MOU will be deemed to have been given when made in writing and delivered or mailed to the respective representatives of City and the County at their respective addresses as follows:

For the City:

Lan C. Wiborg
Deputy Director
Public Utilities Department
525 B Street, Suite 300
San Diego, CA 92101

With a copy to:

Raymond C. Palmucci
Deputy City Attorney, Civil Division
Office of the San Diego City Attorney
1200 Third Avenue, Suite 1100
San Diego, CA 92101

For the County:

San Diego County
Administrative Officer
San Diego County
1600 Pacific Highway
San Diego, CA 92101

With a copy to:

Justin Crumley, Senior Deputy
Office of County Counsel
1600 Pacific Highway, Rm 355
San Diego, CA 92101

Any Party may change the address or facsimile number to which such communications are to be given by providing the other Parties with written notice of such change at least fifteen (15) calendar days prior to the effective date of the change.

All notices will be effective upon receipt and will be deemed received through delivery if personally served or served using facsimile machines, or on the fifth (5^{th}) day following deposit in the mail if sent by first class mail.

XIII. Miscellaneous.

1. Term of MOU**.** This MOU shall remain in full force and effect until the date upon which the Parties have both executed a document terminating the provisions of this MOU.
2. No Third Party Beneficiaries. This MOU is not intended to, and will not be construed to, confer a benefit or create any right on a third party, or the power or right to bring an action to enforce any of its terms.
3. Amendments. This MOU may be amended only by written instrument duly signed and executed by the City and the County.
4. Compliance with Law. In performing their respective obligations under this MOU, the Parties shall comply with and conform to all applicable laws, rules, regulations and ordinances.

5. Jurisdiction and Venue. This MOU shall be governed by and construed in accordance with the laws of the State of California, except for its conflicts of law rules. Any suit, action, or proceeding brought under the scope of this MOU shall be brought and maintained to the extent allowed by law in the County of San Diego, California.

6. Waiver. The waiver by either Party or any of its officers, agents or employees, or the failure of either Party or its officers, agents or employees to take action with respect to any right conferred by, or any breach of any obligation or responsibility of this MOU, will not be deemed to be a waiver of such obligation or responsibility, or subsequent breach of same, or of any terms, covenants or conditions of this MOU, unless such waiver is expressly set forth in writing in a document signed and executed by the appropriate authority of the City and the County.

7. Authorized Representatives. The persons executing this MOU on behalf of the Parties hereto affirmatively represent that each has the requisite legal authority to enter into this MOU on behalf of their respective Party and to bind their respective Party to the terms and conditions of this MOU. The persons executing this MOU on behalf of their respective Party understand that both Parties are relying on these representations in entering into this MOU.

8. Successors in Interest. The terms of this MOU will be binding on all successors in interest of each Party.

9. Severability. The provisions of this MOU are severable, and the adjudicated invalidity of any provision or portion of this MOU shall not in and of itself affect the validity of any other provision or portion of this MOU, and the remaining provisions of the MOU shall remain in full force and effect, except to the extent that the invalidity of the severed provisions would result in a failure of consideration or would materially adversely affect either Party's benefit of its bargain. If a court of competent jurisdiction were to determine that a provision of this MOU is invalid or unenforceable and results in a failure of consideration or materially adversely affects either Party's benefit of its bargain, the Parties agree to promptly use good faith efforts to amend this MOU to reflect the original intent of the Parties in the changed circumstances.

10. Construction of MOU. This MOU shall be construed and enforced in accordance with the laws of the United States and the State of California.

11. Entire MOU.

    a. This MOU constitutes the entire agreement between the City and the County and supersedes all prior negotiations, representations, or other agreements, whether written or oral.

    b. In the event of a dispute between the Parties as to the language of this MOU or the construction or meaning of any term hereof, this MOU will be deemed to have been drafted by the Parties in equal parts so that no presumptions or inferences concerning its terms or interpretation may be construed against any Party to this MOU.

IN WITNESS WHEREOF, the Parties hereto have set their hand on the date first above written.

CITY OF SAN DIEGO

By: _____
Kristina Peralta
Director, Purchasing & Contracting

I HEREBY APPROVE the form of the foregoing Agreement on this 29 day of June, 2017.

MARA ELLIOTT, City Attorney

By: _____
Ray Palmucci
Deputy City Attorney

R-311212

COUNTY OF SAN DIEGO,
a political subdivision of
the State of California

By: _____
Clerk of the Board of Supervisors

DATE: 6/27/17

Approved and or authorized by the Board of Supervisors of the County of San Diego.
Meeting Date: 6/21/17 Minute Order No. 4
By: _____ Date: 6/27/17
Deputy Clerk of the Board Supervisors

APPROVED AS TO FORM AND LEGALITY
BY COUNTY COUNSEL

By: _____ 6/21/17
Senior Deputy

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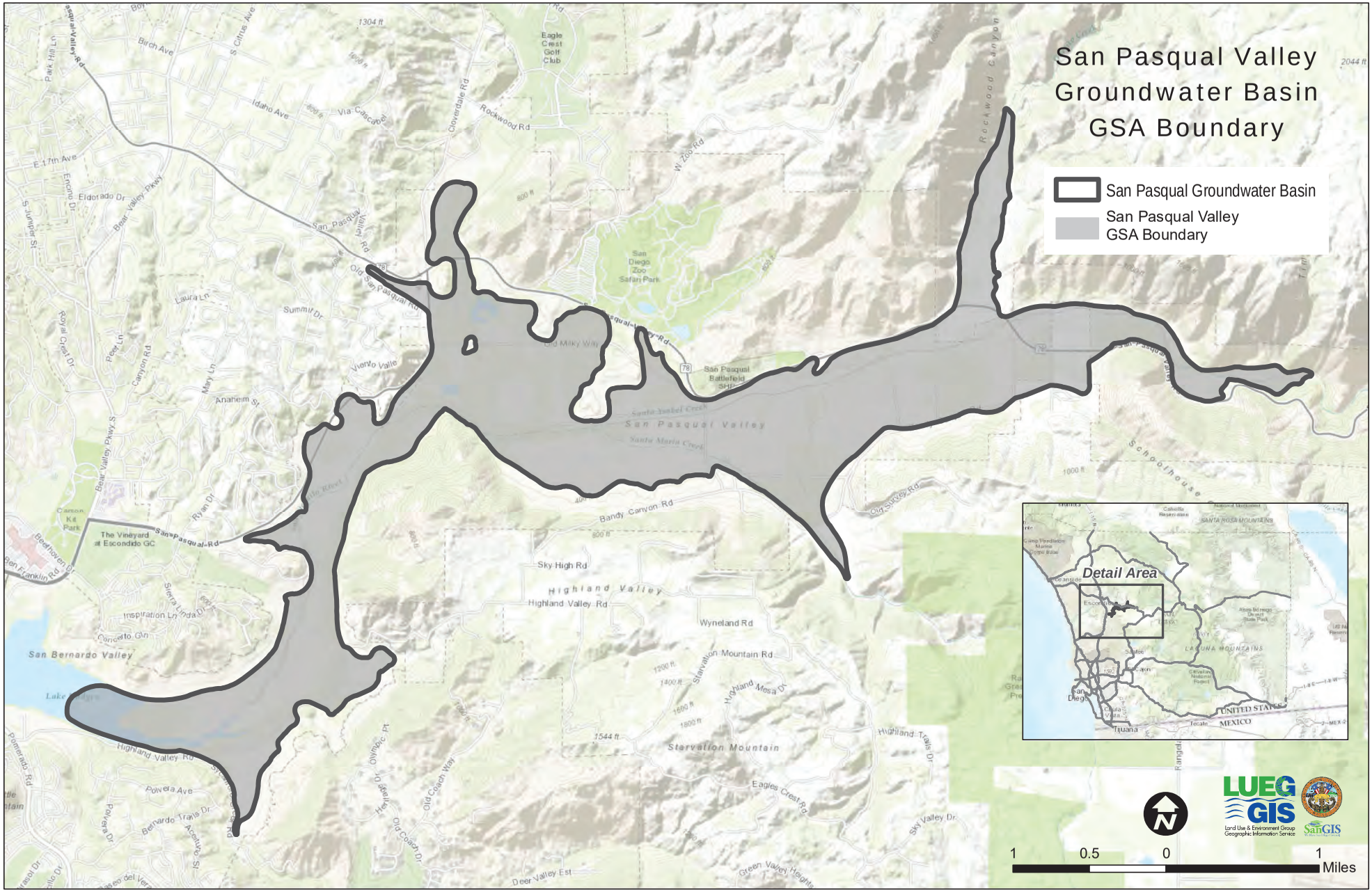

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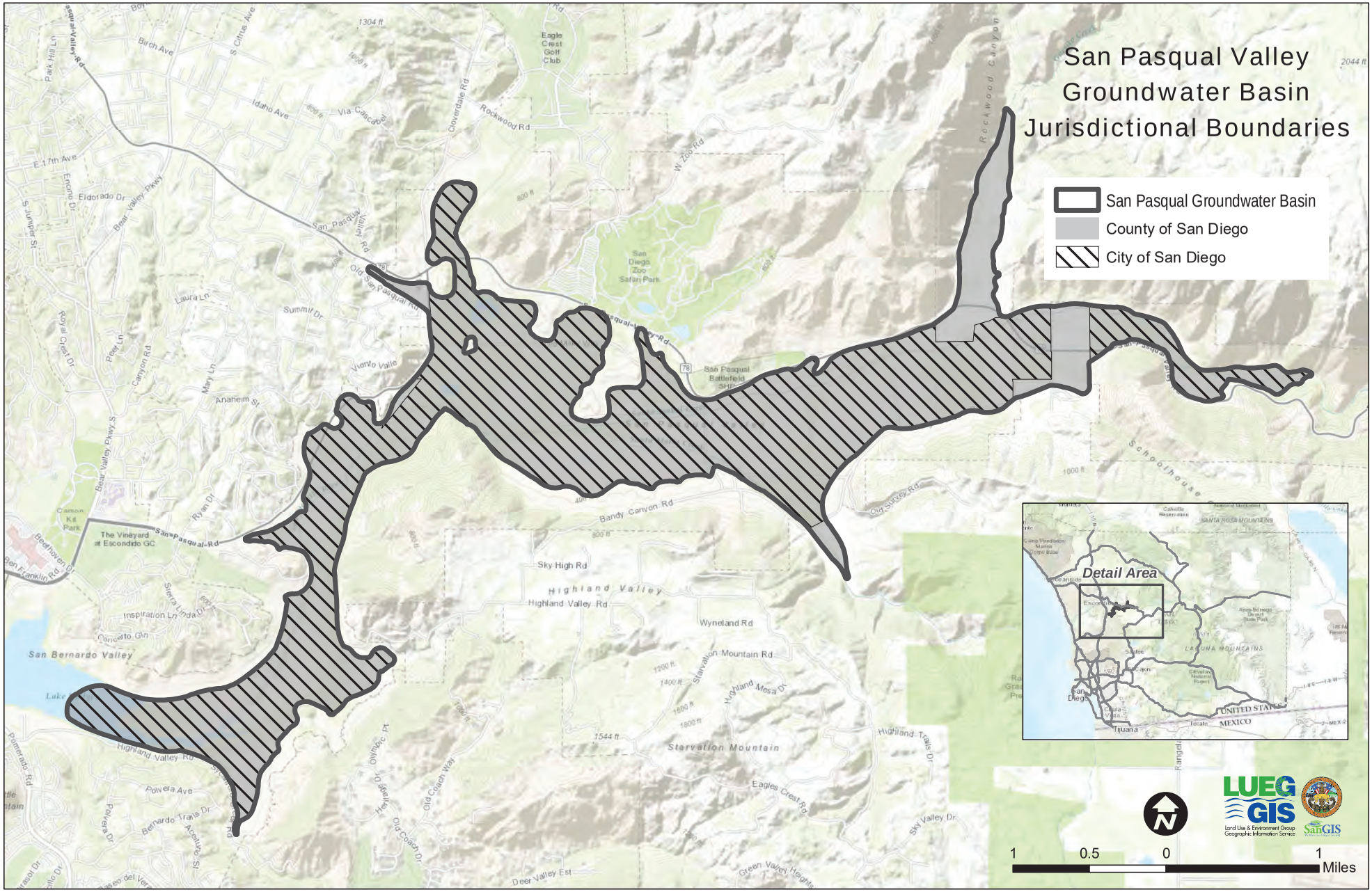

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Exhibit 3

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MEMORANDUM OF UNDERSTANDING
DEVELOPMENT OF A GROUNDWATER SUSTAINABILITY PLAN
FOR THE SAN PASQUAL VALLEY GROUNDWATER BASIN

This Memorandum of Understanding for the Development of a Groundwater Sustainability Plan ("GSP") for the San Pasqual Valley Groundwater Basin ("MOU") is entered into and effective this 29 day of June, 2017 by and between the County of San Diego ("County") and the City of San Diego ("City"). The County and the City are each sometimes referred to herein as a "Party" and are collectively sometimes referred to herein as the "Parties."

RECITALS

WHEREAS, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("Act") found at California Water Code Section 10720, *et seq*;

WHEREAS, Act went into effect on January 1, 2015;

WHEREAS, Act seeks to provide sustainable management of groundwater basins, enhance local management of groundwater; establish minimum standards for sustainable groundwater management; and provide local groundwater agencies the authority and the technical and financial assistance necessary to sustainably manage groundwater;

WHEREAS, the Parties have each declared to be a Groundwater Sustainability Agency ("GSA") overlying portions of San Pasqual Valley Groundwater Basin ("San Pasqual Basin"), identified as Basin Number 9.10, a Bulletin 118 designated (medium-priority) basin;

WHEREAS, each Party has statutory authorities that are essential to groundwater management and Act compliance;

WHEREAS, Section 10720.7 of Act requires all basins designated as high- or medium-priority basins designated in Bulletin 118 be managed under a GSP or coordinated GSPs pursuant to Act;

WHEREAS, Section 10720.7 of Act requires that all basins designated high- or medium- priority basins designated in Bulletin 118 that are not critically overdrafted basins be managed under a GSP by January 31, 2022;

WHEREAS, the Parties intend to eliminate overlap of the Parties by forming a multi-agency GSA (San Pasqual Valley GSA) over the entire San Pasqual Basin (Attachment A) and collectively developing and implementing a single GSP to sustainably manage San Pasqual Basin pursuant to section 10727 *et seq.* of Act;

WHEREAS, the Parties wish to use the authorities granted to them pursuant to the Act and utilize this MOU to memorialize the roles and responsibilities for developing the GSP;

WHEREAS, it is the intent of the Parties to complete the GSP as expeditiously as possible in a manner consistent with Act and its implementing regulations;

WHEREAS, it is the intent of the Parties to cooperate in the successful implementation of the GSP not later than the date as required by the Act for the San Pasqual Basin;

WHEREAS, the Parties wish to memorialize their mutual understandings by means of this MOU; and

NOW, THEREFORE, in consideration of the promises, terms, conditions, and covenants contained herein, the County of San Diego and the City of San Diego hereby agree as follows:

I. Purposes and Authorities.

This MOU is entered into by the Parties for the purpose of establishing a cooperative effort to develop and implement a single GSP to sustainably manage the San Pasqual Basin that complies with the requirements set forth in the Act and its associated implementing regulations. The Parties recognize that the authorities afforded to a GSA pursuant to Section 10725 of the Act are in addition to and separate from the statutory authorities afforded to each Party individually. The Parties intend to memorialize roles and responsibilities for GSP implementation during preparation of the GSP.

II. Definitions.

As used in this Agreement, unless context requires otherwise, the meanings of the terms set forth below shall be as follows:

1. "Act" refers to the Sustainable Groundwater Management Act.
2. "Core Team" refers to the working group created in Section III of the MOU.
3. "Cost Recovery Plan" refers to a component of the Plan that includes an evaluation of fee recovery options and proposed fee recovery alternative(s) available to GSAs pursuant to Sections 10730 and 10730.2 of SGMA.
4. "City" refers to the City of San Diego, a Party to this MOU. The City has designated the Deputy Director for Long-Range Planning and Water Resources Division, Public Utilities Department or their designee(s), as the City department representative to carry out the terms of this MOU for the City.
5. "County" refers to the County of San Diego, a Party to this MOU. The County has designated the Director, Planning & Development Services, or his designee(s), as the County department representative to carry out the terms of this MOU for the County.
6. "DWR" refers to the California Department of Water Resources.
7. "Effective Date" means the date on which the last Party executes this Agreement.
8. "Executive Group" refers to the group created in Section III of the MOU.
9. "Governing Body" means the legislative body of each Party: the City Council and the County Board of Supervisors, respectively.
10. "Groundwater Sustainability Plan ("GSP")" is the basin plan for the San Pasqual Basin that the Parties to this MOU are seeking to develop and implement pursuant to the Act.
11. "Memorandum of Understanding ("MOU")" refers to this agreement.
12. "Party" or "Parties" refer to the City of San Diego and County of San Diego.

13. "GSP Schedule" includes all the tasks necessary to complete the GSP and the date scheduled for completion.

14. "State" means the State of California.

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This section establishes the process for the San Pasqual Basin GSP Core Team, Executive Group and Stakeholder Engagement.

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    b. The Core Team will be coordinated by a City designated person. The City designated person will be responsible for developing the scope of work, schedule, and budget for GSP development for consideration by the Core Team's members.
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    c. The Core Team shall develop a stakeholder engagement plan (Engagement Plan), which shall detail outreach strategies to involve stakeholders and other interested parties in the preparation of the GSP.
    d. Each member of the Core Team shall be responsible for keeping his/her respective management and governing body informed of the progress towards the development of the GSP and for obtaining any necessary approvals from management/governing body. Each member of the Core Team shall keep the other members reasonably informed as to all material developments so as to allow for the efficient and timely completion of the GSP.
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representative.

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d. The Executive Group shall develop and approve a "Guiding Principles" document, which will provide a foundation for collaborative discussion, planning, operational values, and mutual understandings among members of the Core Team. Prior to beginning GSP preparation, the "Guiding Principles" will be prepared and included as part of this MOU through reference.

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c. Attendance at all Core Team meetings may be augmented to include staff or consultants to ensure that the appropriate expertise is available.

d. The Core Team agrees to host a minimum of one Executive Group Meeting per calendar year prior to Plan adoption. The purpose of such meetings will be to discuss, review, and resolve details and issues brought forward from the Core Team regarding the development of the Plan and other related activities.

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1. To provide for consistent and effective communication between Parties, each Party agrees that a single member from each Party's Core Team will be their central point of contact on matters relating to this MOU. Additional representatives may be appointed to serve as points of contact on specific actions or issues.

2. The Core Team shall appoint a representative from the City to communicate actions conducted under this MOU to DWR and be the main point of contact with DWR. The appointee shall not communicate formal actions or decisions without prior written approval from the Core Team.

3. Informal communications between the Parties and DWR are acceptable.

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1. The Parties are responsible for developing a coordinated GSP that meets the requirements of the Act.

2. The Parties are each responsible for implementing the GSP in their respective

jurisdictional areas (see attached map of jurisdictional areas)

3. The Parties will jointly establish their roles and responsibilities for implementing a coordinated GSP for the San Pasqual Basin in accordance with the Act.
4. The Parties will jointly work in good faith and coordinate all activities to meet the objectives of SGMA compliance. The Parties shall cooperate with one another and work as efficiently as possible in the pursuit of all activities and decisions described in the MOU.
5. As part of the Engagement Plan, and prior to GSP preparation, the Parties agree to explore the option of an advisory committee comprised of diverse social, cultural, and economic elements of the population and area stakeholders within the San Pasqual Basin. If implemented, the advisory committee makeup and structure will be determined prior to GSP development with input from local stakeholders.
6. Each of the Parties will provide expertise, guidance, and data on those matters for which it has specific expertise or statutory authority, as needed to carry out the objectives of this MOU. Further development of roles and responsibilities of each Party will occur during GSP development.
7. After execution of this MOU as soon as reasonably possible, the Core Team shall develop a timeline that describes the anticipated tasks to be performed under this MOU and dates to complete each task ("GSP Schedule"); and scope(s) of work and estimated costs for GSP development. The GSP Schedule will allow for the preparation of a legally defensible GSP acceptable to the Parties and include allowances for public review and comment, and approval by Governing Bodies prior to deadlines required in the Act. The GSP Schedule will be determined at the beginning of GSP development and will be referred and amended as necessary to conform to developing information, permitting, and other requirements. Therefore, this GSP Schedule may be revised from time to time upon mutual agreement of the Core Team. Costs shall be funded and shared as outlined in Section VI.
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9. The Core Team shall work in a manner that seeks to achieve full agreement (consensus) amongst the Parties. In the event that the Core Team has attempted, in good faith, to resolve the matter on its own and is unsuccessful, the Core Team agrees to seek resolution through Executive Group Meetings.

VI. Contracting and Funding for GSP Development.

1. The Parties shall mutually develop a scope of work, budget, and Cost Recovery Plan for the work to be undertaken pursuant to this MOU. The GSP Cost Recovery Plan shall be included and adopted in the final San Pasqual Basin GSP. The budget shall be determined prior to any financial expenditures or incurrence of any financial obligations related to consultant costs.
2. The City shall hire consultant(s) to complete required components of the GSP. The

contracting shall be subject to the City's competitive bid process.

3. The Parties agree that consultant costs for GSP development shall be proportionately based on the jurisdictional area of each Party in the San Pasqual Basin such that the City shall pay 90 percent of any consultant cost(s) to prepare a GSP for the San Pasqual Basin while the County shall pay the remaining 10 percent. Compensation for each member's representatives on the Core Team shall be borne by the Party. The Parties shall enter into a cost reimbursement agreement for the preparation of the Plan.
4. Specifically, to fulfill the requirements of the Act, the Core Team will collaboratively agree upon a scope of work for the consultants needed to prepare the GSP. The scope of work and budget shall include only what is required by the Act. In the event that one or more stakeholders requests a non-essential component or additional detail in the scope of work, the Parties will discuss the request, and if appropriate, any deviation from the 90/10 split will be agreed upon in writing prior to execution of that task.
5. The Parties agree that each Party will bear its own staff costs to develop the GSP.

VII. Approval.

1. The Parties agree to make best efforts to adhere to the required GSP Schedule and will forward a final San Pasqual Basin GSP to their respective Governing Body for approval and subsequent submission to DWR for evaluation as provided for in Act.
2. Approval and amendments will be obtained from the County Board of Supervisors prior to submission to the City Council.
3. Each Governing Body retains full authority to approve, amend, or reject the proposed GSP, provided the other Governing Body subsequently confirms any amendments. Both Parties also recognize that the failure to adopt and submit a GSP for the San Pasqual Basin to DWR by January 31, 2022, risks allowing for State intervention in managing the San Pasqual Basin.
4. The Parties agree that they will use good-faith efforts to resolve any issues that one or both Governing Bodies may have with the final proposed GSP for the San Pasqual Basin in a timely manner so as to avoid the possibility of State intervention. An amendment to this MOU is anticipated upon acceptance of the San Pasqual Basin GSP by both Governing Bodies.

VIII. Staffing.

Each Party agrees that it will devote sufficient staff time and other resources to actively participate in the development of the GSP for the San Pasqual Basin, as set forth in this MOU.

IX. Indemnification.

1. Claims Arising From Sole Acts or Omissions of City.
The City of San Diego ("City") hereby agrees to defend and indemnify the County, its agents, officers and employees (hereinafter collectively referred to in this paragraph as "County"), from any claim, action or proceeding against County,

arising solely out of the acts or omissions of City in the performance of this MOU. At its sole discretion, County may participate at its own expense in the defense of any claim, action or proceeding, but such participation shall not relieve City of any obligation imposed by this MOU. The County shall notify City promptly of any claim, action or proceeding and cooperate fully in the defense.

2. Claims Arising From Sole Acts or Omissions of the County.
The County hereby agrees to defend and indemnify the City of San Diego, its agents, officers and employees (hereafter collectively referred to in this paragraph as 'City') from any claim, action or proceeding against City, arising solely out of the acts or omissions of County in the performance of this MOU. At its sole discretion, City may participate at its own expense in the defense of any such claim, action or proceeding, but such participation shall not relieve the County of any obligation imposed by this MOU. City shall notify County promptly of any claim, action or proceeding and cooperate fully in the defense.

3. Claims Arising From Concurrent Acts or Omissions.
The City of San Diego ("City") hereby agrees to defend itself, and the County hereby agrees to defend itself, from any claim, action or proceeding arising out of the concurrent acts or omissions of City and County. In such cases, City and County agree to retain their own legal counsel, bear their own defense costs, and waive their right to seek reimbursement of such costs, except as provided in paragraph 5 below.

4. Joint Defense.
Notwithstanding paragraph 3 above, in cases where City and County agree in writing to a joint defense, City and County may appoint joint defense counsel to defend the claim, action or proceeding arising out of the concurrent acts or omissions of County and City. Joint defense counsel shall be selected by mutual agreement of City and County. City and County agree to share the costs of such joint defense and any agreed settlement in equal amounts, except as provided in paragraph 5 below. City and County further agree that neither Party may bind the other to a settlement agreement without the written consent of both City and County.

5. Reimbursement and/or Reallocation.
Where a trial verdict or arbitration award allocates or determines the comparative fault of the Parties, City and County may seek reimbursement and/or reallocation of defense costs, settlement payments, judgments and awards, consistent with such comparative fault.

X. Litigation.

In the event that any lawsuit is brought against, either Party based upon or arising out of the terms of this MOU by a third party, the Parties shall cooperate in the defense of the action. Each Party shall bear its own legal costs associated with such litigation.

XI. Books and Records.

Each Party shall have access to and the right to examine any of the other Party's pertinent books, documents, papers or other records (including, without limitation, records

contained on electronic media) relating to the performance of that Party's obligations pursuant to this MOU, *providing that* nothing in this paragraph shall be construed to operate as a waiver of any applicable privilege. The Parties shall keep the information exchanged pursuant to this section confidential to the greatest extent allowed by law.

XII. Notice.

All notices required by this MOU will be deemed to have been given when made in writing and delivered or mailed to the respective representatives of City and the County at their respective addresses as follows:

For the City:

Lan C. Wiborg
Deputy Director
Public Utilities Department
525 B Street, Suite 300
San Diego, CA 92101

With a copy to:

Raymond C. Palmucci
Deputy City Attorney, Civil Division
Office of the San Diego City Attorney
1200 Third Avenue, Suite 1100
San Diego, CA 92101

For the County:

San Diego County
Administrative Officer
San Diego County
1600 Pacific Highway
San Diego, CA 92101

With a copy to:

Justin Crumley, Senior Deputy
Office of County Counsel
1600 Pacific Highway, Rm 355
San Diego, CA 92101

Any Party may change the address or facsimile number to which such communications are to be given by providing the other Parties with written notice of such change at least fifteen (15) calendar days prior to the effective date of the change.

All notices will be effective upon receipt and will be deemed received through delivery if personally served or served using facsimile machines, or on the fifth (5^{th}) day following deposit in the mail if sent by first class mail.

XIII. Miscellaneous.

1. Term of MOU**.** This MOU shall remain in full force and effect until the date upon which the Parties have both executed a document terminating the provisions of this MOU.
2. No Third Party Beneficiaries. This MOU is not intended to, and will not be construed to, confer a benefit or create any right on a third party, or the power or right to bring an action to enforce any of its terms.
3. Amendments. This MOU may be amended only by written instrument duly signed and executed by the City and the County.
4. Compliance with Law. In performing their respective obligations under this MOU, the Parties shall comply with and conform to all applicable laws, rules, regulations and ordinances.

5. Jurisdiction and Venue. This MOU shall be governed by and construed in accordance with the laws of the State of California, except for its conflicts of law rules. Any suit, action, or proceeding brought under the scope of this MOU shall be brought and maintained to the extent allowed by law in the County of San Diego, California.

6. Waiver. The waiver by either Party or any of its officers, agents or employees, or the failure of either Party or its officers, agents or employees to take action with respect to any right conferred by, or any breach of any obligation or responsibility of this MOU, will not be deemed to be a waiver of such obligation or responsibility, or subsequent breach of same, or of any terms, covenants or conditions of this MOU, unless such waiver is expressly set forth in writing in a document signed and executed by the appropriate authority of the City and the County.

7. Authorized Representatives. The persons executing this MOU on behalf of the Parties hereto affirmatively represent that each has the requisite legal authority to enter into this MOU on behalf of their respective Party and to bind their respective Party to the terms and conditions of this MOU. The persons executing this MOU on behalf of their respective Party understand that both Parties are relying on these representations in entering into this MOU.

8. Successors in Interest. The terms of this MOU will be binding on all successors in interest of each Party.

9. Severability. The provisions of this MOU are severable, and the adjudicated invalidity of any provision or portion of this MOU shall not in and of itself affect the validity of any other provision or portion of this MOU, and the remaining provisions of the MOU shall remain in full force and effect, except to the extent that the invalidity of the severed provisions would result in a failure of consideration or would materially adversely affect either Party's benefit of its bargain. If a court of competent jurisdiction were to determine that a provision of this MOU is invalid or unenforceable and results in a failure of consideration or materially adversely affects either Party's benefit of its bargain, the Parties agree to promptly use good faith efforts to amend this MOU to reflect the original intent of the Parties in the changed circumstances.

10. Construction of MOU. This MOU shall be construed and enforced in accordance with the laws of the United States and the State of California.

11. Entire MOU.

    a. This MOU constitutes the entire agreement between the City and the County and supersedes all prior negotiations, representations, or other agreements, whether written or oral.

    b. In the event of a dispute between the Parties as to the language of this MOU or the construction or meaning of any term hereof, this MOU will be deemed to have been drafted by the Parties in equal parts so that no presumptions or inferences concerning its terms or interpretation may be construed against any Party to this MOU.

IN WITNESS WHEREOF, the Parties hereto have set their hand on the date first above written.

CITY OF SAN DIEGO

By: _____
Kristina Peralta
Director, Purchasing & Contracting

I HEREBY APPROVE the form of the foregoing Agreement on this 29 day of June, 2017.

MARA ELLIOTT, City Attorney

By: _____
Ray Palmucci
Deputy City Attorney

R-311212

COUNTY OF SAN DIEGO,
a political subdivision of
the State of California

By: _____
Clerk of the Board of Supervisors

DATE: 6/27/17

Approved and or authorized by the Board of Supervisors of the County of San Diego.
Meeting Date: 6/21/17 Minute Order No. 4
By: _____ Date: 6/27/17
Deputy Clerk of the Board Supervisors

APPROVED AS TO FORM AND LEGALITY
BY COUNTY COUNSEL

By: _____ 6/21/17
Senior Deputy

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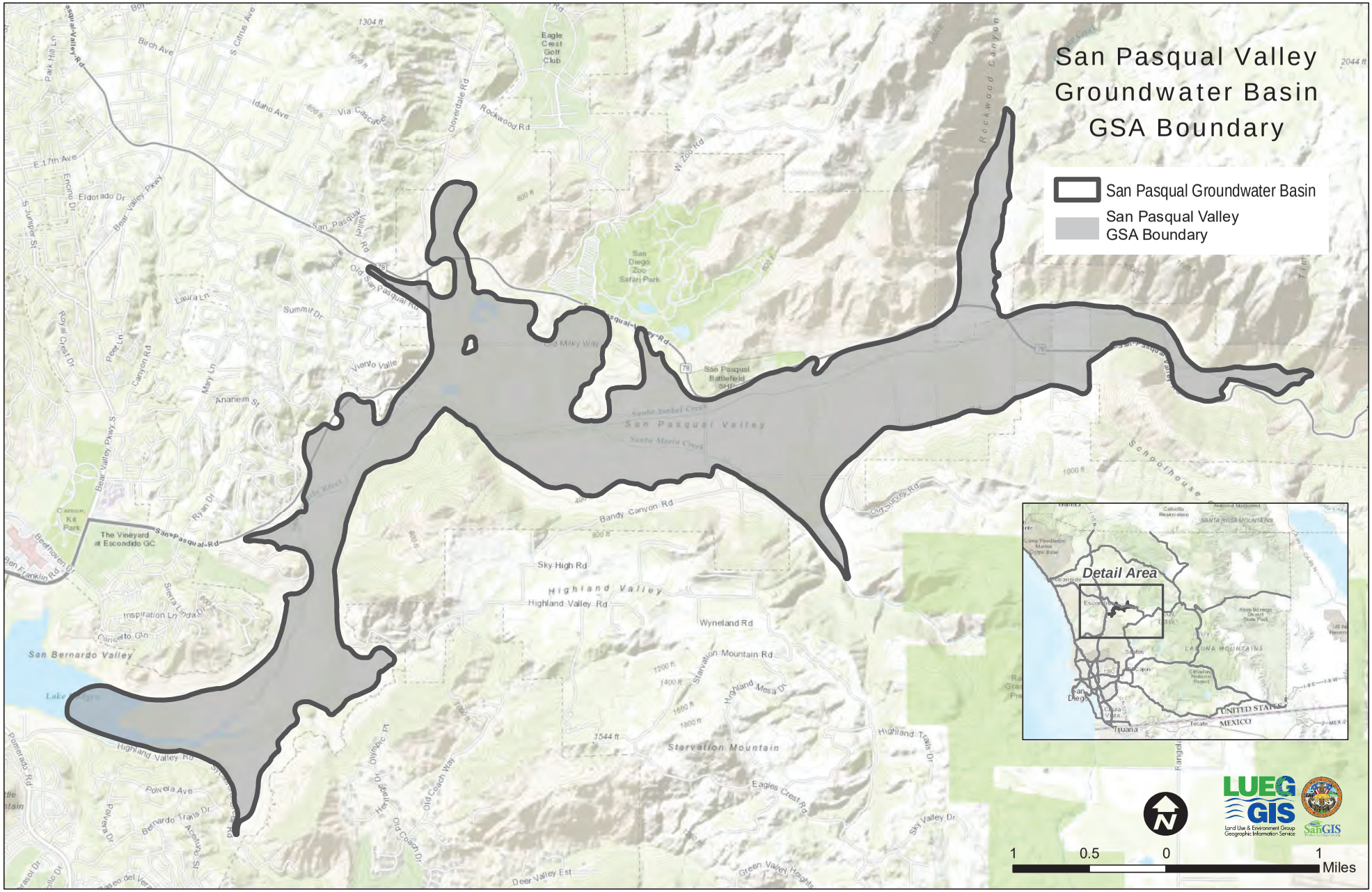

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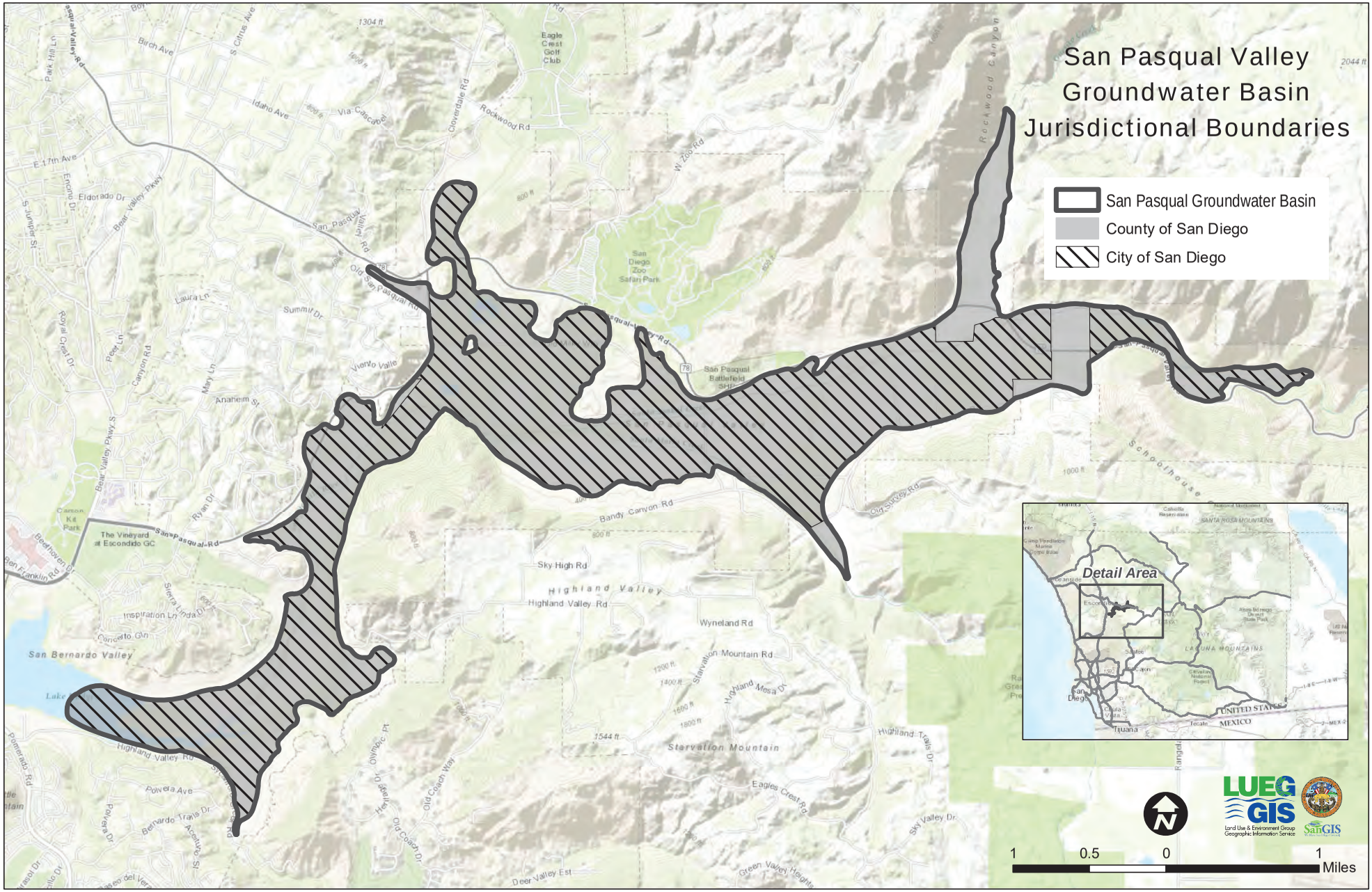

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Exhibit 4

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Del Mar turf superintendent Leif Dickinson (left), Darrell Haire of the Jockeys Guild (center) and Tom Robbins, vice president of racing and industry relations, examine the course. (/ Ed Zieralski)

West Coast Turf will continue growing sod on 360 acres of city land in San Pasqual Valley

By DAVID GARRICK

APRIL 29, 2020 5 AM PT

SAN DIEGO — A company that supplies sod for Pebble Beach Golf Links and the field surfaces of most major stadiums on the West Coast will continue growing much of its product on hundreds of acres of city-owned land for the next 30 years.

The San Diego City Council recently approved a new lease with West Coast Turf that will include 507 city-owned acres in the San Pasqual Valley, where the company has been growing sod for sports fields, high schools and other uses since 1991.

In exchange for use of 362 acres of the land for sod growth, the company maintains 145 acres of adjacent and "unusable" open space in the valley, which also is home to the San Diego Zoo's Safari Park.

The new pact increases the size of the company's lease payments and gives the city a chance to receive more money based on the company's revenue.

The flat-rate, quarterly rent for the site has been $41,495. The new rent will be either $54,300 per quarter or 5 percent of West Coast Turf's gross income, whichever is higher.

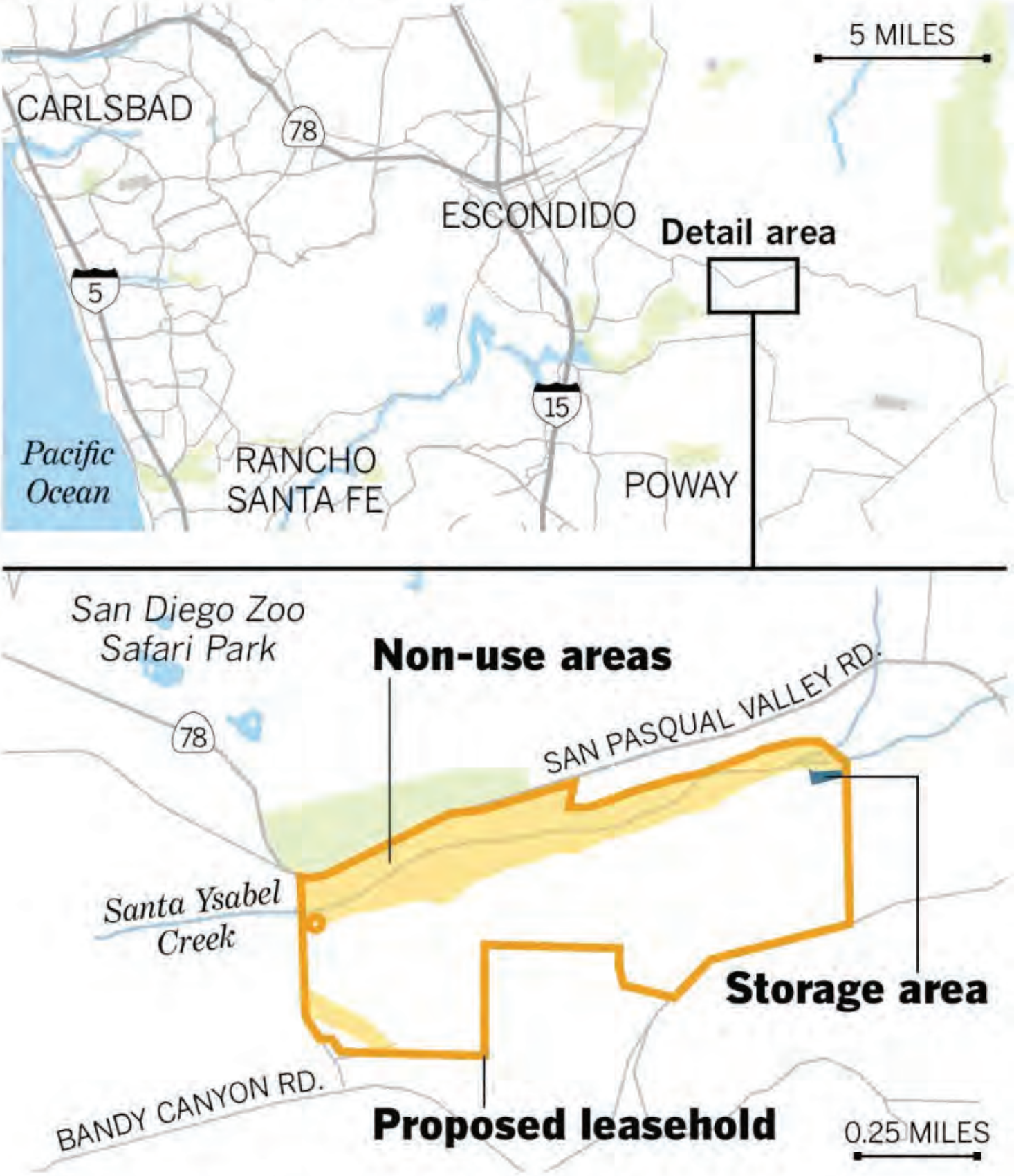
The company, which calls itself a leader in the turfgrass industry, has provided sod for Angel Stadium in Anaheim, Levi's Stadium in Santa Clara, Dodger Stadium, Oracle Park in San Francisco, Santa Anita and Del Mar racetracks, as well as Disneyland, the L.A. Coliseum and the Rose Bowl.

West Coast Turf also has provided sod for eight Super Bowl venues, according to the company's website, and it provides sod to many colleges, including UC San Diego, San Diego State, the University of San Diego, and some local school districts, including Carlsbad, San Marcos and Poway.

The minimum lease payment to the city is based on a recent appraisal that says market-rate annual rent for the land should be $600 per acre multiplied by the number of usable acres, or $217,000 per year.

San Diego extends turf lease

The city agrees to a 30-year lease with a turf company for 507 acres in San Pasqual Valley.



Sources: City of San Diego; Nextzen; OpenStreetMap

MICHELLE GUERRERO U-T

City officials say West Coast Turf has been a quality tenant, particularly with regard to the nearby environment and the Lake Hodges watershed.

“For over 25 years, West Coast Turf has responsibly maintained a clean and successful farming business in San Pasqual Valley,” a city staff report says. “They have demonstrated an understanding that the Lake Hodges watershed is an important asset of the community and that the upstream runoff is an important aspect.”

The company also focuses on water-saving varieties of sod, and its activities are monitored to make sure they aren’t impacting the aquifer in the area, city officials say.

The company sought a long-term lease extension because sod is a long-term perennial crop that typically takes several years to propagate.

West Coast Turf says on its website that using sod for grass fields is superior to seeding them.Sod is immediate while seed is often lost to wind and erosion. Seed also requires more water and takes several weeks to germinate, the company says.

The council approved the new lease in an 8-1 vote, with Councilwoman Vivian Moreno voting “no.” Her staff said there were concerns that the company has in the past produced dust clouds when farming some county-owned land near San Ysidro.

Calls to West Coast Turf seeking comment were not returned Tuesday.

POLITICS | BUSINESS | GROWTH & DEVELOPMENT | SAN DIEGO | TOP STORIES | LATEST | SPORTS

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Exhibit 5

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172 Cal.App.2d 593
District Court of Appeal, Fourth District, California.

Stanley TRUSSELL et al.,
Plaintiffs and Respondents,
v.
CITY OF SAN DIEGO, a Municipal Corporation, Defendant and Appellant.

Civ. 5876.
|
Aug. 5, 1959.
|
Rehearing Denied Aug. 28, 1959.
|
Hearing Denied Sept. 30, 1959.

Synopsis

Suit by owners of riparian, overlying and appropriative water rights against municipality which had constructed dam above point at which plaintiffs diverted water from stream. The Superior Court of San Diego County, Arthur L. Mundo, J., granted the relief sought, and defendant appealed. The District Court of Appeal, Haines, J. pro tem., held that issuance to defendant of permit which was, by its very terms, made subject to 'vested' rights, had not resulted in attachment of any public use to defendant's appropriation of water, except to extent that appropriation might be in excess of quantities required to be released in order to satisfy plaintiffs' rights, and held that even though plaintiffs had permitted completion of defendant's dam before asserting their rights, they were not estopped to seek injunctive relief, and that neither public use doctrine nor doctrine of laches was bar to relief.

Affirmed.

Attorneys and Law Firms

****66** ***596** J. F. DuPaul, City Atty., and Alan M. Firestone, Chief Deputy, San Diego, for appellant.

Swing, Scharnikow & Staniforth, by Phil D. Swing, and C. H. Scharnikow, San Diego, for respondents.

Opinion

HAINES, Justice pro tem.

Santa Ysabel Creek, also known as the San Bernardo River, rises on the westerly slope of Volcan Mountain, in San Diego County, at an elevation of upwards of 5,500 feet and flows in a direction generally southwesterly to its junction with Santa Maria Creek, coming in from the south, below which the combined stream is known as the San Dieguito River which thereafter pursues its course in the same general direction to the Pacific Ocean. This it reaches between Solano Beach and Del Mar at a point about a mile north of the latter. There are several other tributary creeks which join these waters at various points. The terrain through which these streams flow consists of a series of canyons and narrow valleys of which the most important are San Pasqual and San Dieguito. It is with the former that we are here concerned.

The original plaintiffs herein were Stanley Trussell, Lucille M. Trussell, Franklin Trussell, Jane L. Trussell, May Rhodes Trussell, Frank E. Judson, Velda C. Judson, Alice M. Judson Suhrie, Charles A. Judson, Rebecca T. Judson Rebecca P. Judson Dyer, Bernice J. Judson Morrisey, Fred A. Dyer, Erwin C. Georgeson, Lydia ****67** A. Georgeson, Harold W., Pfeiffer, Helen L. Pfeiffer, Southeastern California Association of Seventh-Day Adventists, a corporation, Ralph Cook and Jeanne V. Cook. They were, on May 1, 1956, the date of the commencement of this action, respectively owners of lands particularly described in the complaint, all within ***597** the San Pasqual Valley. They continue respectively to own, occupy and in part to cultivate the lands so described, except as some of them have since disposed of their properties to defendant and appellant City of San Diego, and withdrawn from the case; and except also as plaintiffs and respondents Stanley Trussell and Lucille M. Trussell, husband and wife, in addition to occupying and cultivating certain of their own lands have at various times leased and cultivated lands belonging to others of the plaintiffs; and except also as the plaintiffs Frank E. Judson and Velda C. Judson, in addition to occupying and cultivating certain of their own lands, have leased and cultivated the land owned by plaintiff Alice M. Judson Suhrie.

The San Pasqual Valley includes about 6,000 acres altogether, of which, at the commencement of the action the portions owned and farmed by the plaintiffs aggregated approximately 1,600 acres, forming the community known as East San Pasqual. Of the rest of the 6,000 acres the greater part have been acquired by appellant City of San Diego. These, for the most part, lie downstream from respondents' properties. According to respondents' engineer, Cromwell, about 360 acres of respondents' lands are in fact irrigated. These include

orchards and areas devoted to raising grain, corn and alfalfa. The evidence shows that respondent Stanley Trussell, on his property and that which he and his wife lease are conducting and for many years have conducted an extensive dairy business, requiring for its successful conduct large quantities of water. Other respondents are also maintaining dairies.

The valley and the respondents' lands are underlain by sands and gravels across which the river flows and which form an underground basin. The plaintiffs and respondents, except for such rain as falls on the valley floor, obtain their water supply from the river, which, at the locations of their lands, is not a perennial stream but flows irregularly from negligible discharge in some summer seasons to occasional torrential floods during protracted winter storms. Neither the river nor the creeks tributary to it, except in their upper reaches above the areas with which we are here concerned, flow, through the drier parts of the year, on the surface, but, so far as they continue at all, do so by percolating the sands and gravels which underlie their beds. The percolations of the river, however, in a state of nature, extended beyond the bed of the stream and sunk into the alluvium ***598** of the valley, filling the underlying sands and gravels to the full width of the valley and underlay all of the respondents' lands, all of which were found by the trial court to be riparian to the river itself and all of which were also found by the court to be lands overlying the impregnated basin. These lands are supplied by wells whenever surface flow from the river is not available.

Besides their riparian and overlying rights, respondents, except for the Cooks, are found by the trial court to each own a share in certain appropriative rights in the waters of Santa Ysabel Creek, initiated by their predecessor in interest in 1876 and perfected and put to beneficial use by their predecessors in interest long prior to the year 1913, and ever since exercised by the respondents (other than the Cooks) and their predecessors to the full extent of their requirements, on the said lands owned by them, whenever the water was available in the stream at their point of diversion, which was at the head of the San Pasqual Valley. It is found, however, that in recent years the diversion of water thus appropriated and used on respondents' lands has not, at any time, exceeded 12 cubic feet per second.

****68** According to the findings, defendant and appellant City of San Diego, pursuant to a state permit dated June 30, 1950, constructed the Sutherland Dam on Santa Ysabel Creek at a point some miles above the San Pasqual Valley and above the point at which plaintiffs and respondents divert the appropriated water. The record shows that this permit was made subject to all vested rights. The dam is built at an approximate stream bed elevation of 1,900 feet above sea level. It was commenced in 1952 and was substantially completed and its diversion outlet closed on December 30, 1953, although it is admitted in the pleadings that its full completion did not occur until June, 1954. This dam has impounded, stored and retained all water originating in the watershed above the same, amounting to 7,604 acre feet from January 1, 1954, to June 30, 1957, of which 4,757 acre feet was the inflow for the year 1953–54, 733 acre feet in 1954–55 and 910 acre feet in 1955–56. It is found that all of said water so stored was needed by plaintiffs and respondents to supply their reasonable needs on their lands and that there was not at any of said times any surplus available for appellant city to store or use. It is found that, in consequence of the withholding by appellant city of such stored water, the static water level in the wells of plaintiffs and respondents went down from ***599** approximately 10 feet below the ground surface before the construction of the dam to 44 feet after the dam was completed. It is found that the 10 foot static level referred to was due to an exceptionally wet year in 1952, but that the average static level in respondents' wells prior to construction of the Sutherland Dam ranged from 12 to 20 feet below ground level, and that this range is required to enable respondents to operate their wells as they have been accustomed to operate the same. It is further found that the withholding by defendant and appellant City of San Diego of such stored water has caused the water table beneath the lands of plaintiffs and respondents to fall below the root systems of their trees, orchards and alfalfa, thus requiring respondents to irrigate their trees, orchards and alfalfa more frequently than they otherwise would have had to do, thereby increasing their labor costs and pumping costs; also that the water from their wells was of poorer quality than the surface flow which they had previously obtained at the head of the valley in this, that such surface flow was warmer and carried silt which fertilized their lands. It is also found that by reason of the lowering of the water table respondents were unable to obtain their requirements from their respective wells without the expenditure of substantial sums for new wells and new equipment.

It is found that respondents have employed no unreasonable method of use or unreasonable method of diversion of water nor wasted any water.

The trial court further found that of the losses incurred, expenditures made and damages suffered by respondents in consequence of their impaired water supply, 50 per cent was due to causes unconnected with appellant city's operations,

principally the current severe and protracted drouth, but that the other 50 per cent was the direct and proximate result of appellant city's construction and operation of the Sutherland Dam and the withholding back of it of the waters of the Santa Ysabel Creek originating in the watershed of the latter.

Copies of claims seasonably filed by respondents with the City of San Diego for the damages resulting from the construction and operation of the Sutherland Dam are attached to the complaint and made part of the same as exhibits and the due receipt by the city of these claims is admitted.

The trial court found the amounts of many of the various classes of damages sustained by the several respondents and ***600** also found that appellant City of San Diego will, unless restrained, continue its present policy of withholding behind the Sutherland Dam all of the water of the ****69** Santa Ysabel Creek originating above the dam, to the continued injury and damage of respondents and their lands.

The record shows that the plaintiff and respondent Stanley Trussell in January, 1954, in behalf of himself and others interested, interviewed the city manager of the City of San Diego with a view to working out an arrangement whereby the landowners in the San Pasqual Valley might be assured that their water rights would be safeguarded when the Sutherland Dam should be completed and placed in operation and that a written communication was addressed to the city manager by Mr. Swing as a representative of such landowners under date February 25, 1954, seeking a conference to effect such arrangement, and that such conference was held on April 14, 19549 It further appears that on April 22, 1954, respondents' attorneys addressed a letter to the city manager complaining of the decreased flow then experienced by respondents at respondents' diversion ditch at the head of the San Pasqual Valley due to the obstruction of the runoff upstream resulting from construction work on the dam. This letter recites an inspection on the ground with a representative of the city and the exhibition to him of a photostat of the 1876 appropriation filing. The letter requests immediate restoration of the normal flow below the dam. The record further shows that on July 23, 1954, pursuant to the authority of a resolution adopted on the previous day by the San Diego City Council, the City of San Diego through its city attorney entered into a written stipulation with respondents' present counsel reciting the foregoing contracts and agreeing, *inter alia*, that 'The respective rights of said parties or any of them will not be in any way impaired, prejudiced or lost by lapse of time or delay subsequent to January 30, 1954, in commencing or instituting any legal action or proceeding in the filing of any claim for damages on account of or based upon or arising out of the storing by the City of San Diego of water behind the Sutherland Dam and/or the construction of said Sutherland Dam and/or the diversion of the water impounded by said dam out of the watershed above it'.

This stipulation recites that:

'The purpose of this agreement is to maintain the status quo of the rights enjoyed by the parties hereto as of January ***601** 30, 1954, while negotiating for an agreement of settlement or compromise'.

This stipulation is set up in the complaint and a copy attached as an exhibit thereto, and its existence is recited in the findings.

The trial court also found that the respondents at the time they filed their claims against the City of San Diego and at the time they filed their complaint herein 'had no actual notice or knowledge of the city's plans and intentions on what its policy would be with reference to limiting its storage of Santa Ysabel Creek water back of the Sutherland Dam, solely to the excess and surplus over and above plaintiffs' reasonable requirements, and for that reason they filed a second cause of action to their complaint alleging permanent damages. However, defendant city in its answer denied that it had appropriated to its own use, profit and enjoyment all the waters of Santa Ysabel Creek originating above said dam and denied any permanent injury or damage to plaintiffs or their respective lands. There was no evidence introduced by either party on the subject of permanent damages but the case was tried on the theory that permanent damages were not an issue before the court. Accordingly, no finding is necessary on the second cause of action set out in plaintiffs' complaint, and none will be made'.

The court found also that there was no diversion from the Sutherland reservoir until about March 26, 1954, 'when water from the Sutherland Dam was, for the first time, diverted through a tunnel into the San Vicente Reservoir of the City of San Diego, in order to test the newly constructed Sutherland tunnel and diversion works'.

As conclusions of law the trial court determined that the respondents (except Harold W. Pfeiffer and Helen L. Pfeiffer ****70** who *pendente lite* had disposed of their lands) were 'owners of rights in and to the waters of the Santa Ysabel Creek prior and paramount to the appropriative rights of the defendant City of San Diego'; that the respondents were

entitled to judgment for damages against the city as set out in the findings; that the respondents were entitled to have the water levels in the wells restored so as to range between 12 and 20 feet below the ground surface; that appellant city is not entitled to withhold or store the natural flow of Santa Ysabel Creek when the average static water level under respondents' lands and in their wells falls below 20 feet below the surrounding ground surface and that 'there has been no ***602** such public use made of any of the water stored in or diverted out of Sutherland reservoir to an extent sufficient to deter this court from granting appropriate injunctive relief; furthermore, even if some public use had been made of some of said waters, defendant would not be and is not entitled to assert a claim of public use because of the stipulation' aforesaid.

The trial court proceeded to enter judgment in accordance with its findings and conclusions of law awarding both damages and injunctive relief as therein contemplated. The city has appealed from the judgment.

Pending the appeal the respondents Frank E. Judson, Velda C. Judson and Alice M. Judson Suhrie have reached a settlement with appellant city and the appeal has as to them been dismissed. We have, then, to consider the merits of the appeal as between the remaining respondents and the appellant city.

Appellants claim (1) That the damages awarded the respondents are excessive; and (2) That the respondents should have been denied injunctive relief.

The trial court heard a mass of testimony relative to the monetary detriment suffered by the respective respondents for the years 1954, 1955 and 1956 from the impairment of their water supply, resolving such conflict as there was in the evidence on the subject in reaching its conclusion. The principal industry in the San Pasqual Valley is dairying. The care of cattle requires large quantities of water. To feed them, moreover, alfalfa and corn are grown in considerable quantities. The testimony of various respondents as to their individual efforts to obtain water through the sinking of additional wells and as to what their crops have been from year to year fills many pages of the voluminous transcript, but records were not kept of the exact acreages devoted by particular growers in particular years to particular crops. Although it is clear enough that there has been, during the years 1954, 1955 and 1956, large monetary damage in the valley from water shortage the matter of reducing it to definite figures is no simple task. Respondents' witness Cromwell, who qualified as an expert, not merely as an engineer but also in the practice of applying water to crops, made the estimate of crop damage and additional costs of producing crops, due to water shortage, on which in part the trial court based its damage awards. On direct examination he was allowed without specific objection to give his estimates of the damage suffered by each respondent. On cross-examination it developed ***603** that he reached his figures of crop damage by applying a uniform formula throughout the valley. Taking alfalfa as a typical crop he figured that, as compared to what would be expected had a sufficient water supply been available, there was for each acre of alfalfa land, a loss in 1954 of half a ton of alfalfa, for 1955 a loss of a ton of alfalfa, and for 1956 a loss of a ton and a half of alfalfa. He treated alfalfa through the period involved as worth $35 a ton. He assigned particular acreages to each of the respondents as the area irrigated in a given year by each and, treating the acreage assigned to each as though entirely devoted to alfalfa, he computed the crop damage of each respondent by applying the above formula. He testified that the figures for corn would be substantially the same as for alfalfa and attempted no particularization for other irrigated crops. He added for each ****71** respondent for 1954, $8 per irrigated acre, for 1955, $12 per irrigated acre and for 1956, $21 per irrigated acre as increased cost of labor, fuel, etc. involved in pumping by reason of the progressive lowering of the water table and the inability to get water from the ditch diversion. He also added any cost incurred in the case of the individual respondent for new equipment or well digging required by water conditions. His totals, thus arrived at, were adopted by the trial court in those instances in which the testimony given by individual respondents or other witnesses, did not, in the court's opinion, supply adequate data for fixing the amount of a particular respondent's damages, or where in its opinion Mr. Cromwell's estimate appeared to be the more reliable. The court, having reached its conclusion as to the total damages suffered by each of the several respondents proceeded to divide it by two on the theory that 50% of the damages was attributable to the prolonged drouth and the other 50% to appellant's withholding of water, and treated the result as, in the case of each respondent the loss suffered by him from appellant's operations. The resulting figures are the basis of the awards of damages determined in the findings and contained in the judgment.

Appellant complains of the whole basis on which Cromwell's estimates are made as speculative and unreliable. Particularly does it instance the award made to the Southeastern California Association of Seventh-Day Adventists. This religious corporation, between 1947 and 1950, according to the testimony of Mr. Ambs, a member of its governing

board, acquired lands, now amounting to 238 acres, in the San Pasqual ***604** Valley and established there an academy for young people for whom a rural atmosphere was desired, including incidentally training them in agricultural pursuits. The inducing motive in selecting this locality according to Ambs was the apparently abundant water supply. The witness Juler, who, from 1953 to 1956, served as a member of the school faculty and as its bookkeeper, testified that the academy maintains extensive plantings of lawns and shrubbery about its buildings. At the time he came there it had two orange groves, two or three acres in lemons and an avocado grove. There have been no other further plantings of fruit trees. The school maintains a dairy, not as a commercial enterprise but for its own use. From time to time the number of milk cows varies. It had 52 in 1953 and the same number in 1956, with 62 younger stock. The crops grown have been mainly devoted to feeding the cattle. In 1953 there were produced 256 tons of corn, 178 of green chop and 118 1/2 of dry hay; in 1954, 220 tons of corn, 466 1/2 of green chop and 13 of alfalfa hay; in 1955, 300 tons of corn, 736 1/2 of green chop; and in 1956, 237 tons of corn and 1,285 1/4 of green chop, but no hay. There has been, from time to time, some oats grown and some sudan grass. Juler has no record of the exact acreage from time to time devoted to each class of crop. The witness Weaver, principal of the academy, testified that generally through the period involved there has been some increase in the quantity of produce. He attributed it to increased fertilization. Both he and Ambs emphasized the increasing insufficiency of the water supply. Mr. Weaver testified to the uncertainty in planning for the continuance of the school or for increased enrollment in consequence of the shortage of water. According to respondents' engineer, Cromwell, 176 acres of the academy holdings are actually cultivated. The rest is arable but not irrigated. The item claimed in the complaint and allowed this respondent for diminished crops resulting from water shortage was computed by Cromwell. The diminution is not actual but a diminution in what he claims ought to have been expected. He testified that he took as a basis only 100 acres of the academy's total cultivated area, this being the part of the area susceptible of irrigation from the diversion ditch when in use. To this 100 acres Cromwell applied the formula above mentioned. According to appellant, there should have been no award for crop damage at all to this respondent, since during ****72** the period of drouth its crops have increased rather than diminished. It is apparent, however, that the above figures for crops taken ***605** off this land do not tell the whole story. According to Cromwell the greater part of its irrigated area is in alfalfa. Since only 13 tons of alfalfa hay appear to have been taken off of it in 1954 and none in the two following years it may be assumed that the alfalfa was grown for pasturage rather than to harvest it. The fact that an increase was had in the quantity of certain other crops, particularly green chop, would not necessarily negative a loss, as compared with what in normal conditions should have been expected in the alfalfa crop.

It must be conceded that the basis adopted by the trial court in computing respondent's damages leaves much to be desired in respect of exactitude but Mr. Cromwell's testimony went in practically without objection and appellant did not move to strike it out. It was, therefore, there to be weighed. The trial court, while recognizing the difficulties which it presented was in part guided by it.

Cromwell, *inter alia* stated that the watershed area behind the Sutherland Dam constituted approximately 50 per cent (actually 53%) of the total watershed area upstream from respondents' properties. This statement appellant in its opening brief concedes, so far as it concerns this watershed area, to be substantially correct.

Appellant's engineer, Crooker, who also testified at the trial, undertook to estimate the relative effects of the drouth and of the withholding of water in the Sutherland Dam upon respondents' water supply by a study of the effects of the drough on other lands not affected by the withholding of water at the dam, and concluded that only 16 per cent of the drop in the subsurface water level beneath respondents' lands was due to the withholding of water by the city. Whatever weight is to be given to Mr. Crooker's testimony, however, it must still be borne in mind that the respondents do not rely exclusively in their claim for damages on the lowering of the water table beneath their lands. They rely also on the circumstance that they can no longer for as long a season or in adequate quantities obtain water from their diversion ditch which formerly, for much of each year, furnished their most convenient and least expensive means of obtaining water and applying it to their lands. The trial judge recognized the difficulty of exactly apportioning the whole detriment to respondents between that caused by the city's action and that caused by the drouth. The evidence would not justify us in disregarding the trial court's conclusions on the subject nor in treating them as arbitrary nor in disturbing the portion ***606** of the judgment which fixes the amounts of the damages awarded against appellant city. The trial judge in his memorandum opinion pertinently noted the suggestion made in California Orange Co. v. Riverside Portland Cement

Co., 50 Cal.App. 522, 525, 195 P. 694, 695, quoting from Washburn v. Gilman, 64 Me. 163, that:
'The difficulty may be great of accurately proportioning and assessing the damages done by the defendant, but that difficulty the defendant could have avoided had he taken due care that no occasion should arise requiring such assessment of damages.'

We come, then, to the more serious question whether the injunctive relief granted respondents against appellant city can be sustained. The trial court found that all of the lands of the respondents are riparian to the stream and overlying the basin into which its waters spread. Appellant's counsel urge that the maps show that some of such lands do not abut the river. The point is not material, for even if some portions of them do not border the river bank, the evidence and the findings make it clear that all overlie the underground water-bearing basin, whence it follows that all have at least overlying rights, which, for all purposes with which we are here concerned, are the equivalent of riparian rights. Moreover, except for the respondents Cook, who acquired their ****73** holdings after the Sutherland Dam enterprise had been initiated, all of the respondents are successors in interest of appropriators whose rights, as such, date from 1876, and such appropriative rights have been, at least to the extent of 12 cubic feet per second of flow, exercised thence hitherto, whenever there was any sufficient surface flow in the river, except as their exercise had been interrupted by appellant. There can be no question that all of respondents' water rights, both riparian, overlying and appropriative are prior and paramount to the rights of appellant city. Now, not only have respondents' riparian and overlying uses of the river water been invaded, but respondents' appropriative use of such water has been, during parts of the former season of surface flow of the river, wholly suspended, and for the rest of such former season partially suspended by appellant's action.

In Tulare District v. Lindsay-Strathmore etc. District, 3 Cal.2d 489, 525, 45 P.2d 972, 986, it is said that:
'If the riparian is putting the water to any reasonable beneficial uses, it is now necessary for the trial court to find ***607** expressly the quantity so required and so used. A finding, such as that in the present case to the effect that the riparian requires a 'reasonable' amount for such uses, under the new doctrine, is clearly insufficient and a judgment based thereon must be reversed. The trial court, under the new doctrine, must fix the quantity required by each riparian for his actual reasonable beneficial uses, the same as it would do in the case of an appropriator. The new doctrine not only protects the actual reasonable beneficial uses of the riparian but also the prospective reasonable beneficial uses of the riparian. As to such future or prospective reasonable beneficial uses, it is quite obvious that the quantity of water so required for such uses cannot be fixed in amount until the need for such use arises. Therefore, as to such uses, the trial court in its findings and judgment, should declare such prospective uses paramount to any right of the appropriator.'

The appellant insists that for failure to define the extent of respondents' reasonable use of water as required by the rule thus laid down, the case must be reversed. Contrariwise, the trial judge in his opinion (Clerk's Trans. p. 88) stated that:
'Since the 1928 Amendment to the Constitution of California, our courts have been rejecting the idea that the decree should fix a definite amount of water measurable in second feet, acre feet or miner's inches to any particular parcel of land. * * * Instead of fixing definite amounts of water to be supplied, the courts have been requiring the party at fault to maintain the water level in the injured parties' wells at a certain point.'

The first sentence of this language is taken almost verbatim from the opinion of the United States District Court for the Southern District of California in Rank v. (Krug) United States, 142 F.Supp. 1, 166, where the court cites in support of it City of Lodi v. East Bay Municipal etc. District, 7 Cal.2d 316, 60 P.2d 439 and Stevinson Water District v. Roduner, 36 Cal.2d 264, 223 P.2d 209. These last two cited cases seem to us, however, rather remote in their bearing on the requirement laid down in the Lindsay-Strathmore case.

Curiously enough, though both the Federal Court in Rank v. (Krug) United States, and the trial court in the instant case, cited the Lindsay-Strathmore case in other connections, neither appears to have noted the above-quoted passage therefrom as respects the point now under discussion. We are unable to find that as respects the requirements laid down in ***608** the above quotation from the Lindsay-Strathmore case, that decision has ever been overruled or disapproved, where clearly applicable. We do find, however, that in the case of ****74** Corona Foothill Lemon Co. v. Lillibridge, 8 Cal.2d 522, 66 P.2d 443, the field of its applicability has been significantly restricted. The Supreme Court in the last mentioned case observed that there was not involved an action to quiet title to a water right. Neither, for that matter, is the case before us here an action to quiet title. The test, however, actually applied, though not fully expressed in the Lillibridge opinion, as to the applicability in a given instance of the

rule laid down in the Lindsay-Strathmore case seems to us to have been a more fundamental test, namely, whether or not the application of the rule of the Lindsay-Strathmore case, in a particular instance, would or would not be *useful*. In the Lillibridge case the court held it apparent from the outset that there was no surplus of water in the source of supply over the reasonable needs of the party having the prior right, for any subsequent appropriator. It held, therefore, an accurate measurement of such paramount needs would be useless and, therefore, not required. There could manifestly be no surplus to be appropriated and no measurement was there needed to so determine. In some cases we can see that the application of the Lindsay-Strathmore rule might well be useful and therefore mandatory as in the case of a perennial stream, where the question is merely one of dividing a fairly stable flow between one having a prior right, whose beneficial use of water tends to be much the same for a considerable period, and a subsequent appropriator. There, by ascertaining the quantum of the reasonable beneficial use of the party having the prior or paramount right, the part of the flow left for appropriation can, with reasonable approximation, be determined. On the other hand, it is evident from the opinion in the Lillibridge case that where the application of the Lindsay-Strathmore doctrine would be of no practical utility it will not be applied.

In the case at bar, so far as the appropriative rights of respondents are concerned, the trial court has already determined their extent, to wit, 12 cubic feet of flow per second whenever there is that much surface water in the stream. That quantity is obviously being devoted to reasonable beneficial uses and, as respondents share a single appropriation and a single diversion, the determination of their appropriative right *in solido* is the only quantitive determination practicable or useful. For the determination in the circumstances ***609** of this case, however, of the specific quantities of the reasonable current needs of each of the riparian or overlying owners, as such, who are respondents here, it is difficult to find any utility. On the other hand, such determination could hardly remain effective for any appreciable length of time, since, in the main, respondents are not merely irrigating only a fraction of their arable lands, but there is every probability that more and more of the same will come under cultivation as time goes on, if only there is enough water. On the other hand, there is no direct proportionate relation between any ascertainable quantity of water devoted by respondents at a given time to reasonable beneficial uses and the releases at Sutherland Dam necessary to meet their needs. The San Dieguito River is not a perennial stream. Its flows are subject to wide seasonal, annual and cyclic variations. The excess flows of one season for one year or one cycle have to be relied on to charge the strata from which respondents' wells are fed. It cannot be said that respondents' need for reasonable use on their lands aggregate a given quantity of water per annum and that all the rest that originates above them in the Santa Ysabel watershed is surplus over what needs to be released during any given period at Sutherland Dam. That would be a hopeless oversimplification of the problem. Required releases must have relation to long term needs. The situation is further complicated because there is the question of how much water may, at a given time, be available from tributaries of the San Dieguito other than Santa Ysabel Creek. Respondents are not only entitled to receive the amounts of their reasonable requirements but they are entitled ****75** to have the water table in the San Pasqual Valley maintained at such levels that they can get their water without unreasonable expense.

Our conclusion is that there do not exist in the instant case the conditions which would give the requirements laid down in the rule above quoted from the Lindsay-Strathmore case any useful application here and, therefore, that it was not error for the trial court to refrain from undertaking to find in acre feet or other units of measurement the exact reasonable requirement of each of respondents for the satisfaction of his riparian or overlying rights.

Since the amendment of 1928 by adding section 3 to Article XIV of the State Constitution, respondents' riparian and overlying rights have of course been, as their appropriative rights always were, subject to the requirement that their ***610** use be reasonable and also that the manner of their use be reasonable and not wasteful. The trial court has, in the instant case, found that these conditions have been complied with. As respects the respondents' use of riparian and overlying rights, whatever their exact measurement may be, we see no ground on which this finding can be attacked. There is no evidence that any respondent in exercising his *riparian* or *overlying* rights has ever pumped from wells more water than his reasonable needs have required and certainly the fact that he has to go ever deeper to get his water is not a circumstance to induce prodigality in its use. Nor has any decision been cited to us to the effect that the doctrine that a riparian or overlying owner must be confined to a reasonable use of water requires him, for the benefit of a new appropriator, to submit to the indefinite lowering of his water table and the consequent indefinite increase in his pumping costs. How high its level must be maintained to assure him the reasonable use of his riparian or overlying right without unreasonable cost is in each case a question of fact for the trial court. There is no evidence here, either, that

respondents, in the exercise of their *appropriative* rights, have been making substantially excessive or wasteful consumptive use of water. There is, indeed, some suggestion of weed growth in their open diversion ditch but that is a minor detail and a certain amount of that sort of thing would be unavoidable unless they were to go to large expense in completing the cementing of the ditch. The evidence does show that any loss from weed growth is largely minimized by cleaning the ditch each fall before the flow into it begins, as well as at other times, and also in that, down stream from diversion point, the water is ultimately carried into a pipe line. Both above and below its intake service laterals are run. The principal complaint with respect to respondents' diversions, however, is the inefficiency of their diversion dam. This is merely an obstruction supported at its river bank end by a wooden framework but in its outer portions consisting merely of earth and sand, built up by teams and scrapers, and in portions reinforced by sandbags. This obstruction is placed from time to time in the river bed, sometimes extending clear across the bed of the stream, but at other times merely part way across, to divert stream flow into the ditch. This dam or obstruction is from time to time washed out and as often replaced. Undoubtedly, the installation of a permanent structure would be a matter of great expense, possibly beyond respondents' ***611** means, as it would have to be heavy and would be dangerous unless carried to such a depth and so buttressed as to resist occasional floods. One point here to be noted, however, is that the washing out from time to time of respondents' dam results in no increase in the consumptive use of water. Any water thus released is simply carried down stream either to serve beneficial uses on the way or, except for minor losses in transmission, eventually to be impounded in appellant city's Lake Hodges Dam farther down the river. None of it flows into the ocean. ****76** There is nothing, therefore, in the use of the present diverting dam or structures like it, necessarily to contravene the State's water conservation policy. Appellant's contention in that behalf amounts to a claim that, by building the Sutherland Dam upstream from respondents' lands, appellant is entitled to compel respondents, on pain of not having enough water released from the Sutherland structure for their own diversion, to construct for themselves an otherwise needlessly expensive diversion system. There is no question of unnecessary consumptive use of water by respondents involved. In these circumstances the trial court has found that respondents' method of diversion of water is a reasonable one. The circumstance that appellant would prefer to retain, at the Sutherland Dam, water that might otherwise be released into the river at respondents' point of diversion when the dam there is occasionally washed out, rather than receive the same water again at the Lake Hodges Dam, while it might be a matter to be weighed by the trial court in determining the reasonableness of respondents' method of diverting water, furnishes no ground for upsetting the finding on the subject.

Unless prevented, then, by some devotion of the water supply impounded or to be impounded at the Sutherland Dam to a public use, and in the light of the trial court's finding here that both respondents' use of water and their method of using it are reasonable, it seems plain that they are entitled to such injunctive relief as to adequately protect them in the enjoyment of their rights.

As is said in Peabody v. City of Vallejo, 2 Cal.2d 351, 374–375, 40 P.2d 486, 494, a case in which the 1928 amendment to Article XIV of the Constitution is fully considered and applied:
'There is and should be no endeavor to take from a water right the protection to which it is justly entitled. The preferential and paramount rights of the riparian owner, the owner of an underground and percolating water right, and the prior ***612** appropriator are entitled to protection of the courts at law or in equity * * *.'

The Supreme Court, in that case, goes on to say that a new 'appropriator may use the stream surface or underground, or percolating water, so long as the land having the paramount right is not materially damaged', but that 'any use by an appropriator which causes substantial damage thereto, taking into consideration all of the present and reasonably prospective recognized uses, is an impairment of the right for which compensation must be made either in money or in kind, and in the event public use has not attached the owner of the paramount right is entitled to injunctive relief.'

It is true, as noted in this Peabody case (2 Cal.2d at page 376, 40 P.2d at page 496), quoting from Waterford Irr. Dist. v. Turlock Irr. Dist., 50 Cal.App. 213, 221, 194 P. 757, that:
'The mere inconvenience, or even the matter of extra expense, *within limits which are not unreasonable*, to which a prior user may be subjected, will not avail to prevent a subsequent appropriator from utilizing his right.'

The evidence and the findings in this case disclose, however, that appellant city's proceedings result in far more than mere inconvenience and reasonable expense to respondents. The city's proceedings amount, according to the testimony and

findings, to wholly depriving respondents of the use of all water of the San Dieguito River except that which comes into it from tributaries below the Sutherland Dam, thus eliminating the flow past respondents' lands by not less than one-half, which, combined with the effect of the present drouth, has, at least for the present, for the most part prevented respondents from using appropriated water to which they have prior and paramount rights, and by excessive lowering of the water table, made difficult and unreasonably **77 expensive respondents' use even of their riparian and overlying rights.

Respondents, therefore, have fully established their right to injunctive relief, unless as we have said, such relief is barred by the intervention of a public use and we are thus brought to consider that phase of the case. In view of the stipulation between appellant city and respondents' counsel, the rights of the parties in that respect are to be treated as they stood on January 30, 1954. Some years prior to that date the electors of the city had voted a bond issue to cover the cost of erecting the Sutherland Dam and acquiring the needed water rights in connection therewith. In 1950 the *613 State had issued its permit allowing appellant city to appropriate for storage there for the use of its inhabitants water from the Santa Ysabel Creek. There can be no doubt, therefore, that it was prior to January 30, 1954, a matter of public notoriety that the city intended to, and could of right, devote to public use, any water which it might be entitled to retain and impound from the flow of Santa Ysabel Creek.

In these circumstances appellant claims that a public use attached to the Sutherland enterprise either when the bond issue was voted or at least as early as the issuance of the state permit, since it, and the application for it, specifically state it to be 'for the purpose of serving the City of San Diego, having a present population of 363,000.'

Reliance, *inter alia*, is placed on the language of section 1 of Article XIV of the State Constitution to the effect that 'the use of all water now appropriated, or that may hereafter be appropriated, for sale, rental, or distribution, is hereby declared to be a public use * * *', and on the language of the Supreme Court in San Joaquin, etc., Irr. Co. v. Stevinson, 164 Cal. 221, 226, 128 P. 924, 926, which preceded the constitutional amendment to the effect that:

'It is settled that the use of water for sale, rental, and distribution to the public generally is a public use.'

Our attention is also called to language in the case of McCrary v. Beaudry, 67 Cal. 120, 121, 7 P. 264, 265, to the effect that 'water appropriated for distribution and sale is, *ipso facto*, devoted to a public use.'

It is further urged that respondents here, before acting in defense of their rights, allowed the city's construction of its dam to proceed to completion, and that, therefore, there should be applied the principle announced in Katz v. Walkinshaw, 141 Cal. 116, 136, 70 P. 663, 74 P. 766, 772, 64 L.R.A. 236, that:

'Where the complainant has stood by while the development was made for public use, and has suffered it to proceed at large expense to successful operation, having reasonable cause to believe it would affect his own water supply, the injunction should be refused, and the party left to his action for such damages as he can prove.'

This language, it may be pointed out, is not even by its terms applicable here, because, although the Sutherland Dam had been substantially completed a month before January 30, 1954, when respondents first moved to protect their rights, it had not yet proceeded to 'successful operation', and, *614 indeed, owing to the drough, has not even yet done so. However, appellant's argument overlooks one vital element in the situation, namely, that the state permit under which the city operates and under which it alone claims any right to appropriate water from the Santa Ysabel Creek, is by its very terms made subject to 'vested' rights, and, therefore, to all riparian, overlying or appropriative rights of respondents. In view, then, of the terms of the permit, respondents, until they had some sort of notice to the contrary, had every right to assume that appellant would observe its terms and refrain from withholding at the Sutherland Dam such waters **78 as respondents were reasonably entitled to have flow down to their lands. This right so to assume respondents continued to have until they observed the cessation of the major part of the flow of the San Dieguito River past their land in consequence of the closing on December 30, 1953, of the Sutherland Dam outlet as hereinbefore noted. On that date the dam was substantially though not fully complete. They were therefore guilty of no laches in permitting the completion of the dam before asserting their rights. In the very next month, with what the trial court must have believed to be reasonable diligence, they proceeded through their representatives to contact appellant city and assert their rights and in due course took measures to protect their interests. Not only, then, did the trial court properly conclude that they were not estopped to seek injunctive relief here, but it must also be held that the issuance to the city of its permit never did and does not now *ipso facto* result in the attachment of any public use to

appellant's appropriation of water, whether contemplated or actual, except to the extent that such appropriation may be in excess of the quantities required to be released in order to satisfy respondents' rights. To hold otherwise would be to hold inoperative the provision of the permit expressly making it subject to vested rights. If, therefore, as to any water *de facto* appropriated or which may hereafter be *de facto* appropriated by appellant from the flow of the Santa Ysabel Creek, except out of surplus over what respondents' needs require, such public use can only have attached in the past or attach in the future by a *de facto* devotion of such non-surplus water to such public use. Obviously, however, no such *de facto* devotion could have occurred before December 30, 1953, for practically no water had theretofore been impounded, and certainly none applied to any public use. Nor had any been so applied on or prior to January 30, ***615** 1954, as of which date, under the stipulation, respondents' rights are to be measured, for none was diverted from the Sutherland Dam until the following March. Neither can it with confidence be said that any *de facto* public use of such non-surplus water has even yet attached, since the only actual use, at least up to the date of the trial, of such water as the city had up to that time impounded, was for the mere purpose of testing the transmission tunnels between the Sutherland and San Vicente reservoirs. In view of all this and of the stipulation in evidence, it must be held that the trial court's conclusion that appellant has no ground for invoking the public use doctrine to bar respondents from injunctive relief was correct.

In this connection a singular situation with respect to the pleadings has developed. Respondents in framing their complaint set out two causes of action, the first asserting their claim for damages incurred for the years 1954 and 1955 from deprivation of water through appellant's operations and seeking judgment for the same and injunctive relief against appellant's continued withholding of water. By way of a second cause of action, respondents set out their claim for the permanent damage to their properties based on the supposition that appellant's withholding of water would continue. In other words, they set out what their claim would be in inverse condemnation. Appellant in answer not only denied the damage alleged in the first cause of action but in answering both causes of action made its denial so broad as to deny its intention to continue to withhold the water claimed by respondents. Accordingly, at the time of trial respondents, in view of that denial, announced that they would proceed only on their first cause of action and would offer no evidence on their second, and in its judgment the court expressly withheld any determination as to the latter. By supplemental complaint respondents asked damages claimed by them to have been incurred for the year 1956, the year in which the action was filed. The existing judgment, therefore, as we have seen, in its award of damages is inclusive then ****79** of the three years 1954, 1955 and 1956, in addition to which, it grants the injunctive relief sought.

Our determination that respondents are entitled to some injunctive relief still leaves for determination the question as to how far such relief should go. Considerable portions of respondents' remaining holdings are also arable and, as has been seen, have riparian or overlying rights or ***616** both. In the natural course of things these will to a greater or lesser extent be added to the areas now irrigated. Appellant makes several objections to the trial court's conclusion that respondents are entitled to have the range of the water table under their lands at from 12 to 20 feet below the surface restored and maintained. It is said in the first place that this would not allow for other land owners than respondents in the valley drawing off water for use on their lands, and, in particular, that it would prevent appellant itself from pumping water for its own lands in the valley which greatly exceed in area those owned by respondents. Mr. Cromwell, however, testified that in his opinion the use of pumped water on appellant's lands, since these lie downstream from those of respondents, would not materially affect the water table under the latter. Furthermore, the evidence shows that the substrata under respondents' lands are of very coarse material, whence it would seem to follow that any drawdown in the water table would be rapidly replaced if only there was adequate water available for spreading. It is further objected that, according to the findings, appellant's withholding of water is only one of the causes for the lowered water table under respondents' lands, the other cause being the present drouth, and that to require the maintenance of the water table at any given level would be to require appellant to insure respondents against a lowering of the water table either by reason of the present or any future drouth.

But it was said in Hillside Water Company v. Los Angeles, 10 Cal.2d 677, 686, 76 P.2d 681, 686, that:
'The law as announced in the case of Miller v. Bay Cities Water Company, supra, (157 Cal. 256, 107 P. 115, 27 L.R.A.,N.S., 772) to the effect that the right of an overlying land owner to the percolating water beneath his lands is analogous to the riparian right, has not been changed, and has been recognized in the subsequent cases declaring the new law. Thereunder these respondents have had, and still have, the right to the use of the underground waters in the Bishop cone as a supporting underground water supply available to and for the benefit of their farming operations.

It is readily seen that the use of this underground supply as an undersupport for irrigation or other surface uses would minimize the requirements of surface irrigation and result in benefit to the surface soil and crop conditions. *And it may not be rightly said that such use is not a beneficial use of the underground waters*.' (Italics ours.)

***617** In that case the judgment awarding plaintiffs injunctive relief against the City of Los Angeles was reversed for the sole reason that a public use was, in the circumstances there, held to have attached. The plaintiffs were there left, therefore, to seek their damages in inverse condemnation. Not so here. Counsel say that it was the duty of the trial court to find a physical solution, but it is not always that one can be found and the court did not find available any other than the injunctive relief granted. Until and unless some such solution is forthcoming there can apparently be no effective relief to respondents without requiring the reasonable restoration and maintenance of the water table. Even assuming it to be true that the present depression of that table is in part due to the drouth and only in part to appellant's withholding of water, we note that the injunction granted did not require appellant to maintain it at the top of the 12 to 20 foot range found to have prevailed before the Sutherland Dam was built, but merely forbade such impounding as would prevent ****80** its depression below the bottom of that range, i. e., 20 feet below the surface. We cannot say that this was an unreasonable requirement. The trial court has retained jurisdiction to grant appropriate relief to any party on a proper evidentiary showing of merit. This reservation is to be interpreted as admitting of modification of the injunctive feature of the judgment if and whenever any other suitable and sufficient physical solution can be devised; or if the particular level required to be maintained in the water table shall be found unworkable.

There is one other matter to be dealt with in the case. Appellant claims that mileage and witness fees allowed as costs by the trial court to the witnesses Ambs, Juler and Weaver, to whose connection with respondent Southeastern California Association of Seventh-Day Adventists we have already referred, should be disallowed. Admittedly, such fees and mileage are not allowable to parties to the action. No authorities, however, have been cited to the effect that they are to be denied to individuals not shown to have any private interest in the litigation, merely because they are directors or employees of a corporate party.

The judgment is affirmed.

MUSSELL, Acting P. J., and SHEPARD, J., concur.

On Denial of Rehearing

PER CURIAM.

***618** Counsel for appellant City of San Diego, in their petition for rehearing, *inter alia*, dispute the sufficiency of the resolution adopted by the city council of that city, a copy of which they set out in their petition, to authorize the city attorney to stipulate with counsel for the respondents that the rights of the latter should be treated as continuing as they stood on January 30, 1954, pending negotiations between the parties for a settlement of their differences. Without retracting anything from our view that in the circumstances respondents were entitled to rely on the stipulation as made, it may nevertheless be pertinent to observe that in order to show themselves entitled to the relief sought they are in fact under no necessity of invoking the protection of the stipulation nor of going back to January 30, 1954, as the date of which their rights are to be considered fixed.

Appellants place excessive emphasis on the trial court's finding that:
'The appropriation of water by the City of San Diego in Sutherland Dam, and the subsequent distribution and sale of a portion thereof was and is a public use.'

The appropriation of water referred to in this finding as a public use, being under a state permit which expressly made it subject to vested rights could apply only to surplus water, not to water required to satisfy respondents' reasonable needs, and as we pointed out in our opinion, there has not, so far as the record shows, even yet been actually any substantial service to the public of water from the Sutherland Dam.

We reiterate, therefore, that there is nothing in the claim of devotion of appropriated water to a public use to debar respondents from injunctive relief.

The other points made in the petition for rehearing have been sufficiently dealt with in the opinion as rendered.

Rehearing denied.

Hearing denied; TRAYNOR, J., dissenting.

343 P.2d 65

All Citations

172 Cal.App.2d 593, 343 P.2d 65

Exhibit 6

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From: Carlson, Sandra <CarlsonS@sandiego.gov>
Sent: Thursday, October 8, 2020 12:42 PM
To: Peter Quinlan <pquinlan@dudek.com>; Bennett, Jim <Jim.Bennett@sdcounty.ca.gov>
Cc: Danek, Karina <KDanek@sandiego.gov>
Subject: Re: Contacting Nate Brown

Peter,
Please email me your specific questions and I will forward to Nate to get them answered. It wouldn't be fair to the other AC members if we gave you free access to Nate and no one else got that. I'm sure you understand the sensitivity of the matter.
Thanks.

Sandra Carlson, P.E.

Associate Civil Engineer

Public Utilities Department

T (619) 533-4235

From: Peter Quinlan <pquinlan@dudek.com>
Sent: Thursday, October 8, 2020 12:35 PM
To: Carlson, Sandra <CarlsonS@sandiego.gov>; Bennett, Jim <Jim.Bennett@sdcounty.ca.gov>
Subject: [EXTERNAL] Contacting Nate Brown

Sandra and Jim,
Would it be possible for me to just call Nate to ask some clarifying questions about the model development? It appears the model will be complete before we have another TPR meeting.
Thanks,
Peter

Peter T. Quinlan
Vice President
DUDEK
pquinlan@dudek.com
760.479.4127

Exhibit 7

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From:	Carlson, Sandra
To:	Bolouri, Michael
Subject:	Fw: Emails and Phone Conversations (Frank and Peter)
Date:	Wednesday, May 20, 2020 4:51:10 PM
Attachments:	Call with Frank Konyn - 5-19-20.pdf

---

please save

From: John Ayres <jwayres@woodardcurran.com>
Sent: Wednesday, May 20, 2020 9:36 AM
To: Carlson, Sandra <CarlsonS@sandiego.gov>; Rosalyn Prickett <rprickett@woodardcurran.com>
Subject: [EXTERNAL] Emails and Phone Conversations (Frank and Peter)

Sandra,

Please find attached the call log for my chat with Frank yesterday. I've included the attachments he sent me after the call as well. We're planning to use this information to refine the cross-section in his area.

Here's text for sending to Peter Quinlan.

Peter,

We'd like to work with you to select the representative monitoring network for groundwater levels in the SPV GSP. Specifically, we'd like to identify monitoring wells in the Rockwood Canyon area. We've included the five wells you've provided information for previously on the potential monitoring network map, and would like to refine those to just the dedicated monitoring wells, which I believe are MW-1, MW-2, and MW-3.

We'd also like to add that dry well in the northern portion of the canyon you mentioned as a possibility during the TPR meeting to the network, would you provide information on that well?

We're hoping for a monthly monitoring schedule on representative wells in the monitoring network, to match the existing monitoring frequency that is underway in the majority of wells monitored in the basin. Happy to discuss this in greater detail as needed.

John Ayres PG, CHG
Project Manager

Woodard & Curran
jwayres@woodardcurran.com
phone: 916.233.8352

From: Carlson, Sandra <CarlsonS@sandiego.gov>
Sent: Tuesday, May 19, 2020 10:27 AM
To: John Ayres <jwayres@woodardcurran.com>
Subject: reminders

Hi John-

A couple of things – on your call to Frank, please document in writing some minutes from the call and send to me so we cover ourselves for the next AC meeting. I would hate for Frank to say "well john told me …. During a phone call" and it lead to a call from the mayor. Not that he would but these are interesting times.

Also, per our meeting yesterday, just a reminder to send a draft email to me for Peter re: the dry deep well and one other issue that I can't remember.

Thanks. Have a great day.

Sandra

Exhibit 8

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From: Frank Konyn
To: Carlson, Sandra
Subject: RE: Fabulous gift
Date: Thursday, December 19, 2019 5:16:25 AM

You are welcome! I appreciate the relationship we have. Best wishes for a great New Year.

Frank

From: Carlson, Sandra [mailto:CarlsonS@sandiego.gov]
Sent: Wednesday, December 18, 2019 9:49 PM
To: Frank Konyn <frank@konyndairy.com>
Subject: Fabulous gift

Frank- you are such a great marketer. Loved the entire gift from concept to theme to packaging. Excellent job and thank you so much. I'm so copying your idea next time I need a novel gift idea.
Stay creative.
Sandra Carlson

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Exhibit 9

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THE CITY OF SAN DIEGO

September 22, 2015

Mr. Emmet Aquino, Environmental Planner
Planning and Development Services Department
County of San Diego
5510 Overland Avenue, Suite 310
San Diego, CA 92123

Dear Mr. Aquino:

Subject: Rancho Guejito Rockwood Village Major Grading Plan; PDS2015-LDGRMJ-30016

The City of San Diego recently provided comments regarding the County's "Intent to Adopt Findings" and associated Exemption for this Project (see attached letter dated September 8, 2015). Additional and overarching concerns about this project, and hence the reason for this supplemental letter, need to be addressed. These concerns are outlined below. The City's Public Utilities Department respectfully requests a meeting *as soon as possible* with the County to discuss these matters.

San Pasqual Groundwater Basin

The proposed Project (covers 279 acres) will obtain water from wells located on the east side of Rockwood Canyon. The wells would draw water from the San Pasqual Groundwater Basin. Section 9 (d), Page 23, of the Exemption Checklist states that "the project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table." The City of San Diego strongly disagrees with this statement.

Rockwood Canyon is part of the San Pasqual Groundwater Basin (Figure 1). This Basin is already experiencing over-drafting of groundwater. Logically, implementation of the proposed Project could significantly and cumulatively exacerbate this problem. In addition, questions about Rancho Guejito's right to use water from this Basin for their purposes should also be addressed.

Public Utilities Department
525 B Street, Suite 300, MS 906 • San Diego, CA 92101-4409
Tel (619) 533-7595

Traffic

Access to the northern planting area will be from a private road and West Zoo Road/Rockwood Road. West Zoo Road is located on City-owned land; it follows the western boundary of one of the City's lessee's, Safari Park.

This is not a public road, and most of it is designated as a "Z" Road by the County of San Diego. This means it is an unimproved road that has no public road status and is not maintained by either the City or the County of San Diego. Several neighboring properties have an easement over City land to use this road. The Safari Park uses the road for employee access. No other access shall be granted.

Please contact George Adrian, Principal Water Resources Specialist, at (619) 533-4680 or GAdrian@sandiego.gov to arrange a meeting at your earliest convenience.

Sincerely,

Lan C. Wiborg
Deputy Director
Long-Range Planning & Water Resources Division

LW/vs

Enclosures: 1. Figure 1: San Pasqual Basin, Wells & City Leases
2. Letter dated September 8, 2015

cc: Ray Palmucci, Deputy City Attorney
Myra Herrmann, Senior Planner, Planning Department
Jeffery Pasek, Watershed Manager, Public Utilities Department, Long-Range Planning & Water Resources Division
George Adrian, Principal Water Specialist, Long-Range Planning & Water Resources Division
Tracy Irvin, Supervising Property Agent, Real Estate Assets Department

Exhibit 10

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Planning and Development Services Department
County of San Diego
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cc: Ray Palmucci, Deputy City Attorney
Myra Herrmann, Senior Planner, Planning Department
Jeffery Pasek, Watershed Manager, Public Utilities Department, Long-Range Planning & Water Resources Division
George Adrian, Principal Water Specialist, Long-Range Planning & Water Resources Division
Tracy Irvin, Supervising Property Agent, Real Estate Assets Department

Exhibit 11

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San Pasqual Valley Groundwater Basin

- Groundwater Basin Number: 9-10
- County: San Diego
- Surface Area: 4,540 acres (7.1 square miles)

Basin Boundaries and Hydrology

This groundwater basin underlies San Pasqual Valley and Cloverdale, Rockwood, and Bandy Canyons in central San Diego County. The basin is bounded by Lake Hodges on the west and otherwise by nonwater-bearing rocks of the Peninsular Ranges (DWR 1959; Rogers 1965; Izbicki 1983). Average annual precipitation ranges from 11 to 15 inches. Santa Ysabel, Guejito, and Santa Maria Creeks drain the valley and converge to form the San Dieguito River, which flows into Lake Hodges.

Hydrogeologic Information

Water Bearing Formations

The water-bearing units of the San Pasqual Valley Groundwater Basin are alluvium and residuum. Groundwater in this basin is unconfined (DWR 1959; Izbicki 1983) and well yields range to 1,700 gpm (DWR 1959).

Alluvium. Quaternary alluvium in this basin ranges to greater than 200 feet thick. This unit consists of unconsolidated gravel, sand, silt, and clay, and the average specific yield is about 16 percent (Izbicki 1983).

Residuum. Residuum is typically Green Valley Tonalite that has been weathered in place, creating an arkose-like grus that can bear water, or weathering to clay with boulders (DWR 1993). This residuum is Quaternary or older in age and is wide-spread throughout the region (DWR 1967). This unit has a maximum thickness of 100 feet (DWR 1959) and an average specific yield of about 1 percent (Izbicki 1983).

Recharge Areas

Natural recharge of the basin is from infiltration of precipitation to the valley floor and percolation of ephemeral stream flow of the Santa Ysabel, Bach, Guejito, and Santa Maria Creeks. During typical years, no stream flow leaves the valley and all surface runoff becomes groundwater recharge (Izbicki 1983). Also, excess irrigation waters percolate and contribute to recharge (Izbicki 1983).

Groundwater Level Trends

In the western part of the basin, hydrographs show that groundwater levels declined about 30 feet during 1953 through about 1968, recovered about 20 feet in 1969, declined an additional 50 feet by about 1978 when the water table recovered to pre-1953 levels (Izbicki 1983). In the eastern part of the basin, the water table declined about 50 feet during 1960 through 1966, recovered by about 1972, then experienced a similar cycle and recovered to be to fill the basin in 1982 (Izbicki 1983). Water levels in 1991 were mostly

lower than in 1982 (DWR 1993). Groundwater generally moves westward through the basin (DWR 1993).

Groundwater Storage

Groundwater Storage Capacity. The estimated total storage capacity is about 73,000 af (DWR 1975). However, Izbicki (1983) calculated the storage capacity to be 58,000 af for the alluvium and greater than 5,000 af for the residuum, suggesting a total capacity of about 63,000 af.

Groundwater in Storage. Unknown.

Groundwater Budget (Type C)

Information is not available to construct a budget.

Groundwater Quality

Characterization. Groundwater in this basin is of mixed character (DWR 1993). In the eastern part of the valley, groundwater is mainly calcium bicarbonate character with TDS content mostly less than 500 mg/L (DWR 1993). In the western part of the valley, groundwater is dominantly sodium chloride in character with sulfate as a prominent minor anion (Izbicki 1983; DWR 1993). TDS concentration in the basin ranges from 350 to 1,790 mg/L (DWR 1993).

Impairments. Nitrate concentration ranges to 91.7 mg/L and elevated nitrate concentration is widespread (DWR 1993).

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: to 1,700 (alluvium) (DWR 1959)	Average: 1,000 (Izbicki 1983) to 600 (residuum) (Izbicki 1983)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Department of Health Services and cooperators	Title 22 water quality	2

Basin Management

Groundwater management:

Water agencies

Public	San Diego County Water Authority
Private	

References Cited

California Department of Water Resources (DWR). 1959. *San Dieguito River Investigation.* Bulletin 72. 174 p.

_____. 1967. *Ground Water Occurrence and Quality, San Diego Region.* Bulletin 106-2. 233 p.

_____. 1975. *California's ground water*. Bulletin 118. 135 p.

_____. 1993. *San Diego Region Ground Water Studies, Phase VI.* Memorandum Report. 98 p.

Izbicki, John A. 1983. Evaluation of the San Dieguito, San Elijo, and San Pasqual Hydrologic Subareas for Reclaimed Water Use, San Diego County, California. U. S. Geological Survey Water-Resources Investigations Report 83-4044. 131 p.

Additional References

California Department of Water Resources (DWR). 1973. *Preliminary Evaluation of Groundwater Basins in San Dieguito Investigation*. Preliminary report. 20 p.

_____. 1983. *San Diego County Cooperative Groundwater Studies Reclaimed Water Use, Phase I.* Southern District Report 84 p.

Errata

Substantive changes made to the basin description will be noted here.

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Exhibit 12

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EVALUATION OF THE SAN DIEGUITO, SAN ELIJO, AND SAN PASQUAL HYDROLOGIC SUBAREAS FOR RECLAIMED WATER USE, SAN DIEGO COUNTY, CALIFORNIA

By John A. Izbicki

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 83-4044

Prepared in cooperation with the
COUNTY OF SAN DIEGO
and the
CALIFORNIA DEPARTMENT OF WATER RESOURCES

5008-07

August 1983

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information
write to:

District Chief
U.S. Geological Survey
2800 Cottage Way, Room W-2235
Sacramento, Calif. 95825

Copies of this report may
be purchased from:

Open-File Services Section
Western Distribution Branch
U.S. Geological Survey
Box 25425, Federal Center
Denver, Colo. 80225
Telephone: (303) 234-5888

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SAN PASQUAL HYDROLOGIC SUBAREA

Geology

The San Pasqual hydrologic subarea lies entirely within the Peninsular Range Province. Crystalline rocks of the southern California batholith are exposed in or underlie the entire subarea (fig. 23).

The most extensive rocks are granodiorites which cover slightly over 50 percent of the subarea. These rocks are resistant to weathering and form prominent hills and ridgetops.

Green Valley Tonalite is exposed in approximately 30 percent of the subarea. Green Valley Tonalite is not resistant to erosion and forms deeply weathered lowlands and hilly topography, especially in the vicinity of faults. Green Valley Tonalite may weather to several hundred feet in depth, forming a material known locally as residuum, or decomposed granite (DG). These deeply weathered exposures occupy 1,550 acres, or slightly over 8 percent of the subarea.

Small exposures of gabbro and diorite and metamorphic rock occur as scattered remnants or roof pendants within the more extensive crystalline rocks of the subarea. In some instances these rocks, particularly the gabbro, are deeply weathered and resemble weathered outcrops of Green Valley Tonalite.

Quaternary alluvium stretches across the southern half of the San Pasqual hydrologic subarea. Three smaller alluvium-filled valleys join the main valley from the northwest, northeast, and south. In total, alluvium covers almost 15 percent of the subarea.

Soils

There are three major soil associations within the San Pasqual hydrologic subarea. Fallbrook-Vista and Cienba-Fallbrook soils are found in upland areas. Visalia-Tujunga soils are found in the valley floor (fig. 24).

Soils of the Fallbrook-Vista association have developed along the western edge of the subarea and near San Diego Wild Animal Park. This association is characterized by Fallbrook and Vista soils, between 1.5 to 4 feet thick, and shallow Cienba soils, generally less than 1.5 feet thick. Deep soils are atypical of this association and only small areas of Ramona soils, developed over weathered tonalite, attain thicknesses greater than 5 feet. Infiltration capacities are high to moderate throughout most of the Fallbrook-Vista association, ranging from 0.6 to 2.0 in/h for Fallbrook soils, to 20 in/h for Cienba soils. Ramona soils are characterized by a clay hardpan at a depth of 1.5 feet; consequently, infiltration rates for Ramona soils are poor and range between 0.2 to 0.6 in/h.

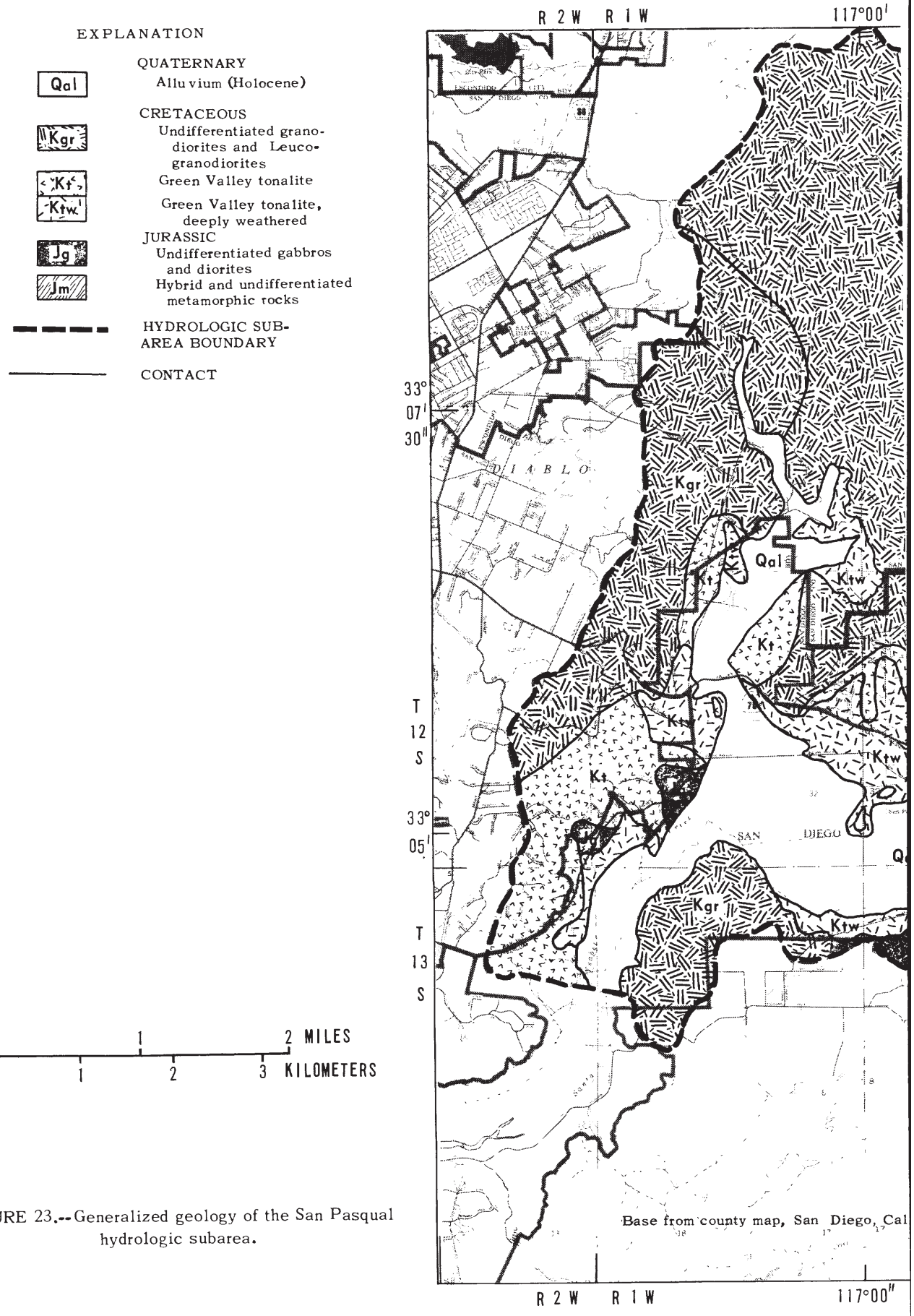
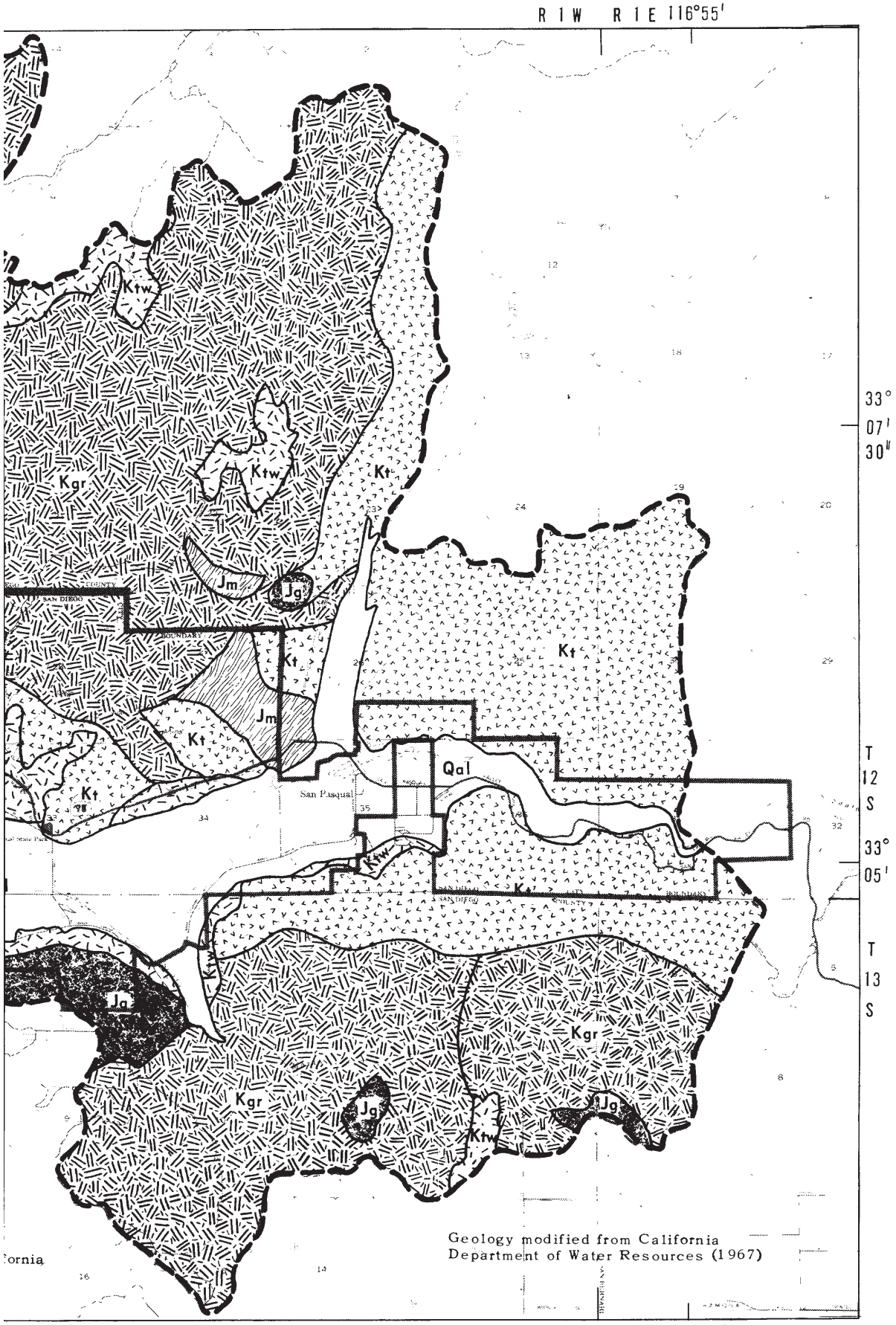


FIGURE 23.--Generalized geology of the San Pasqual hydrologic subarea.


R 1 W
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33°
05'
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Qal
San Pasqual
SAN DIEGO COUNTY
BOUNDARY
Geology modified from California
Department of Water Resources (1967)

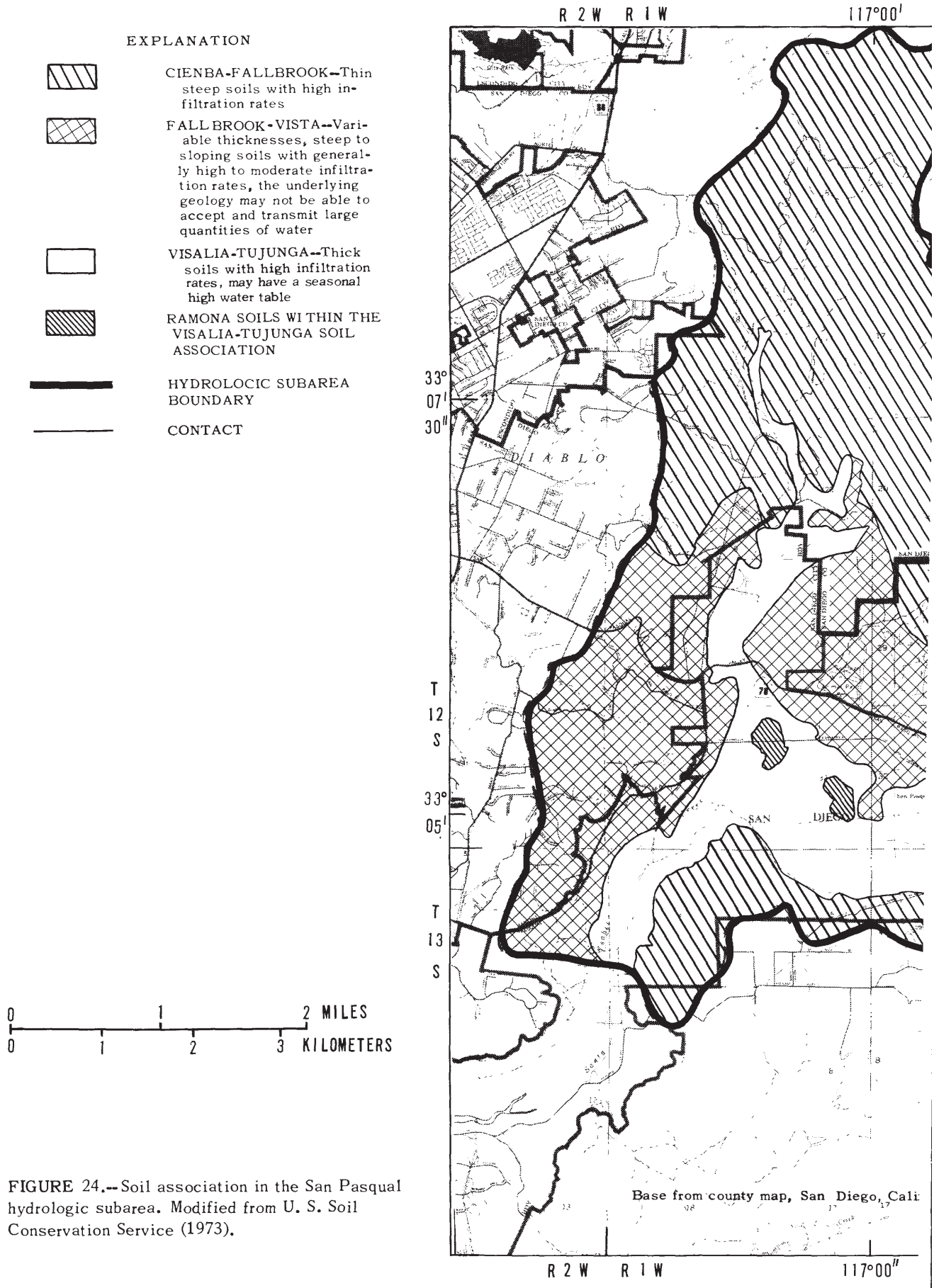
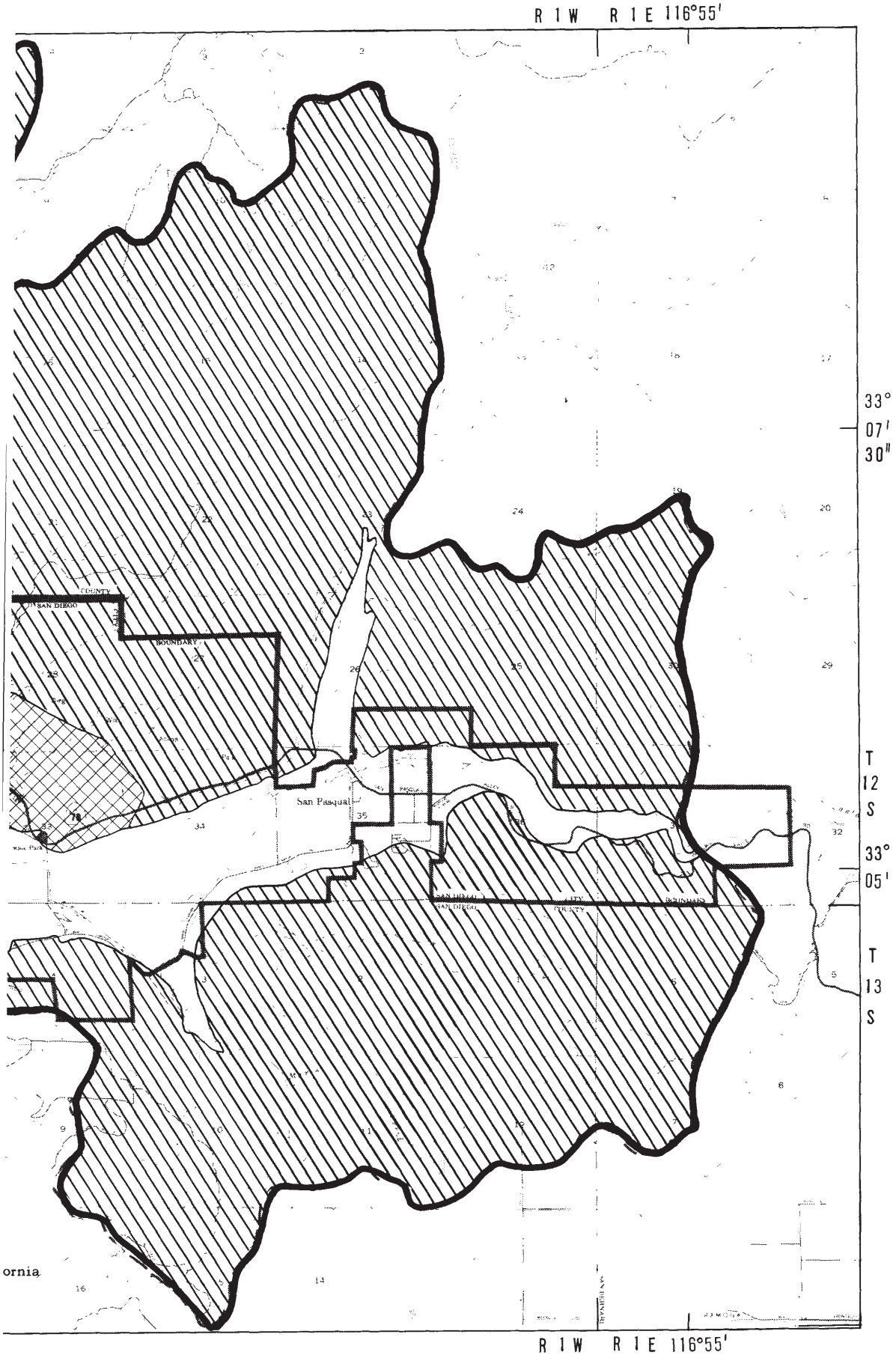


FIGURE 24.--Soil association in the San Pasqual hydrologic subarea. Modified from U. S. Soil Conservation Service (1973).


R 1 W R 1 E 116°55'
33° 07' 30"
T 12 S
33° 05'
T 13 S
San Pasqual
R 1 W R 1 E 116°55'

The Cienba-Fallbrook association has many of the same soils as the Fallbrook-Vista association, but in different proportions. Shallow Cienba soils developed over granodiorite dominate this association. However, small areas of Fallbrook and Vista soils have developed over exposures of tonalite and gabbro.

Limitations on applying reclaimed water to upland soils are soil thickness and the ability of the underlying soil profile and geology to accept, filter, and transmit water. Presently, many agricultural areas in the uplands are able to transmit irrigation return water from hillside avocado groves only through shallow circulation and subsurface discharge to springs. If this were reclaimed water, there could be health hazards associated with viruses not killed by wastewater treatment processes or removed by limited soil contact. Proper choice of application sites, methods, rates, and amounts should minimize shallow circulation and surface discharge of reclaimed water, thus minimizing health concerns associated with reclaimed water use on upland soils.

Soils of the Visalia-Tujunga association have developed over the alluvium. All soils within this association are greater than 5 feet thick. In general, infiltration capacities are high and range from 2.0 to 6.3 in/h for Visalia soils, to greater than 20 in/h for Tujunga soils. Small areas of Ramona soils are also present in the Visalia-Tujunga association, particularly where alluvial fill is thin. The primary limitation on application of reclaimed water to soils of the Visalia-Tujunga association is a high water table, within several feet of land surface much of the year.

Surface Water

Streamflow Characteristics

Streamflow data are summarized in table 7, and the locations of stream gages are shown in figure 25. Streamflow into the San Pasqual hydrologic subarea is from Santa Ysabel, Guejito, Santa Maria, and Cloverdale Creeks. A small amount of streamflow originates as springs in uplands of the hydrologic subarea. All surface-water flow leaves the hydrologic subarea through the San Dieguito River at San Pasqual Narrows.

Santa Ysabel Creek is the largest stream, draining 128 mi^2 of largely undeveloped land above the San Pasqual hydrologic subarea. Large parts of its watershed are within Cleveland National Forest and several Indian reservations. Streamflow in Santa Ysabel Creek has been regulated since July 1954 by Sutherland Reservoir, which has a capacity of 29,680 acre-ft, and may further be controlled by the proposed Palmo Dam, which will have a capacity of 30,000 acre-ft and an average annual yield of 8,500 acre-ft.

TABLE 7.--Summary of flow data for the San Pasqual hydrologic subarea

[USGS, U.S. Geological Survey]

Station name	USGS No.	Period of record	Drainage area (mi^2)	Annual discharge (acre-ft) average	Annual discharge (acre-ft) median	Median number of days with flow greater than 0.1 ft^3/s	Maximum discharge for period of record instantaneous (ft^3/s)	Maximum discharge for period of record annual (acre-ft)
Santa Ysabel Creek near Ramona[1]	11025500	02-1912 to 02-1923 10-1943 to 09-1981	112	14,900	3,912	180	28,400	149,000
Santa Ysabel Creek near San Pasqual[1]	11026000	12-1905 to 09-1910 03-1911 to 09-1912 [2]04-1947 to 11-1955 04-1956 to 03-1980	128	5,000	507	102	12,500	29,700
Guejito Creek near San Pasqual	11027000	12-1946 to 09-1981	22	2,110	290	148	3,940	23,900
Santa Maria Creek near Ramona	11028500	11-1912 to 09-1920 10-1946 to 09-1981	58	4,050	145	53	15,200	43,500
San Dieguito River near San Pasqual[1]	11029000	[2]04-1947 to 04-1956 05-1956 to 09-1965	250	[3]1,610	0	0	[3]3,600	[3]14,500

[1]Flow in stream has been regulated since July 1954 by Sutherland Reservoir which has a capacity of 29,680 acre-ft. There are additional small diversions above the station.

[2]Records compiled for irrigation season only.

[3]Based on one flow event in 1958.

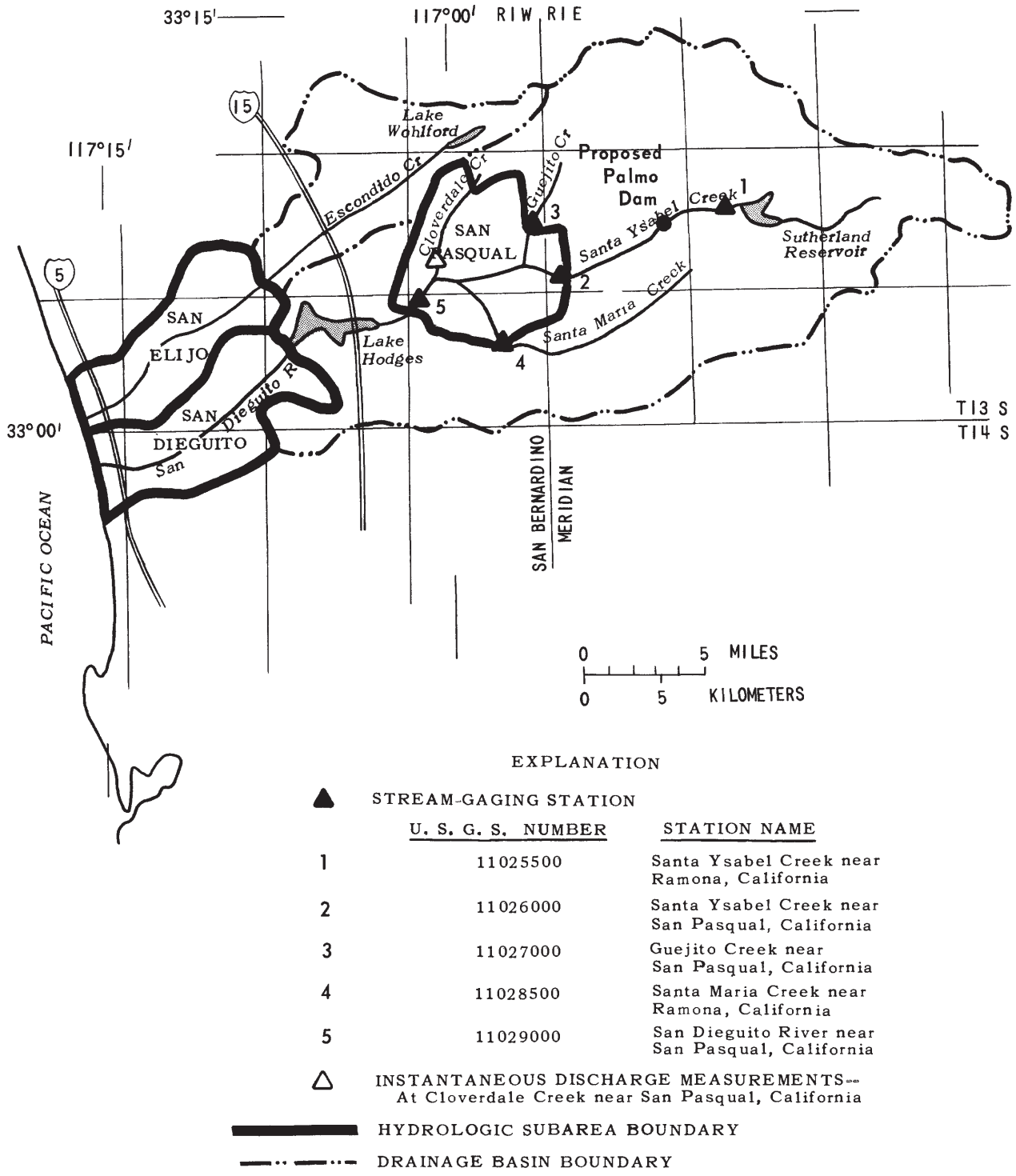


FIGURE 25.--Location of stream-gaging stations in the San Pasqual hydrologic subarea.

Santa Ysabel Creek near San Pasqual typically flows 102 days during the year and median annual discharge is 510 acre-ft. Maximum annual flow in Santa Ysabel Creek was 29,700 acre-ft in 1979. Data for Santa Ysabel Creek near Ramona (table 7) indicate Santa Ysabel Creek may actually flow for a much longer period each year, and may discharge as much as 3,900 acre-ft of water annually. However, these data reflect natural flow regime before completion of Sutherland Dam, and a generally wetter period of record.

With respect to median annual discharge, Guejito Creek is the second largest stream in the hydrologic subarea. Guejito Creek near San Pasqual drains a largely undeveloped watershed of 22 mi^2, with flow unregulated except for several small diversions. This stream flows about 148 days each year (median value) and has a median annual discharge of 290 acre-ft. Maximum annual flow from Guejito Creek was 23,900 acre-ft in 1978, almost as much as the maximum annual flow from Santa Ysabel Creek.

Santa Maria Creek drains a largely agricultural watershed of 58 mi^2. Streamflow is unregulated except for several small diversions. Although the drainage area is much larger than that of Guejito Creek, flows in Santa Maria Creek are dampened by another ground-water basin farther upstream. Santa Maria Creek near Ramona flows about 53 days each year (median value) and in many years it does not flow at all. Median annual flow from Santa Maria Creek is 145 acre-ft and the maximum annual flow was 43,500 acre-ft in 1916.

Cloverdale Creek drains an 18 mi^2 agricultural watershed. Streamflow is unregulated and ungaged. Irrigation return water from hillside avocado groves has turned Cloverdale Creek into a perennial stream. Instantaneous discharge measured on November 24, 1981, and March 25, 1982, was 2.0 and 3.6 ft^3/s, respectively. This water was primarily irrigation return water, and will be discussed in the section on recharge.

Median annual surface-water flow into the hydrologic subarea, excluding Cloverdale Creek, is about 940 acre-ft. In a typical year, no surface-water flow leaves the subarea. In wet years and during floods, enough surface water is available to provide flow in the San Dieguito River at San Pasqual Narrows. Because the period of record includes years 1946-77, the driest period in the last 400 years (Larry Michaels, San Diego County Water Authority, written commun., 1982), estimates of streamflow characteristics may be low.

Surface-Water Quality

Historical water-quality data for Santa Ysabel Creek below Sutherland Dam from 1956-81 are summarized in table 8. No discharge data are available to determine the relation between water quality and discharge, and to separate baseflow from stormflow. However, minimum concentrations given in table 8 probably reflect quality of stormflow, and maximum concentrations probably reflect quality of baseflow. Throughout the period of record, water in Santa Ysabel Creek has been a mixed type, dominated by bicarbonate on the anionic side; relative concentrations of dissolved species have remained constant. Historical water-quality data are not available for Guejito, Santa Maria, or Cloverdale Creeks.

Surface-water-quality data for the San Pasqual hydrologic subarea were collected in 1981-82. Two samples were collected from Santa Maria, Guejito, and Cloverdale Creeks, one in autumn to reflect baseflow, and another during the recessional flow of a late spring storm. Only one sample was collected from Santa Maria Creek, as there was no flow in autumn 1981. Dissolved-solids concentrations were lowest in Santa Ysabel and Guejito Creeks, 321 and 366 mg/L, respectively, and were highest in Cloverdale Creek, 1,040 mg/L. Santa Maria Creek had an intermediate dissolved-solids concentration of 734 mg/L. Water was a mixed type in all streams. However, water from Cloverdale and Santa Maria Creeks was dominated by sodium chloride and bore a strong resemblance to imported water. Water from Santa Ysabel and Guejito Creeks was well mixed on the cationic side, but dominated by bicarbonate on the anionic side. No stream seems to contribute large amounts of sulfate to the hydrologic subarea. Water-quality analyses are listed in appendix A.

TABLE 8.--Summary of water-quality data for Santa Ysabel Creek below Sutherland Dam, 1956-81

[<, less than; --, no data]

	Number of observations	Minimum	Median	Maximum
Instantaneous discharge----------ft^3/s--	0	--	--	--
Specific conductance µmho/cm at 25°C----------	41	260	480	642
pH----------	40	7.0	8.4	10
Dissolved solids-------mg/L--	39	180	306	406
Sodium----------mg/L--	41	17	38	160
Calcium----------mg/L--	41	22	32	100
Magnesium----------mg/L--	41	5	15	31
Chloride----------mg/L--	41	19	49	140
Sulfate----------mg/L--	41	5	36	360
Alkalinity as $CaCO_3$----mg/L--	36	85	130	157
Boron----------µg/L--	10	<10	90	220

Ground Water

Crystalline Rocks

Granodiorite and much of the Green Valley Tonalite are weathered to only a shallow depth, but may have fractures which can yield small quantities of water to wells. In the San Pasqual area, well yields from fractured crystalline rocks are as high as 15 gal/min, but typically less than 2 gal/min. Specific capacities for wells in fractured crystalline rocks of the San Pasqual subarea are less than 0.04 (gal/min)/ft of drawdown.

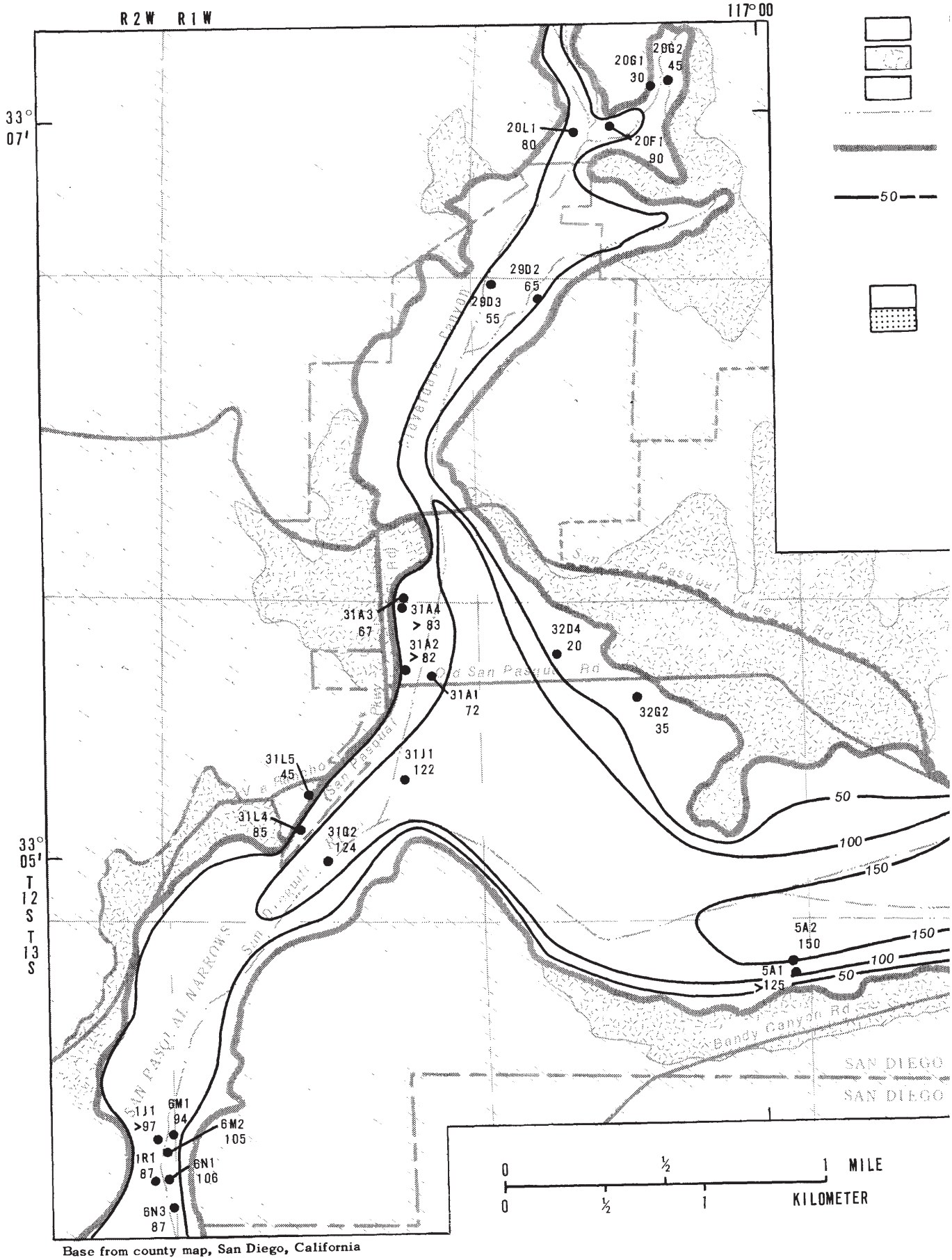
Residual Aquifer

Deeply weathered exposures of Green Valley Tonalite form the residual aquifer. Water-yielding characteristics are summarized in table 9. In the San Pasqual subarea, well yields are as high as 600 gal/min and the median yield is 40 gal/min. Specific capacities for wells in weathered tonalite are as high as 0.7 (gal/min)/ft of drawdown with a median value of 0.4 (gal/min)/ft of drawdown. In addition to surface exposures, drillers' logs reveal considerable weathered tonalite buried beneath alluvial fill. If this material is accounted for and the average depth of weathered material is assumed to be 100 feet, by using an average specific yield of 0.01 (Ramsahoye and Lang, 1961) the total storage in the residual aquifer is estimated to be less than 5,000 acre-ft.

Water generally moves from the residual aquifer downgradient into the alluvial fill. Movement between the two is accelerated during periods of low ground-water levels in the alluvium. Although the residual aquifer contains only a small quantity of water, it may be locally important during such times.

Alluvial Aquifer

Alluvial fill covers 3,410 acres or almost 15 percent of the San Pasqual subarea. Alluvial thickness exceeds 120 feet in San Pasqual Narrows and increases to over 200 feet in the upper part of the basin (fig. 26). The alluvial aquifer contains 364,000 acre-ft of fill. Drillers' logs and specific-capacity data indicate alluvial fill in the San Pasqual subarea has better water-yielding characteristics than the San Dieguito subarea farther downstream, therefore an average specific yield of 0.16 was used to estimate storage. Total ground-water storage in the alluvial aquifer is approximately 58,000 acre-ft. The alluvial fill is a water-table aquifer and ground water is not confined.



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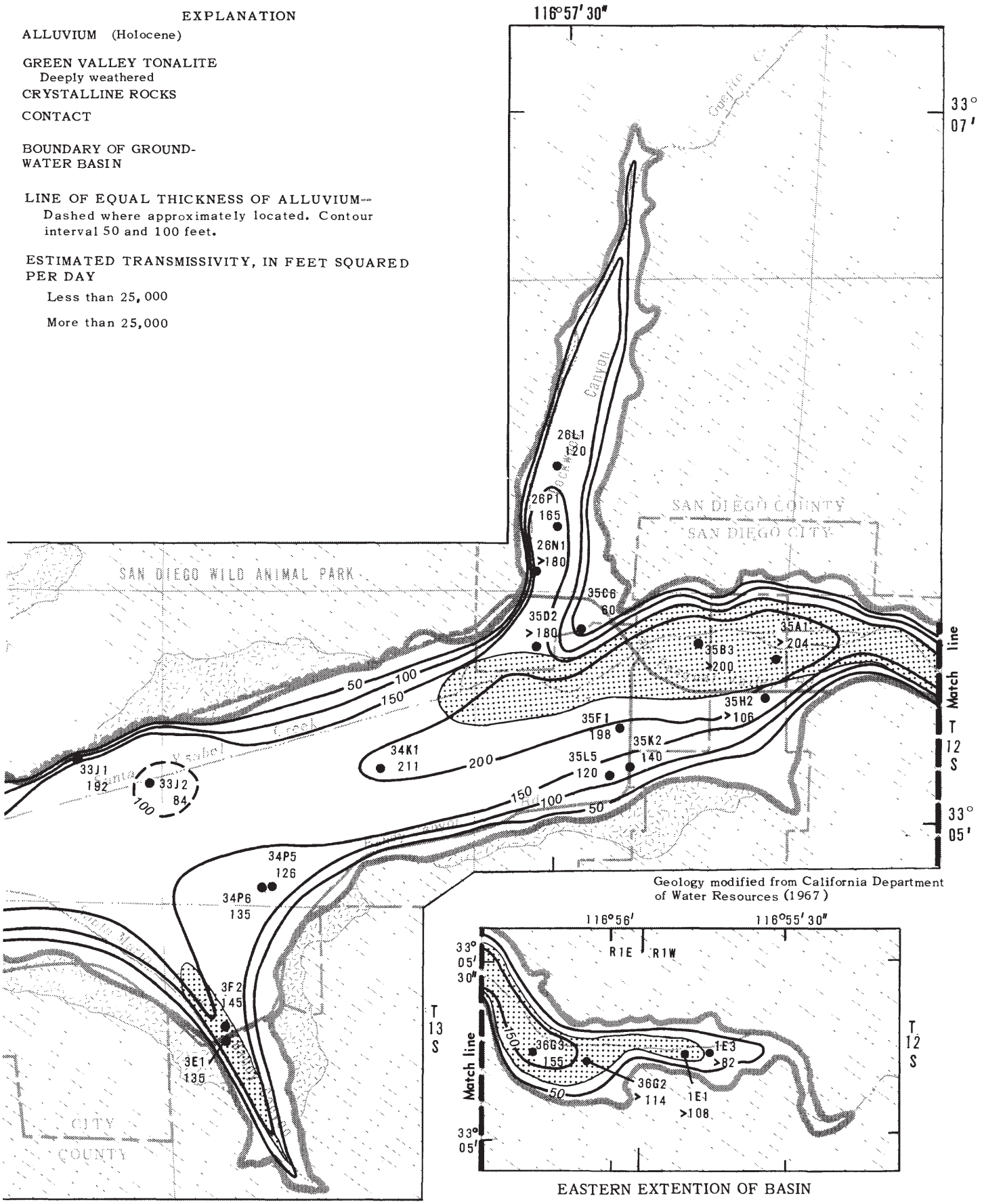


FIGURE 26.--Thickness of the San Pasqual alluvial aquifer.

TABLE 9.--Water-yielding characteristics of aquifers

[Data from drillers' information.

Geologic unit	Map symbol	Exposure in subarea (acres)	Maximum thickness (feet)	Description
Alluvium	Qal	3,410	>200	River and stream deposits of gravel, sand, silt, and clay.
Crystalline rocks of the southern California batholith	Kgr, Kt, Jg, Jm	15,040	Basement complex	Primarily unweathered granodiorite and tonalite.
Deeply weathered exposures of Green Valley Tonalite	Kt_1	1,550	Plus or minus 100, variable	Deeply weathered Green Valley Tonalite, frequently covered by a thin layer of alluvium.

Wells in the alluvium yield as much as 1,600 gal/min. Although highest yields are in the upper part of the basin, wells yielding almost 1,000 gal/min are found throughout the main canyon and Rockwood and Bandy Canyons.

Well logs show a mixture of clean sand, gravel, and silt throughout the alluvium. In general, well logs indicate a greater percentage of clean sand and gravel in the upper basin and a greater percentage of silt in the lower basin and San Pasqual Narrows (Kohler and Miller, 1982).

Specific-capacity data reflect generalized distribution of sand, gravel, and silt within the aquifer. Several wells, most located in a line along the northern edge of the upper basin from the mouth of Rockwood Canyon east to the inflow of Santa Ysabel Creek, have specific capacities

in the San Pasqual hydrologic subarea

>, greater than; --, no data]

Water-yielding characteristics			
General	Well yield (gal/min)	Specific capacity ((gal/min)/ft of drawdown)	Transmissivity (ft^2/d)
Yields water freely to wells.	As much as 1,600.	Typically 16, but may exceed 100.	Typically 4,000, but may exceed 25,000.
Yields small quantities of water to wells from fractures.	Less than 2, but may be as much as 15.	Less than 0.1.	--
Yields water to wells from weathered granite matrix and fractures.	Typically less than 40, but may be as much as 600.	Typically less than 0.4, but may be as much as 0.7.	--

greater than 100 (gal/min)/ft of drawdown. One well in Bandy Canyon also has a specific capacity greater than 100 (gal/min)/ft of drawdown. Specific-capacity data from wells in the remainder of the aquifer average 16 (gal/min)/ft of drawdown with a maximum of 75 (gal/min)/ft.

Estimates of transmissivity can be obtained by multiplying specific capacity by 250. This value is based on statistical correlations done by Thomasson and others (1960) in California's Central Valley, and has been routinely extended to California's coastal and desert basins. Using this method, aquifer transmissivities along the northern edge of the upper San Pasqual basin and Bandy Canyon exceed 25,000 ft^2/d (fig. 26). In the remainder of the alluvium, transmissivities are less than 20,000 ft^2/d and average 4,000 ft^2/d.

Recharge.--Recharge to the alluvial aquifer originates primarily outside the hydrologic subarea as flow in Santa Ysabel, Guejito, and Santa Maria Creeks. In a typical year no flow leaves the subarea and all surface water becomes ground-water recharge, about 940 acre-ft/yr. During wet years flow may be great enough to fill the alluvial aquifer, with the excess leaving the subarea as flow in the San Dieguito River. Additional recharge is provided by water imported to the subarea for agricultural use. Streamflow originating inside the subarea, leakage from the surrounding residual aquifer, and precipitation contribute small amounts of recharge that may be locally important.

Imported water use in the San Pasqual subarea has grown in recent years. In 1970, 2,140 acre-ft of water was imported to the subarea and in 1980, 3,560 acre-ft of imported water was used. Currently, imported water is used primarily in San Diego Wild Animal Park and hillside avocado groves west of Cloverdale Canyon.

Based on calculations by the California Department of Water Resouces (California Department of Water Resources, 1983), 710 acre-ft of imported water used for irrigation was available for deep percolation and recharge to the alluvial aquifer in 1970. By 1980 this figure increased to 1,160 acre-ft. This was sufficient to turn Cloverdale Creek into a perennial stream in 1977 and to maintain water levels in Cloverdale Canyon near land surface. At that time, water levels throughout the remainder of the alluvial aquifer were generally greater than 40 feet, and occasionally as deep as 85 feet below land surface.

Occurrence and movement.--Movement of ground water is from the major source of recharge at the inflow of Santa Ysabel Creek and from smaller recharge areas in Rockwood, Bandy, and Cloverdale Canyons, downgradient to the discharge area in San Pasqual Narrows. With the exception of evapotranspiration losses, all water entering the alluvial aquifer exits through San Pasqual Narrows.

In the early 1900's before the beginning of extensive ground-water development, water levels were very near land surface throughout much of the alluvial aquifer (fig. 27 and 28). Water levels remained high throughout the 1930's, and declined only gradually during the 1940's and 1950's. Rate of water-level decline increased in the early 1960's and historically low water levels occurred in 1965 and 1977.

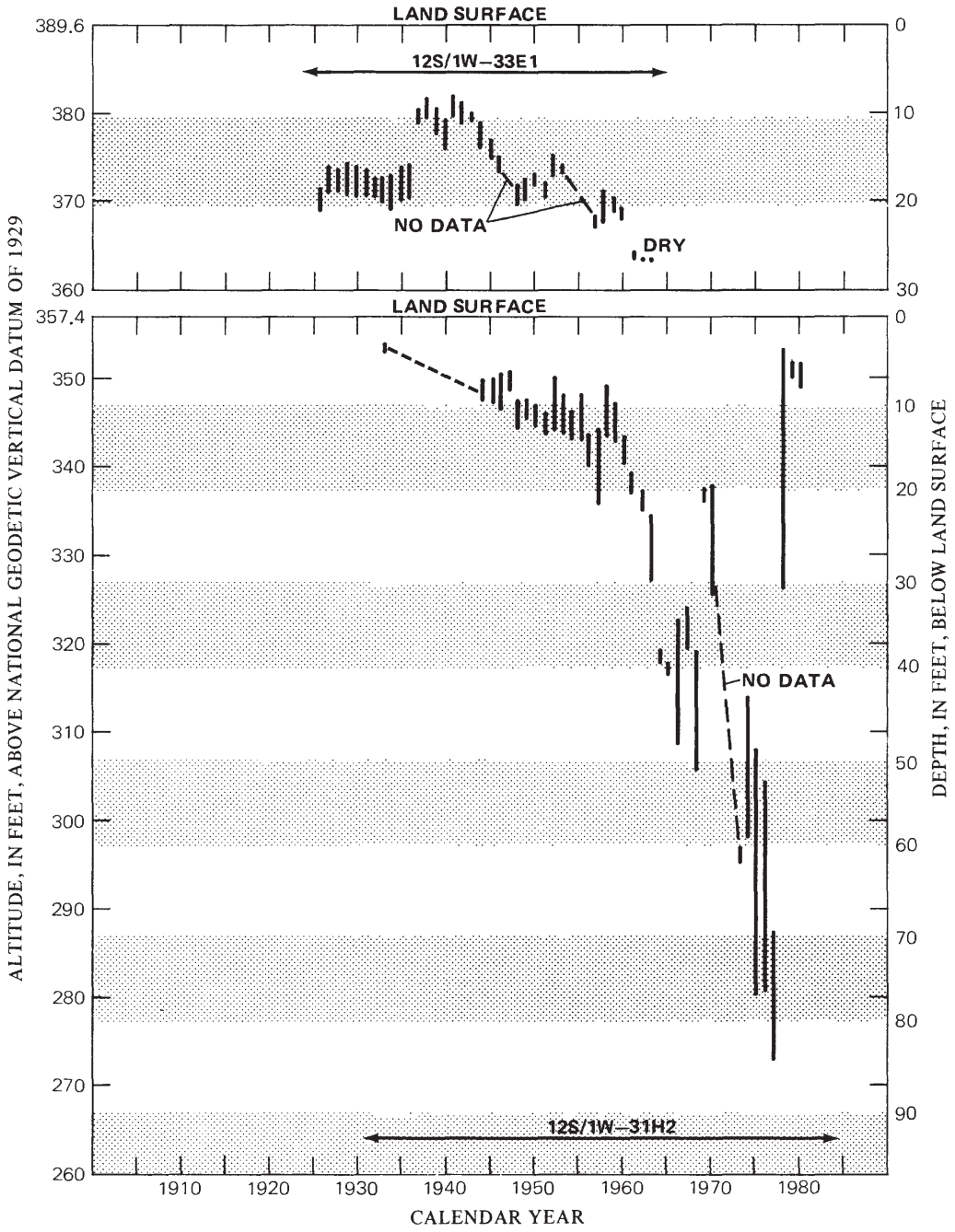


FIGURE 27. – Hydrographs for wells in the lower part of the San Pasqual basin. Vertical bar indicates range of water–level fluctuation during year. (Location of wells shown in appendix C.).

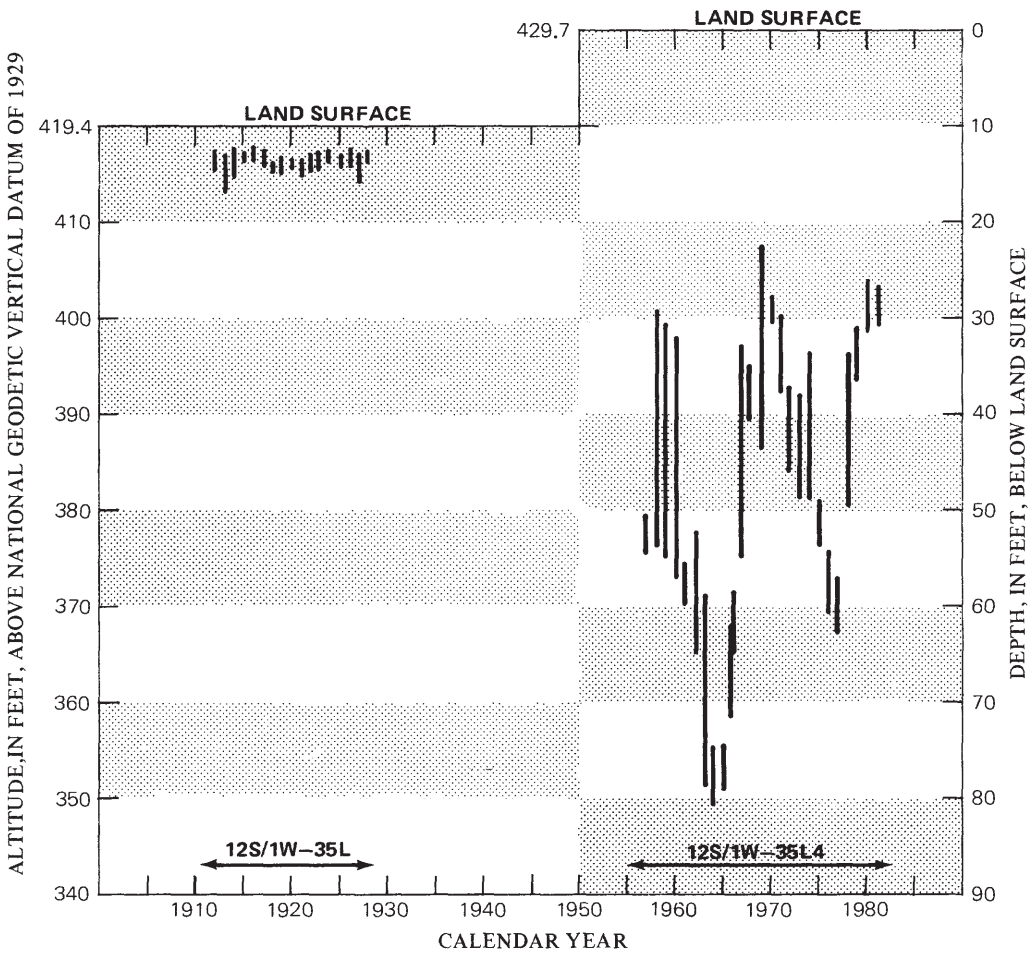


FIGURE 28. – Hydrographs for wells in the upper part of the San Pasqual basin. Vertical bar indicates range of water–level fluctuation during year. (Location of wells shown in appendix C.).

Figure 29 is a water-level-contour map for spring 1977. At that time, water levels in the San Pasqual alluvium were the lowest ever recorded prior to the beginning of an irrigation season. The hydraulic gradient through San Pasqual Narrows was reversed, and ground water was moving into the basin from outside the hydrologic subarea. The only discharge from the San Pasqual subarea was through evapotranspiration of agricultural crops. Depth to water was greater than 40 feet throughout most of the alluvium and exceeded 80 feet in some places. This represented a reduction in storage of 23,800 acre-ft. Storage remaining in the basin was 34,200 acre-ft, or 60 percent capacity.

Water levels rose rapidly in 1978 in response to a wet year. The alluvial aquifer filled, and ground-water movement returned to normal.

Figure 30 is a spring 1982 water-level-contour map. Ground-water movement was again downgradient from major sources of recharge at Santa Ysabel Creek, Rockwood Canyon, and Bandy Canyon to the discharge area in San Pasqual Narrows. A new source of recharge was irrigation return from avocado groves along the western edge of the lower basin and Cloverdale Canyon. Irrigation return moves from hillsides through the residual aquifer, surfacing as springs in many places, eventually entering the alluvial aquifer. In only a small part of the alluvium were depths to water greater than 10 feet, and nowhere was depth to water greater than 30 feet (fig. 30). The aquifer was full in spring 1982.

Ground-Water Quality

Crystalline Rocks

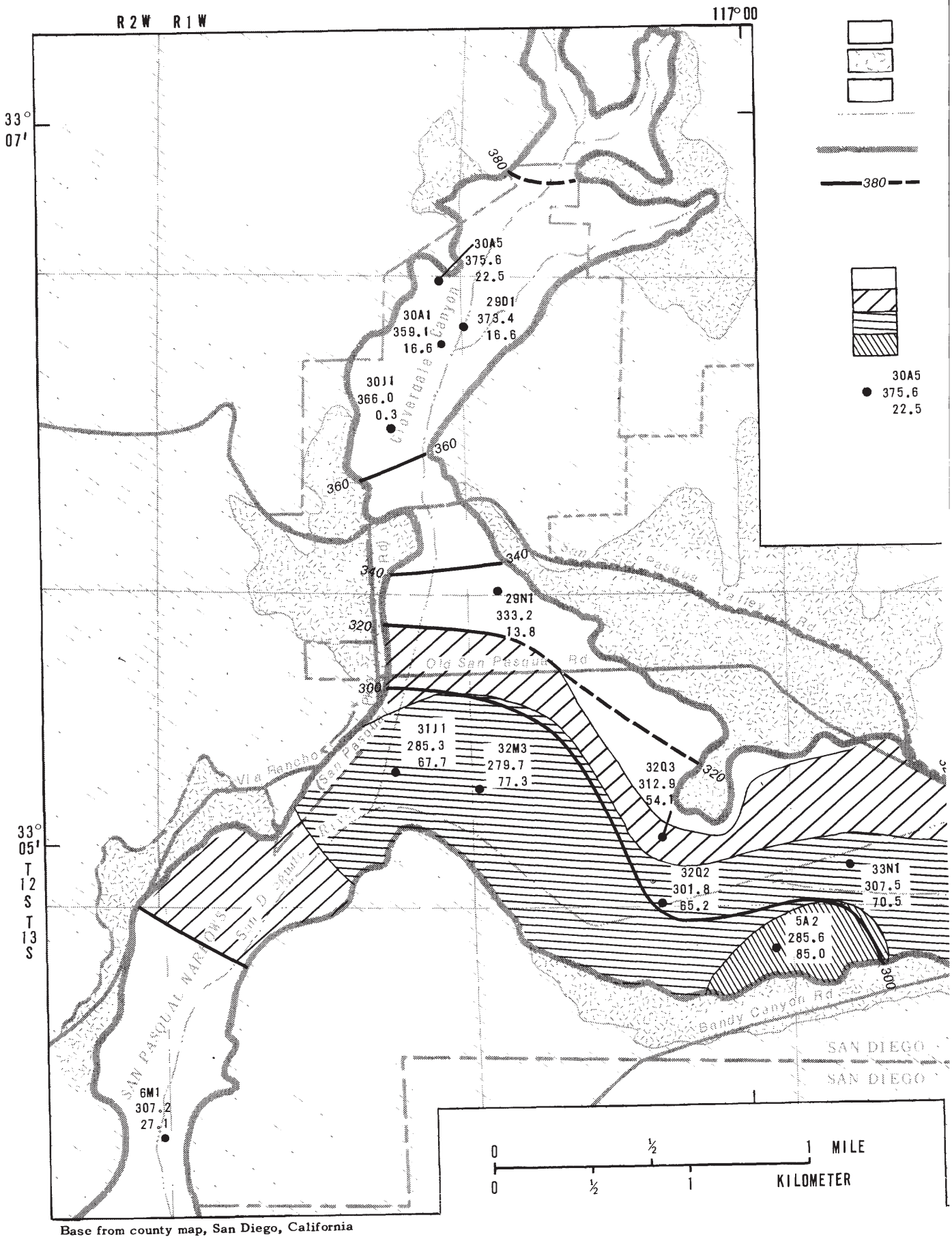
Water from wells in fractured crystalline rocks in San Diego County has a median dissolved-solids concentration less than 500 mg/L (California Department of Water Resources, 1967). However, because wells in this material yield water from fractures which have little ability to adsorb or filter pollutants, quality of the water is easily degraded. Little information is available on current water-quality problems in crystalline areas of the San Pasqual hydrologic subarea.

Residual Aquifer

Prior to 1967, water from weathered granite aquifers in San Diego County had a median dissolved-solids concentration between 500 and 600 mg/L (California Department of Water Resources, 1967). In the San Pasqual subarea, dissolved-solids concentrations in 1981 and 1982, estimated from specific conductance, were as high as 1,430 mg/L, with a median concentration of 1,040 mg/L. In the residual aquifer dissolved solids (as reflected by specific conductance) tend to be higher downgradient from agricultural land.

Dissolved-solids concentrations in water from the residual aquifer are on the average somewhat lower than dissolved-solids concentrations in water from the alluvium in Cloverdale Canyon and the lower part of the basin. Several wells in shallow alluvial fill (12S/1W-20M1 and 12S/1W-30A5) which were completed in the residual aquifer yield water lower in dissolved solids than nearby wells completed only in the surrounding alluvium (fig. 33). When ground-water levels are low in Cloverdale Canyon and the lower basin, the residual aquifer contributes water with a lower average dissolved-solids concentration to the alluvial aquifer, and may actually improve water quality (with respect to dissolved-solids concentration) in some wells.

Water in some areas of the residual aquifer has elevated concentrations of nitrate that could move into the alluvium when ground-water levels are low, particularly in the vicinity of San Diego Wild Animal Park.



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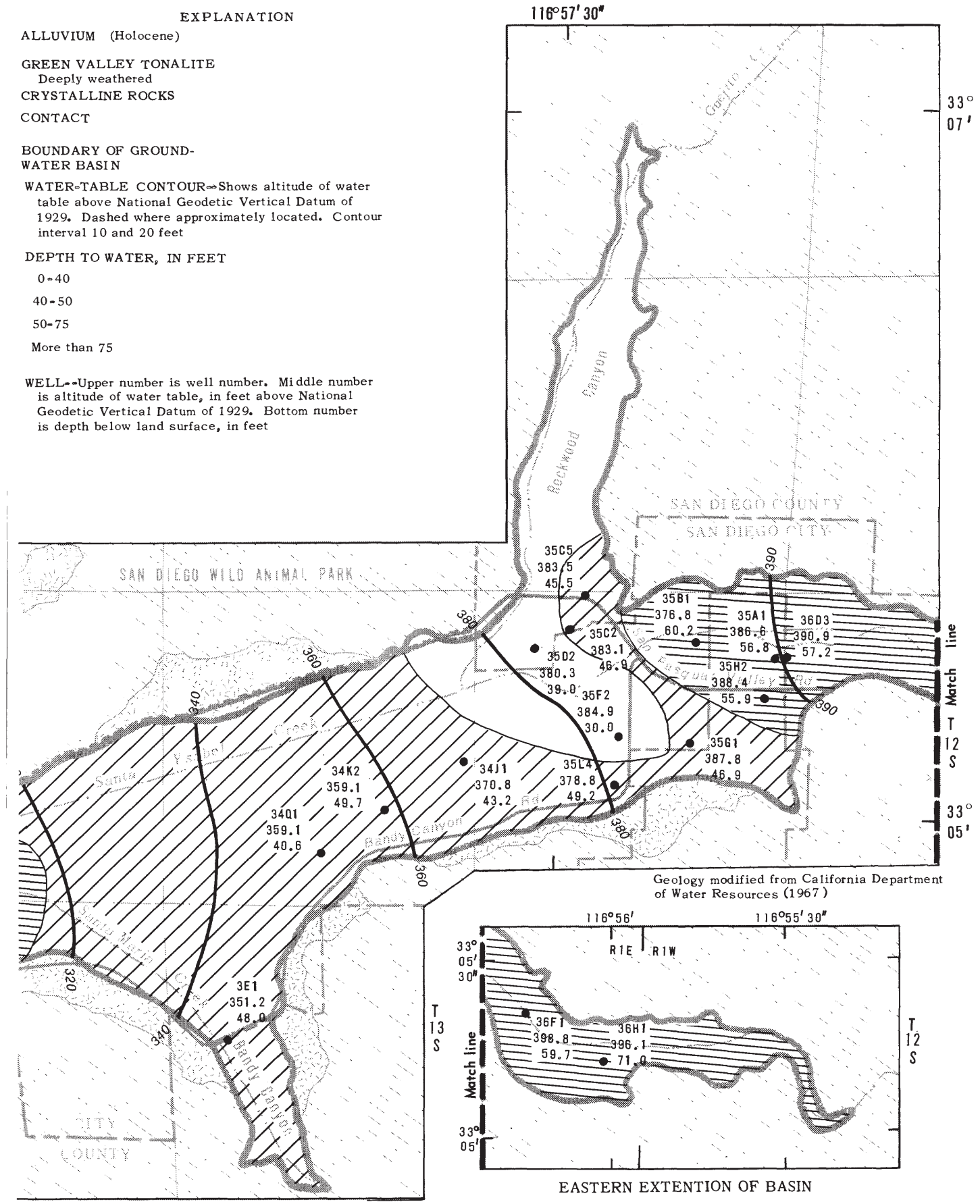
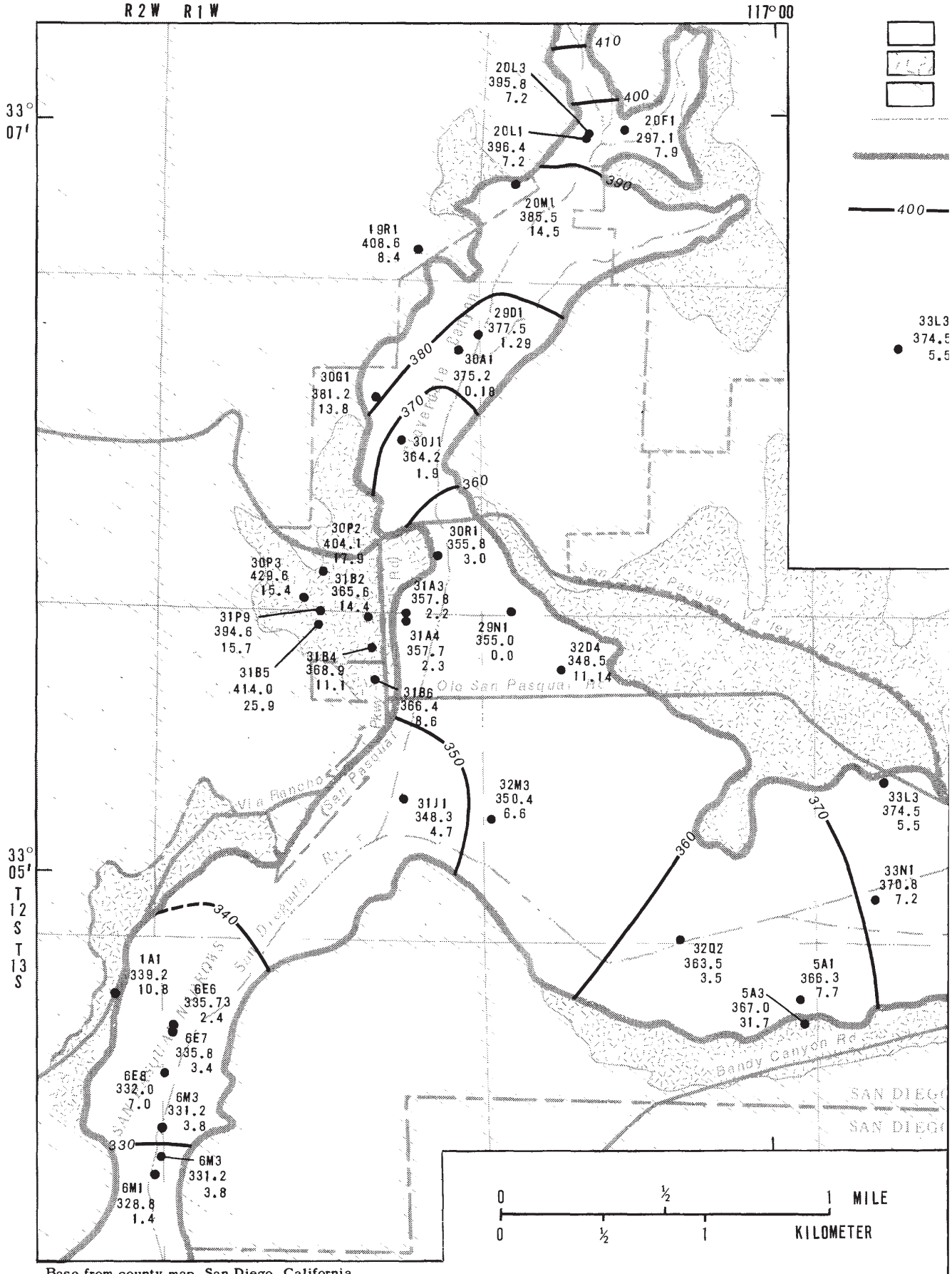


FIGURE 29.--Water-level contours and depth to water in the San Pasqual alluvial aquifer, spring 1977.



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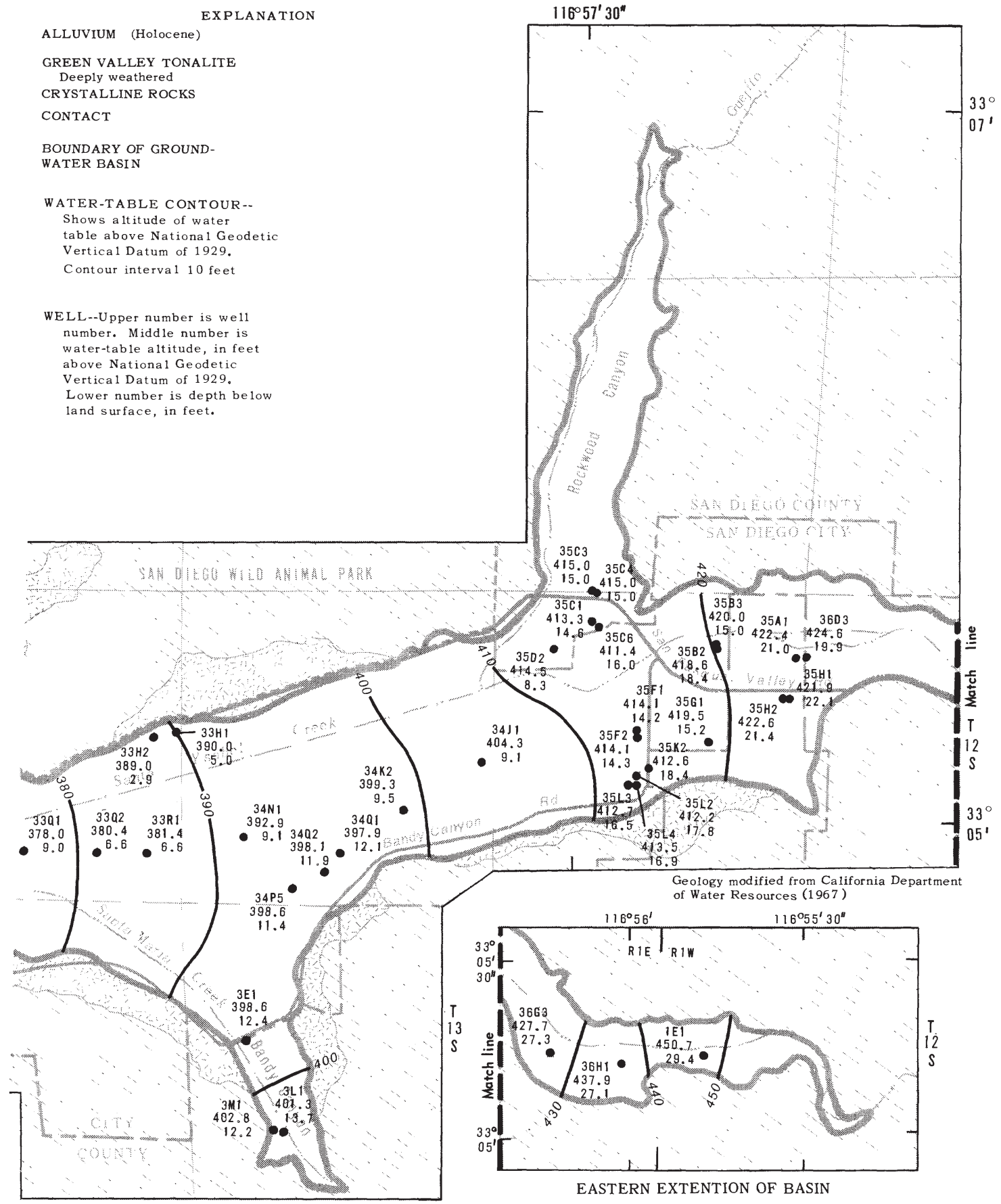


Geology modified from California Department of Water Resources (1967)

EASTERN EXTENTION OF BASIN

FIGURE 30.-- Water-level contours and depth to water in the San Pasqual alluvial aquifer, spring 1982.

Alluvial Aquifer

Historical water quality.--Figure 31 is a ground-water-quality map of the alluvial aquifer in spring 1957, prior to the increased water-level declines of the 1960's. At that time, only one of the sampled wells (12S/1W-30R1) yielded water with dissolved-solids concentrations greater than 1,000 mg/L. Dissolved-solids concentrations from highly transmissive areas in the upper basin were less than 500 mg/L.

During spring 1957, ground water in the alluvium was generally a mixed type. Calcium and sodium were the predominant cations. Calcium predominanted in the highly transmissive areas of the upper basin and sodium predominanted downgradient. Bicarbonate was the predominant anion and sulfate was of minor importance throughout the aquifer.

Water from upper reaches of Cloverdale Canyon was a sodium chloride bicarbonate type. Sodium and chloride increased as water moved downgradient through Cloverdale Canyon, becoming a sodium chloride type as it left the canyon to enter the main body of the aquifer.

By the time ground water left the subarea at San Pasqual Narrows, dissolved solids increased but did not exceed 1,000 mg/L. The percentage of sulfate also increased and ground water was again a mixed type.

Historically, nitrate has been a problem in the alluvial aquifer. Figure 32 shows wells which have yielded water with nitrate concentrations greater than EPA drinking water limits of 10 mg/L as N. Most of the wells are located in the upper part of the basin and may be associated with dairy and poultry operations in that area.

Present water quality.--Present water quality in the alluvium is variable (fig. 33). Lowest dissolved-solids concentrations are found in highly transmissive parts of the upper basin and Rockwood Canyon. Ground water from these areas generally has less than 500 mg/L dissolved solids. Downgradient from highly transmissive parts of the upper basin dissolved-solids concentrations increase, but generally remain below the basin objective of 1,000 mg/L. Dissolved-solids concentrations in water in the lower basin and San Pasqual Narrows are generally above 1,000 mg/L and are as high as 1,550 mg/L. Dissolved-solids concentrations in Cloverdale Canyon and in parts of the upper basin also exceed 1,000 mg/L. Increasing dissolved-solids concentrations in these areas may be related to land use. Irrigation return water appears to contribute to high concentrations of dissolved solids in ground water from Cloverdale Canyon.

Field measurements of specific conductance were converted to dissolved-solids concentration using the following relation:

$$DS=0.7SC-40,$$

where

DS is dissolved-solids concentration, in milligrams per liter; and
SC is specific conductance, in micromhos per centimeter at 25°C.

This relation was developed using linear regression on data collected by the U.S. Geological Survey and the city of San Diego between autumn 1981

and spring 1982. Twenty-three samples with dissolved-solids concentrations ranging from 414 to 2,480 mg/L were used and an R^2 of 0.96 was obtained. This relation is basin specific and care should be used when extrapolating to other areas.

Chloride and sulfate exceed the EPA suggested limit for drinking water of 250 mg/L in ground water from San Pasqual Narrows and Cloverdale Canyon.

Ground water in highly transmissive areas of the alluvial aquifer is a mixed type and resembles recharge water from Santa Ysabel and Guejito Creeks. Cations are well mixed and the percent difference between calcium, sodium, and magnesium is only a few milliequivalents. Bicarbonate and chloride are the dominant anions in the upper basin. Sulfate is relatively unimportant in ground water from highly transmissive areas of the upper basin. Downgradient, the relative importance of sulfate increases. This is probably due to agricultural water use, soil amendments (particularly calcium sulfate, used when irrigating with water high in sodium), and irrigation return water. Increasing importance of sulfate does not seem to be related to recharge water from Santa Maria Creek.

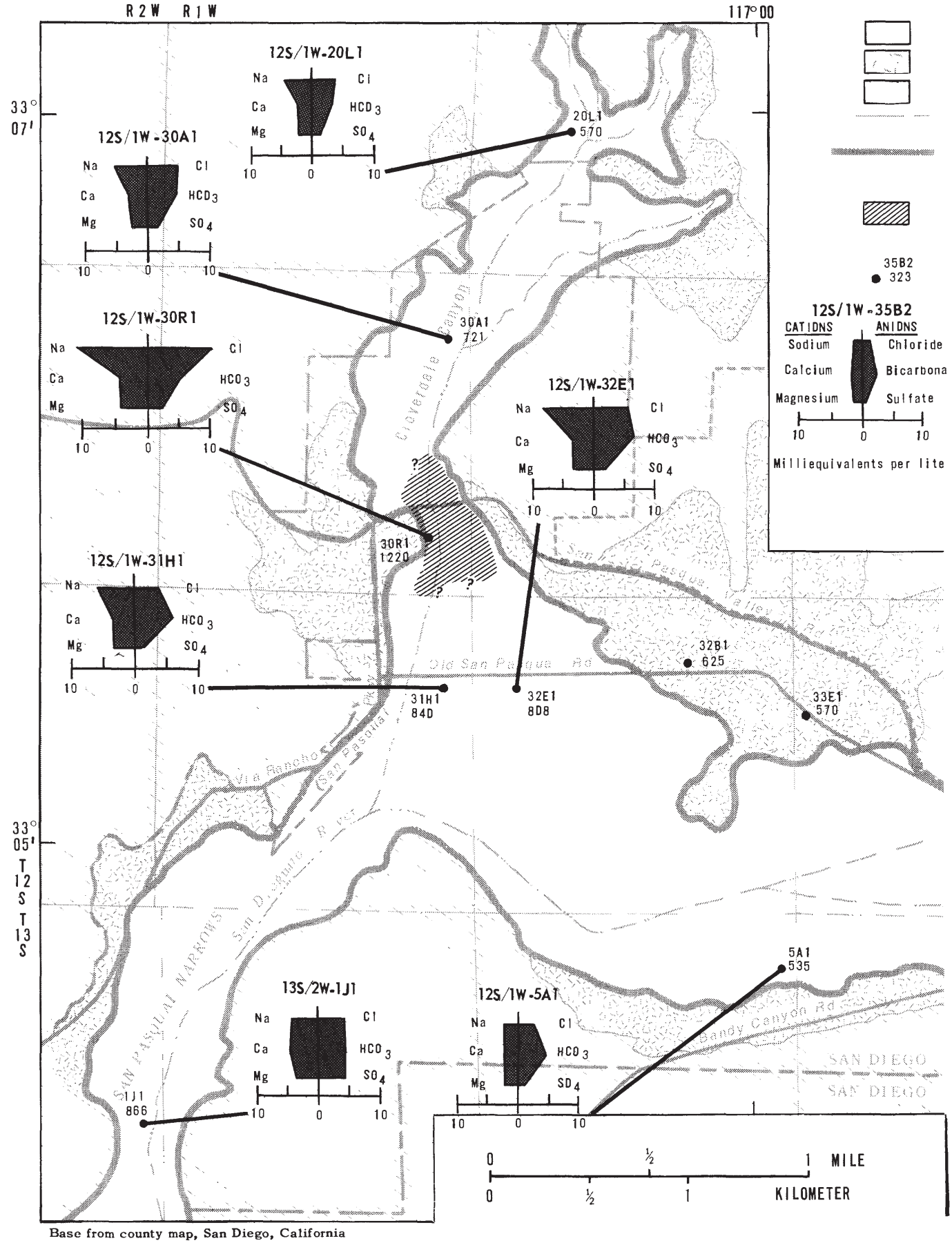
When ground water leaves the subarea at San Pasqual Narrows, it is different from its original composition. Ground water in the Narrows is a sodium chloride sulfate type and reflects agricultural water use in the San Pasqual subarea, and mixing of native water with irrigation return water imported from the Colorado River and northern California.

In 1981 and 1982, only two wells for which chemical analyses were available (12S/1W-34K2 and 12S/1W-35H2) yielded water with nitrate concentrations greater than the EPA recommended limit for drinking water of 10 mg/L nitrate as nitrogen (45 mg/L nitrate as nitrate). Both wells are in the upper part of the basin where dissolved-solids concentrations are below 1,000 mg/L. High nitrate levels in these wells indicate there is still a nitrate problem in the alluvial aquifer, particularly the upper basin, despite the recent filling of the aquifer after floods in 1978.

Impact of Reclaimed Water Use

The impact of reclaimed water use in the San Pasqual hydrologic subarea will depend greatly upon the reclaimed-water management scheme ultimately used. To be properly evaluated, the impact of reclaimed water use should be compared to and contrasted with possible future trends in water quantity and quality for the San Pasqual hydrologic subarea.

If reclaimed water is not used, the amount of ground water in storage in the alluvial aquifer will follow historic patterns of filling and subsequent depletion that are closely associated with long-term trends in precipitation (fig. 27 and 28). During prolonged dry spells, such as occurred prior to 1966 and 1978, ground-water levels will decline and many wells will go dry. The value of the ground-water resource will be greatly diminished when needed most.



Base from county map, San Diego, California

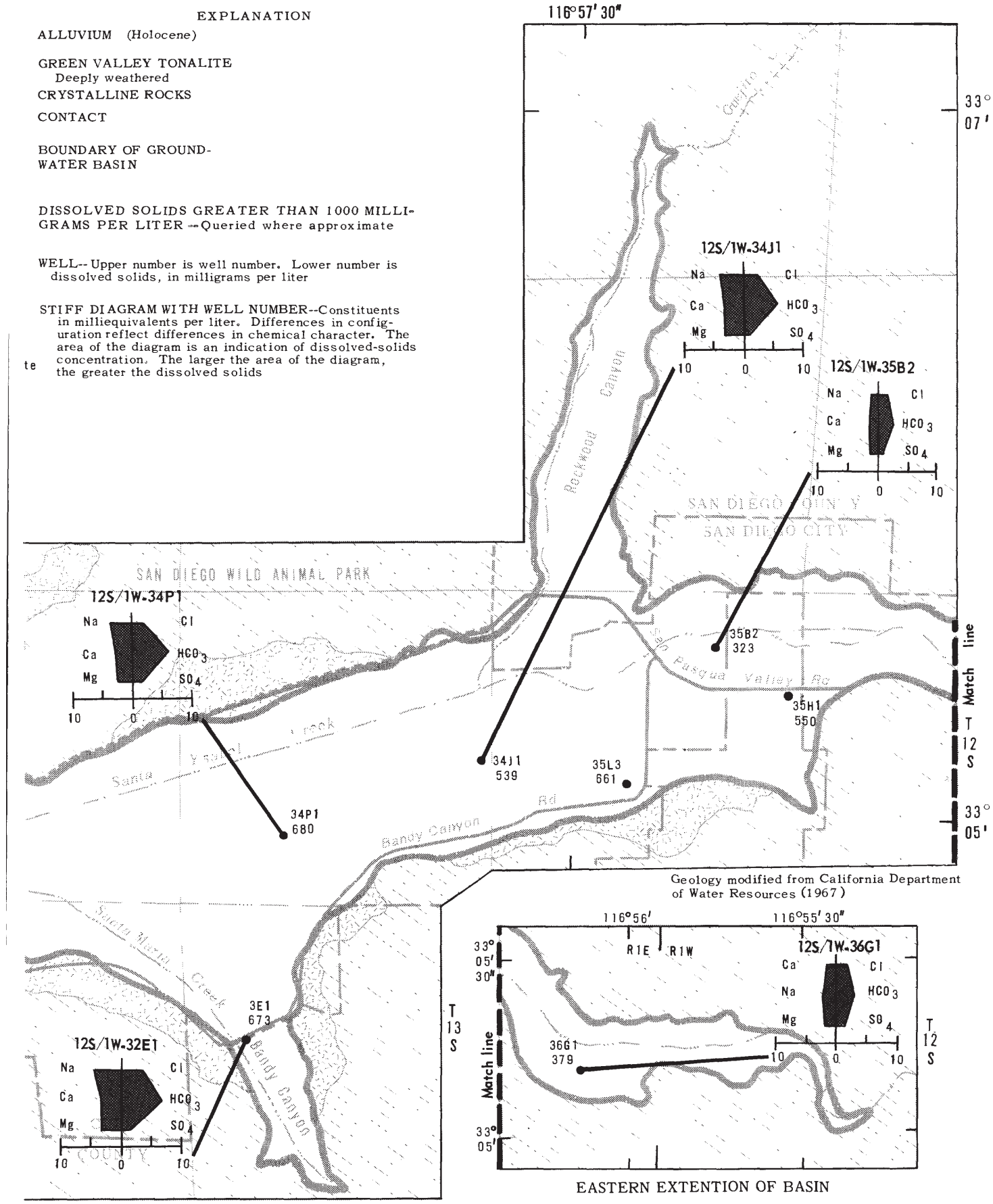
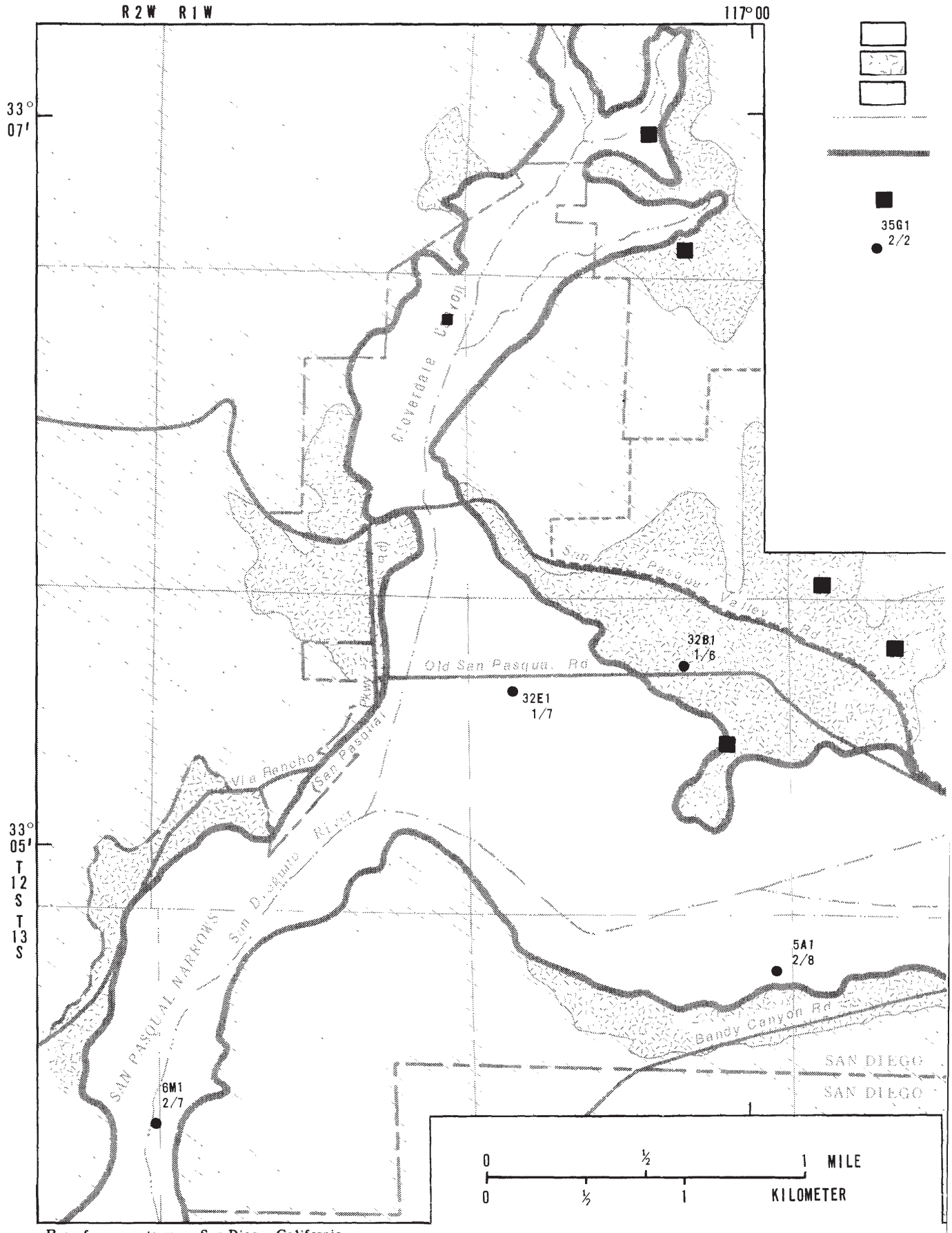
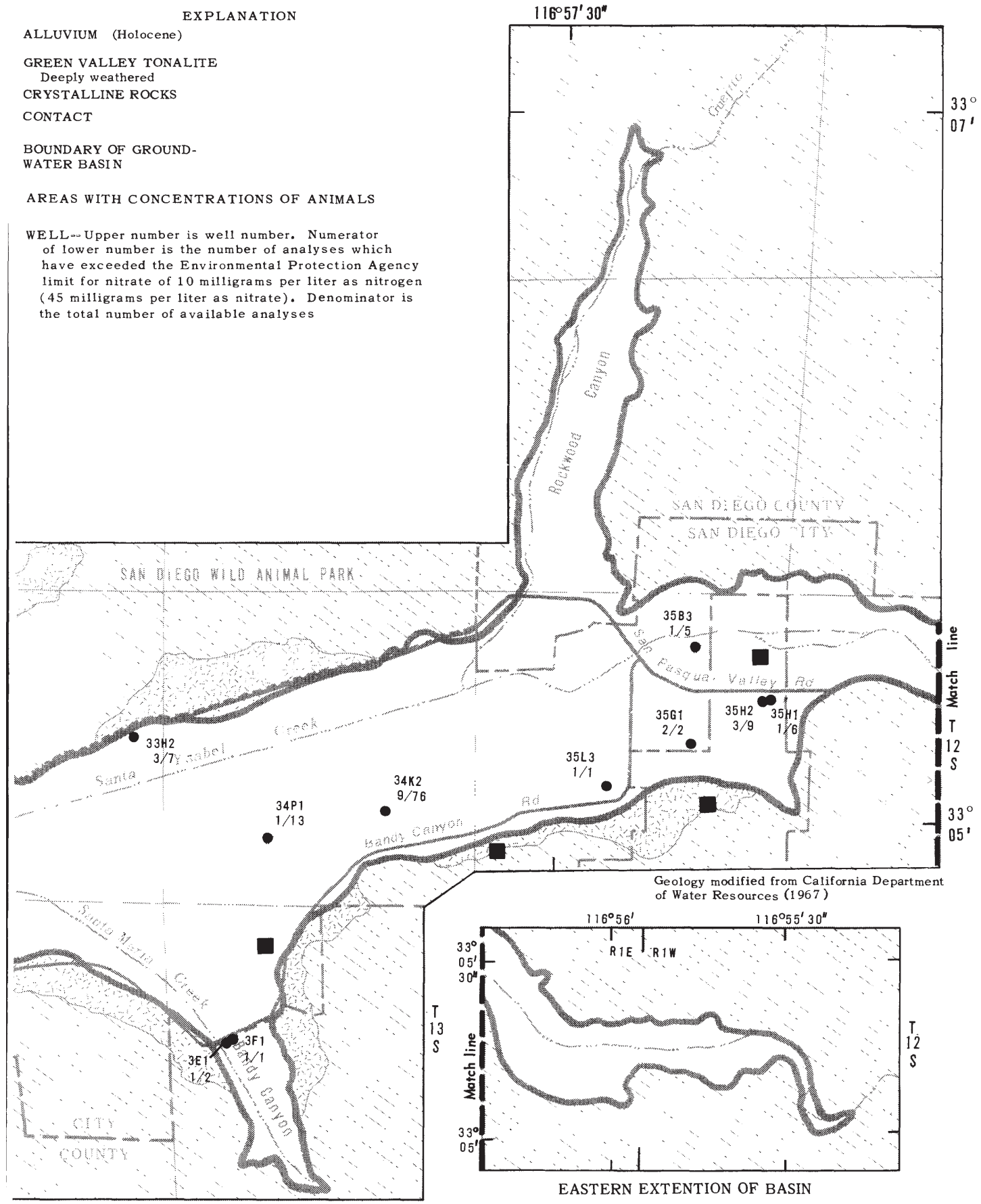


FIGURE 31.--Water quality in the San Pasqual alluvial aquifer, spring 1957.



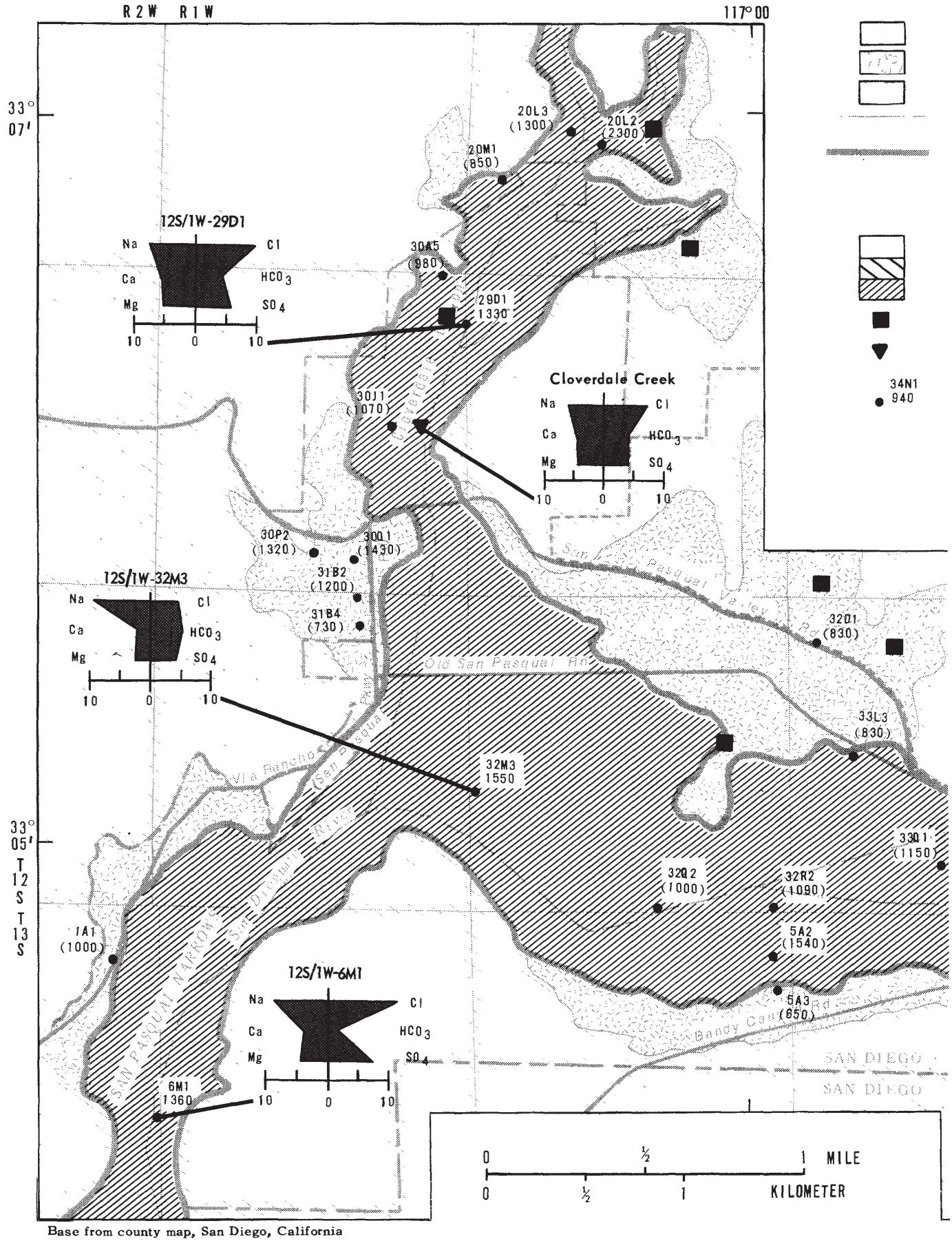
Base from county map, San Diego, California

FIGURE 32.--Location of wells that have yielded water with



Geology modified from California Department of Water Resources (1967)

high concentrations of nitrate, San Pasqual alluvial aquifer, 1950-81.



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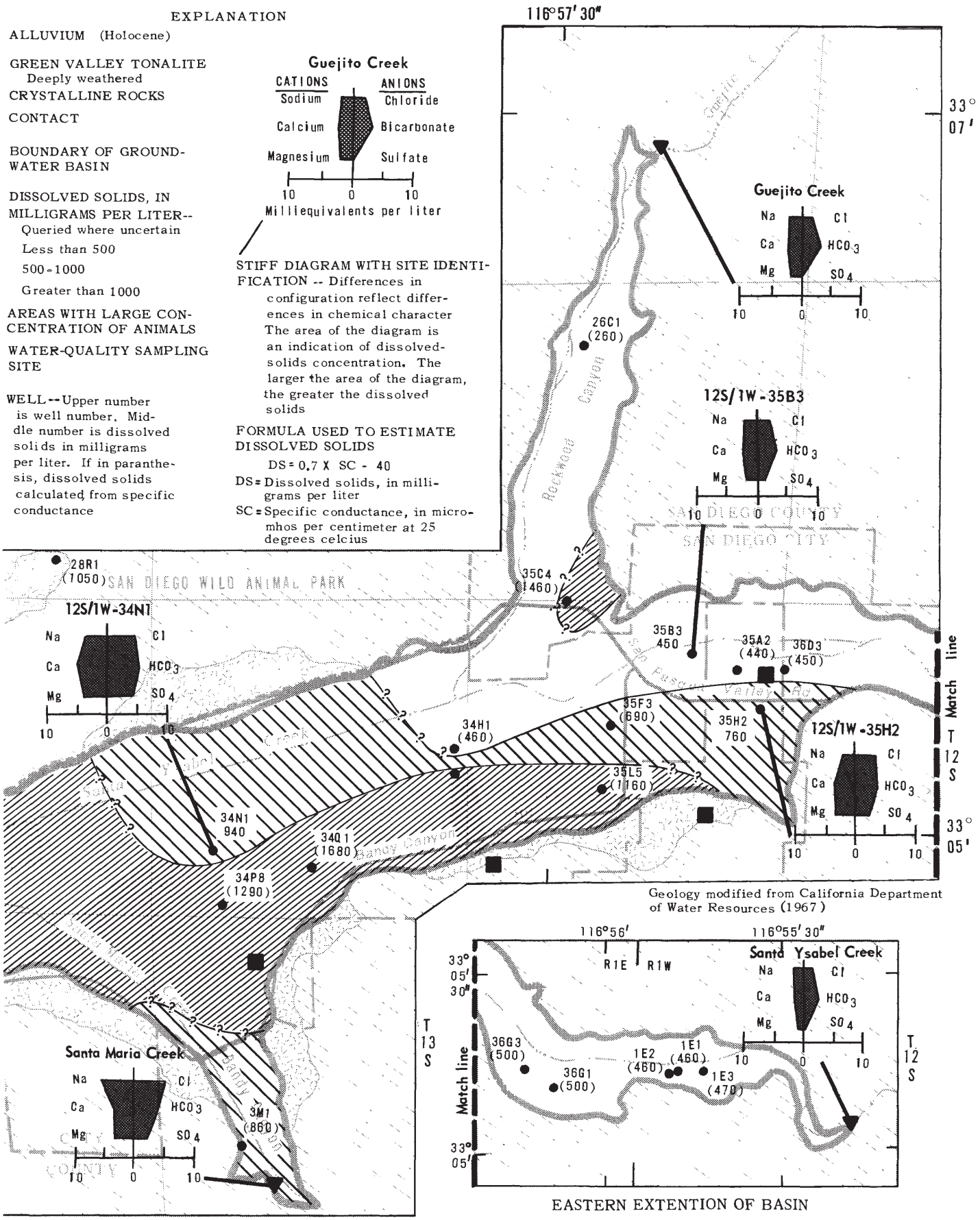


FIGURE 33.--Water quality in the San Pasqual alluvial aquifer, spring 1982.

The quality of the water in the alluvial aquifer has deteriorated since 1957. Changes in ground-water quality are evident when comparing ground-water-quality maps for 1957 and 1982 (fig. 31 and 33). During this period, dissolved-solids concentrations increased in much of the aquifer and now exceed the basin objective of 1,000 mg/L. Sulfate and chloride concentrations also increased and now exceed the EPA suggested limit of 250 mg/L for public water supplies by the time ground water leaves the subarea at San Pasqual Narrows. Ground-water types in Cloverdale Canyon and the lower part of the basin have changed and now resemble irrigation return water that comprises a significant part of the recharge. Water quality in the alluvium will probably continue to deteriorate through agricultural water use.

Changes in agricultural practices may further degrade ground-water quality. Currently, slopes surrounding the upper part of the basin are not used for agriculture. However, many of these slopes, particularly in the neighborhood of Bandy and Rockwood Canyons and the northeastern edge of the upper basin, are being converted to avocado groves and are being irrigated with imported water. Springs and seeps below these groves now flow year round and ground-water quality in the Rockwood Canyon area has already been affected (fig. 33). If this trend continues, water quality throughout the alluvial aquifer may deteriorate and begin to resemble ground-water quality now found in Cloverdale Canyon.

Further development of surface-water resources along Santa Ysabel Creek at Palmo Dam may affect the quantity of recharge available to the alluvial aquifer, particularly during dry years. This may affect water quality and ground-water movement in the upper part of the basin.

Reclaimed Water Quality

Reclaimed water will be secondary treated sewage effluent from the Hale Avenue Wastewater Treatment Plant in Escondido. Reclaimed water has an average dissolved-solids concentration ranging from 650 to 950 mg/L, and is a sodium chloride type, chemically resembling imported water rather than native ground water (California Department of Water Resources, 1983). Nitrate concentrations in the reclaimed water would not exceed EPA limits of 10 mg/L as nitrogen (45 mg/L as nitrate) (Larry Michaels, San Diego County Water Authority, oral commun., 1982).

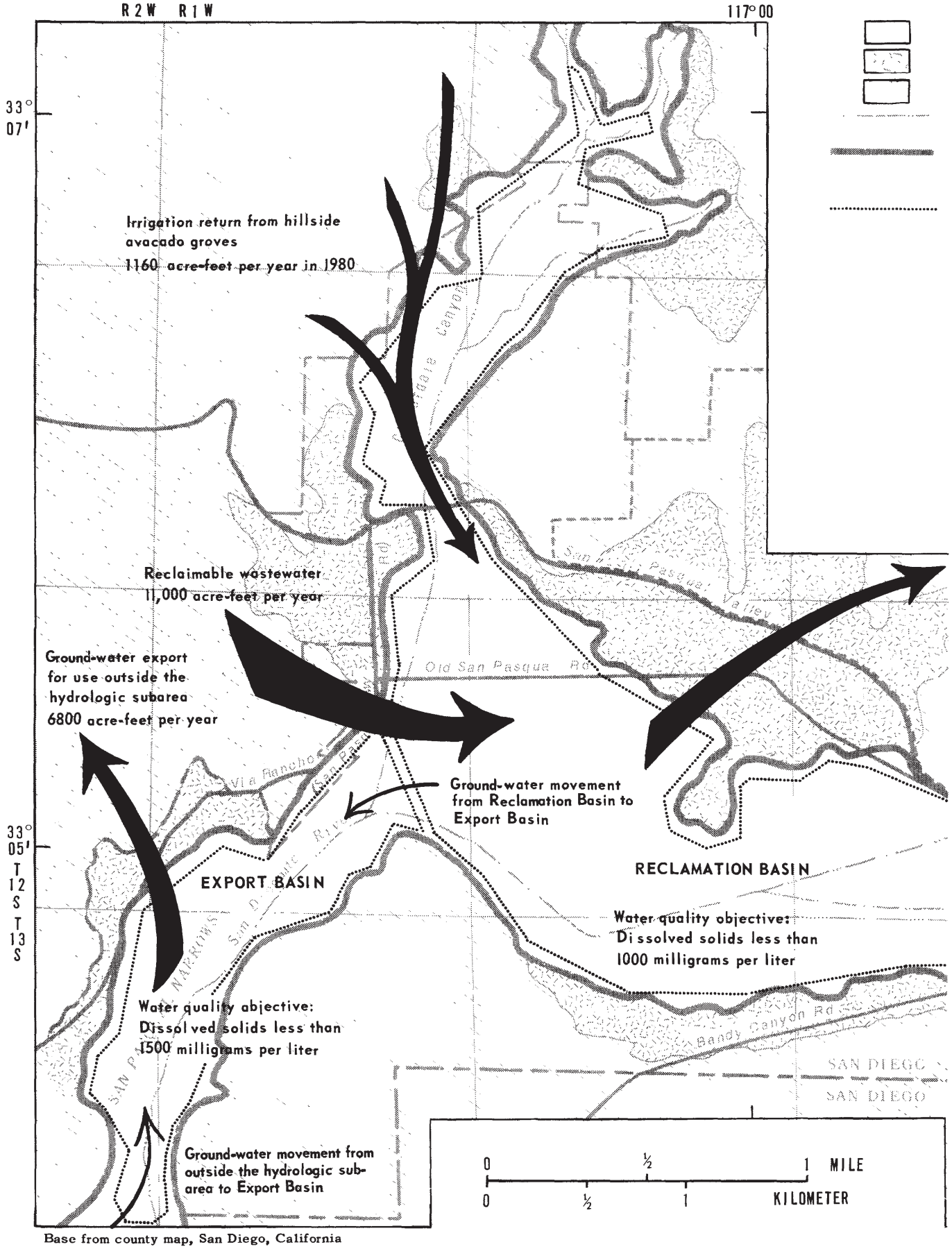
Reclaimed Water Use Plans

Use of reclaimed water in upland areas surrounding Cloverdale Canyon and the lower part of the basin as a substitute for irrigation with imported water has been proposed by the California Department of Water Resources (1983). Upland soils may be suitable for reclaimed water use if application rates and techniques are selected on a site-specific basis so that shallow circulation and discharge of water to surface seeps can be avoided. In many upland areas where reclaimed water use is possible, the underlying residual aquifer has already been impacted by agricultural irrigation return and would not be further degraded by applications of reclaimed water unless application techniques are used that allow evaporative and transpirative concentration to become excessive.

Reclaimed water applied to upland areas in the San Pasqual hydrologic subarea will eventually enter the alluvial aquifer.

Current reclaimed water use plans for the alluvial aquifer, proposed by the San Diego County Water Authority, divide the aquifer into three subareas (fig. 34) (Larry Michaels, San Diego County Water Authority, written commun., 1982). The upper part of the basin will not receive reclaimed water. The lower basin will be managed as a reclamation basin and will receive large quantities (up to 11,000 acre-ft/yr) of reclaimed water. San Pasqual Narrows will be managed as an export basin. Ground-water discharge through the narrows will be intercepted and exported for use outside the hydrologic subarea to prevent reclaimed water from entering Lake Hodges, a public water-supply reservoir.

Objectives of this management plan are to obtain ground water having dissolved-solids concentrations less than 1,000 mg/L in the lower part of the basin. The plan also tries to maintain high ground-water quality in the upper part of the basin. Irrigation return water from Cloverdale Canyon and hills along the western edge of the lower basin, and possible future reclaimed water use in those areas will be important considerations in successful management.



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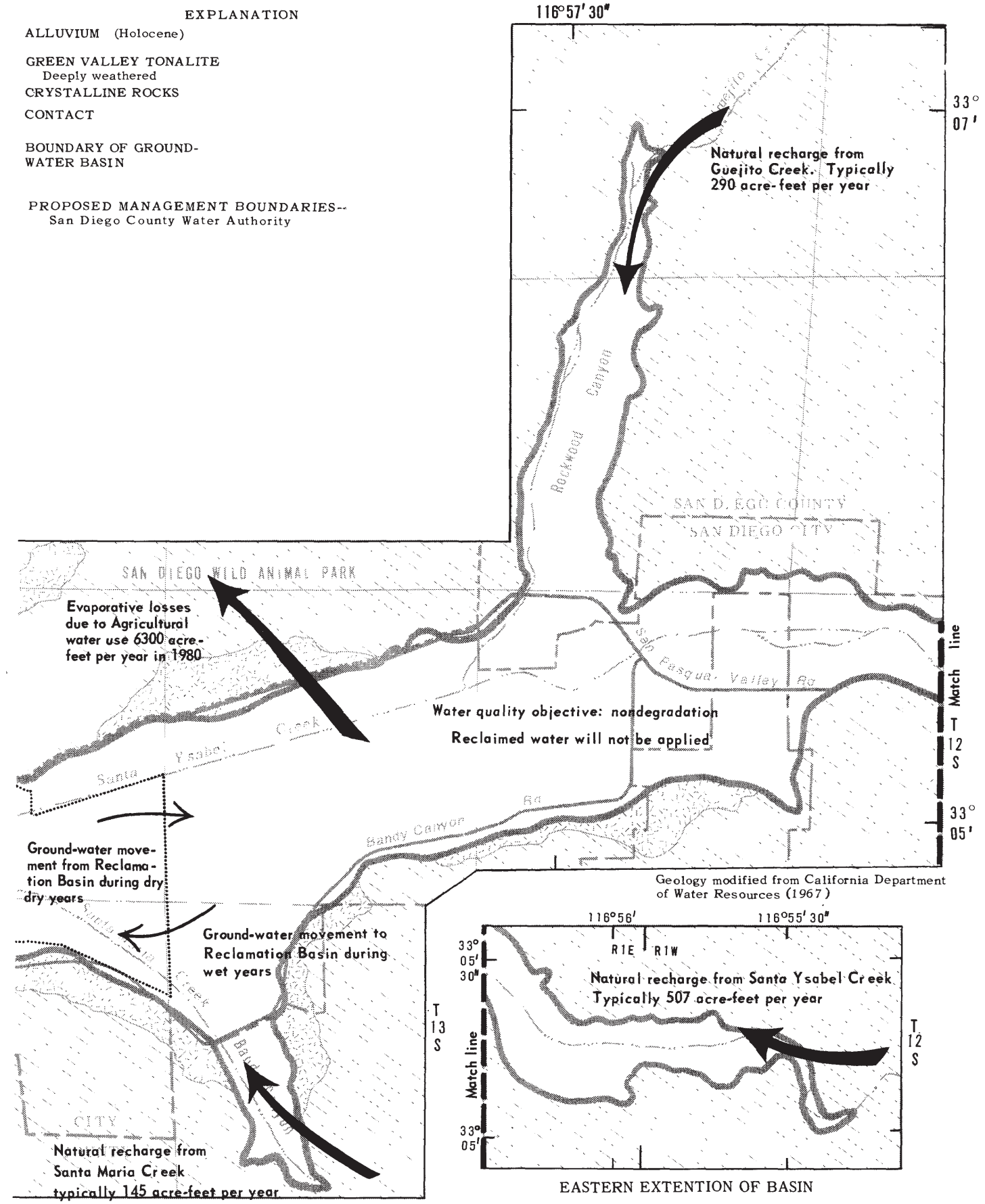

FIGURE 34.--A possible reclaimed water management plan for the San Pasqual alluvial aquifer.

In 1982, water levels in the alluvial aquifer were near land surface and little additional storage capacity was available for reclaimed water. If reclaimed water is applied during a wet cycle when ground-water levels are high, waterlogging of the soil and surface runoff could occur. To combat this problem, the reclaimed water use plan proposes to lower water levels by pumping ground water presently stored in the lower part of the basin. This water would then be exported for use outside the hydrologic subarea. Ground water presently in storage has dissolved-solids concentrations greater than 1,000 mg/L. Under current management proposals, this water would be replaced by reclaimed water with dissolved-solids concentrations between 650 and 950 mg/L. Therefore, transfer of ground water from the hydrologic subarea also represents a net transfer of dissolved solids. Water quality, with respect to dissolved solids, may improve with time. Salt-balance calculations by the San Diego County Water Authority indicate dissolved-solids concentrations may be reduced to below 1,000 mg/L (Larry Michaels, San Diego County Water Authority, 1982).

Because storage in the alluvial aquifer is small (58,000 acre-ft) when compared to the maximum annual streamflow into the subarea of 110,000 acre-ft[2], the alluvial aquifer could fill in one rainy season (as it did in 1978), and despite intensive management efforts, there may not always be sufficient storage available to accept reclaimed water. Reclaimed water use would have to be adjusted accordingly.

In dry years such as 1977, there would be ample available storage in the lower part of the basin to accept reclaimed water (fig. 27). However, during dry periods, ground-water levels would be low throughout the entire aquifer except where reclaimed water is being applied. Applied water would create a local ground-water high, with some reclaimed water flowing to the export area in San Pasqual Narrows and some flowing to the upper part of the basin. Because ground-water movement is slow, only a small potential exists for reclaimed water to move from the reclamation basin to the upper part of the basin where it could contaminate potable water supplies, except during periods of extended drought. During drought periods, movement of reclaimed water and ground-water quality could be monitored to protect water quality in the upper part of the basin.

The current reclaimed water use plan proposed by the San Diego County Water Authority does not incorporate changes in land use practices and surface-water development which may alter the hydrologic system. However, changes in water quality will occur with or without reclaimed water use and reclaimed water may act to partly alleviate future water-quality problems.

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[2]Calculated as the sum of maximum measured annual recharge from Santa Ysabel, Guejito, and Santa Maria Creeks (table 7).

SUMMARY

Reclaimed water could be used to augment water supplies in the San Diego area. Of the three hydrologic subareas studied, San Elijo has the least opportunities for reclaimed water use, and San Pasqual the most. The San Dieguito hydrologic subarea has possibilities for reclaimed water use, but presents several difficulties to effective implementation of reclaimed water use plans.

In the San Dieguito hydrologic subarea the greatest possibility for reclaimed water use is in the alluvial aquifer (52,000 acre-ft of storage). Ground-water quality within the alluvium has deteriorated as a result of seawater intrusion, intrusion of ground water from surrounding marine sedimentary rock, and changes in natural recharge patterns. Currently, the aquifer is of limited value as a water supply, and dissolved-solids concentrations typically exceed the basin objective of 1,000 mg/L and may exceed 5,000 mg/L. Application of large quantities of reclaimed water may, in time, improve water quality within the aquifer and increase its usefulness.

During dry years, considerable storage would be available to accept reclaimed water. During wet years when recharge is available from the San Dieguito River, ground-water levels and storage would have to be manipulated to avoid waterlogging of soils and surface runoff of applied reclaimed water. If ground-water levels are lowered below sea level, seawater intrusion would have to be controlled. It will not be possible to eliminate intrusion of ground water from surrounding marine sedimentary rock.

Limited use of reclaimed water may be made in upland areas of the San Dieguito hydrologic subarea.

Reclaimed water use possibilities in the San Elijo hydrologic subarea are confined primarily to upland areas of the Pacific Coastal Plain having deep soils, high infiltration rates, and a gently rolling topography. In some areas reclaimed water applied to upland areas may enter the alluvial aquifer.

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Exhibit 13

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Estimated Infiltration, Percolation, and Recharge Rates at the Rillito Creek Focused Recharge Investigation Site, Pima County, Arizona

By John P. Hoffmann, Kyle W. Blasch, Don R. Pool, Matthew A. Bailey, and James B. Callegary

Abstract

A large fraction of ground water stored in the alluvial aquifers in the Southwest is recharged by water that percolates through ephemeral stream-channel deposits. The amount of water currently recharging many of these aquifers is insufficient to meet current and future demands. Improving the understanding of streambed infiltration and the subsequent redistribution of water within the unsaturated zone is fundamental to quantifying and forming an accurate description of streambed recharge. In addition, improved estimates of recharge from ephemeral-stream channels will reduce uncertainties in water-budget components used in current ground-water models.

This chapter presents a summary of findings related to a focused recharge investigation along Rillito Creek in Tucson, Arizona. A variety of approaches used to estimate infiltration, percolation, and recharge fluxes are presented that provide a wide range of temporal- and spatial-scale measurements of recharge beneath Rillito Creek. The approaches discussed include analyses of (1) cores and cuttings for hydraulic and textural properties, (2) environmental tracers from the water extracted from the cores and cuttings, (3) seepage measurements made during sustained streamflow, (4) heat as a tracer and numerical simulations of the movement of heat through the streambed sediments, (5) water-content variations, (6) water-level responses to streamflow in piezometers within the stream channel, and (7) gravity changes in response to recharge events. Hydraulic properties of the materials underlying Rillito Creek were used to estimate long-term potential recharge rates. Seepage measurements and analyses of temperature and water content were used to estimate infiltration rates, and environmental tracers were used to estimate percolation rates through the thick unsaturated zone. The presence or lack of tritium in the water was used to determine whether or not water in the unsaturated zone infiltrated within the past 40 years. Analysis of water-level and temporal-gravity data were used to estimate recharge volumes. Data presented in this chapter were collected from 1999 though 2002. Precipitation and streamflow during this period were less than the long-term average; however, two periods of significant streamflow resulted in recharge—one in the summer of 1999 and the other in the fall/winter of 2000.

Flux estimates of infiltration and recharge vary from less than 0.1 to 1.0 cubic meter per second per kilometer of streamflow. Recharge-flux estimates are larger than infiltration estimates. Larger recharge fluxes than infiltration fluxes are explained by the scale of measurements. Methods used to estimate recharge rates incorporate the largest volumetric and temporal scales and are likely to have fluxes from other nearby sources, such as unmeasured tributaries, whereas the methods used to estimate infiltration incorporate the smallest scales, reflecting infiltration rates at individual measurement sites.

Introduction

The city of Tucson and surrounding areas obtain most of their municipal, agricultural, and industrial water from ground water that is withdrawn from thick, alluvial-basin aquifers. The amount of water currently recharging the aquifers within the Tucson area is insufficient to meet current and future demands. Resultant ground-water deficits are manifested in water-level declines of more than 60 m since the middle of the 20th century. These declines are largest where ground-water withdrawals are greatest.

The alluvial aquifers are recharged by infiltration from irrigation and industrial returns and by seepage losses through stream channels. In the Tucson area, where the climate is semiarid, diffuse recharge through the basin sediments from precipitation is considered a negligible component of total recharge owing to low precipitation rates and high evapotranspiration (ET) rates (Scott and others, 2000). For instance, annual precipitation averages 31.5 cm on the valley floor, and annual potential ET ranges from 90 to 190 cm (Yitayew, 1990). Additionally, depth to ground water in the underlying alluvial basin can be tens of meters, providing opportunity for ample storage of infiltrated water. Because of these conditions, concentrated infiltration repeated over time, such as infiltration from irrigation and industrial returns, is necessary for recharge to occur. A large fraction of ground water stored in the allu-

vial aquifer was recharged by water that percolated through ephemeral stream-channel deposits (Davidson, 1973; Hanson and Benedict, 1994).

Rillito Creek, located in the Upper Santa Cruz Basin in southern Arizona (fig. 1), is typical of a large, ephemeral stream in the Southwest. In many basins of the Southwest, such as in the Upper Santa Cruz Basin, streams originating at higher elevations coalesce downstream to form larger ephemeral streams. Streams originating near mountain fronts typically flow over thick, alluvial valleys, lose hydraulic connection with the underlying aquifer, and are ephemeral in their lower reaches. Underlying many of these ephemeral streams is a coarse-grained stream-channel deposit that overlies a basin-fill deposit. The coarse-grained stream-channel deposit typically has high permeability and infiltration rates (Anderson and others, 1992; Hanson and Benedict, 1994).

Although recharge from infiltration of streamflow is known to occur in ephemeral-stream channels in the Southwest, such as Rillito Creek, the processes that control the spatial distribution and volume of infiltration that recharges the underlying aquifers are poorly understood. The Rillito Creek focused recharge investigation site was selected as one of six sites to study recharge processes in the Southwest (see chapter C) as part of the U.S. Geological Survey (USGS) Ground-Water Resources Program and generally is representative of ephemeral washes within the Sonoran Desert. Improving the understanding of streambed infiltration and the subsequent redistribution of water within the unsaturated zone is fundamental to quantifying and forming an accurate description of streambed recharge. Improved estimates of recharge from ephemeral stream channels will reduce uncertainties in water-budget components used in current ground-water models. In addition, recharge augmentation has been proposed along several reaches of ephemeral streams in the Tucson area, including Rillito Creek, and understanding processes that control recharge is important to the construction of recharge facilities.

Purpose and Scope

The purpose of this chapter is to present a summary of findings related to a focused recharge investigation along Rillito Creek, Pima County, Arizona. One of the challenges of quantitatively studying recharge beneath ephemeral streams is the need to integrate measurements made over a wide range of spatial and temporal scales. No single method of measurement or analysis can resolve the complex physical processes that contribute to infiltration, percolation, and recharge beneath ephemeral streams; therefore, a variety of approaches are presented that provide a wide range of temporal- and spatial-scale measurements of recharge beneath Rillito Creek.

Six approaches were used to evaluate infiltration, percolation, and recharge to the aquifer beneath Rillito Creek. Cores and cuttings were collected during the drilling of five boreholes. Laboratory measurements used to determine physical and hydraulic properties of these cored subsurface materials (Hoffmann and others, 2002) represent the smallest spatial scale in this investigation. The core-based data typically are on the order of several centimeters, but are scaled up to meters in this report. Water content extracted from the cores, and environmental tracers measured in these waters, represent a temporal scale that is a function of the thickness and hydraulic properties of the unsaturated zone: in general, these data represent a time scale of less than 2 years in this investigation. Seepage measurements made during sustained streamflow represent portions of a streamflow event and typically have time scales of a few hours to several days. Measurements of temperature and water content in vertical (one-dimensional) and two-dimensional profiles represent spatial scales that are typically less than 5 m and have temporal scales that vary from seconds to several days. Vertically nested piezometers were installed in the boreholes drilled in the stream channel to monitor water-level responses to streamflow. These measurements also represent a temporal scale that is a function of the thickness and hydraulic properties of the unsaturated zone and, in general, represents a time scale of weeks to several months in this investigation. Measurements of ground-water storage changes using temporal-gravity measurements have the largest spatial and temporal scales spanning several square kilometers and a period of record of several months to years. Data presented in this chapter were collected from 1999 through 2002.

Previous Investigations

Smith (1910) probably was the first investigator to examine recharge along Rillito Creek. He concluded there was a difference in infiltration rates between the flashy, silt-laden summer flows, and the steady, long-duration flows of the winter snowmelt runoff. This conclusion was based partly on seasonal well hydrographs and ground-water temperature data. Investigators to follow, such as Schwalen and Shaw (1957) and Matlock (1965), also concluded that winter streamflow was the most effective source of recharge to the Tucson Basin. Burkham (1970) developed an empirical formula to estimate infiltration along a 15-km reach of Rillito Creek on the basis of streamflow losses between discharge measurement points. Davidson (1973) suggested that at least 90 percent of the amount of infiltrated water results in recharge. The remaining 10 percent is lost to ET. Although not necessarily specific to Rillito Creek, the work of Wallace and Lane (1978) related infiltration potential to stream-channel order. Wallace and Lane concluded that the greatest infiltration potential occurs in the large-order streams because these streams contain the greatest volume of alluvium. Hanson and Benedict (1994) summarized previous estimates of recharge and developed new estimates on the basis of work by previous investigators and numerical simulation.

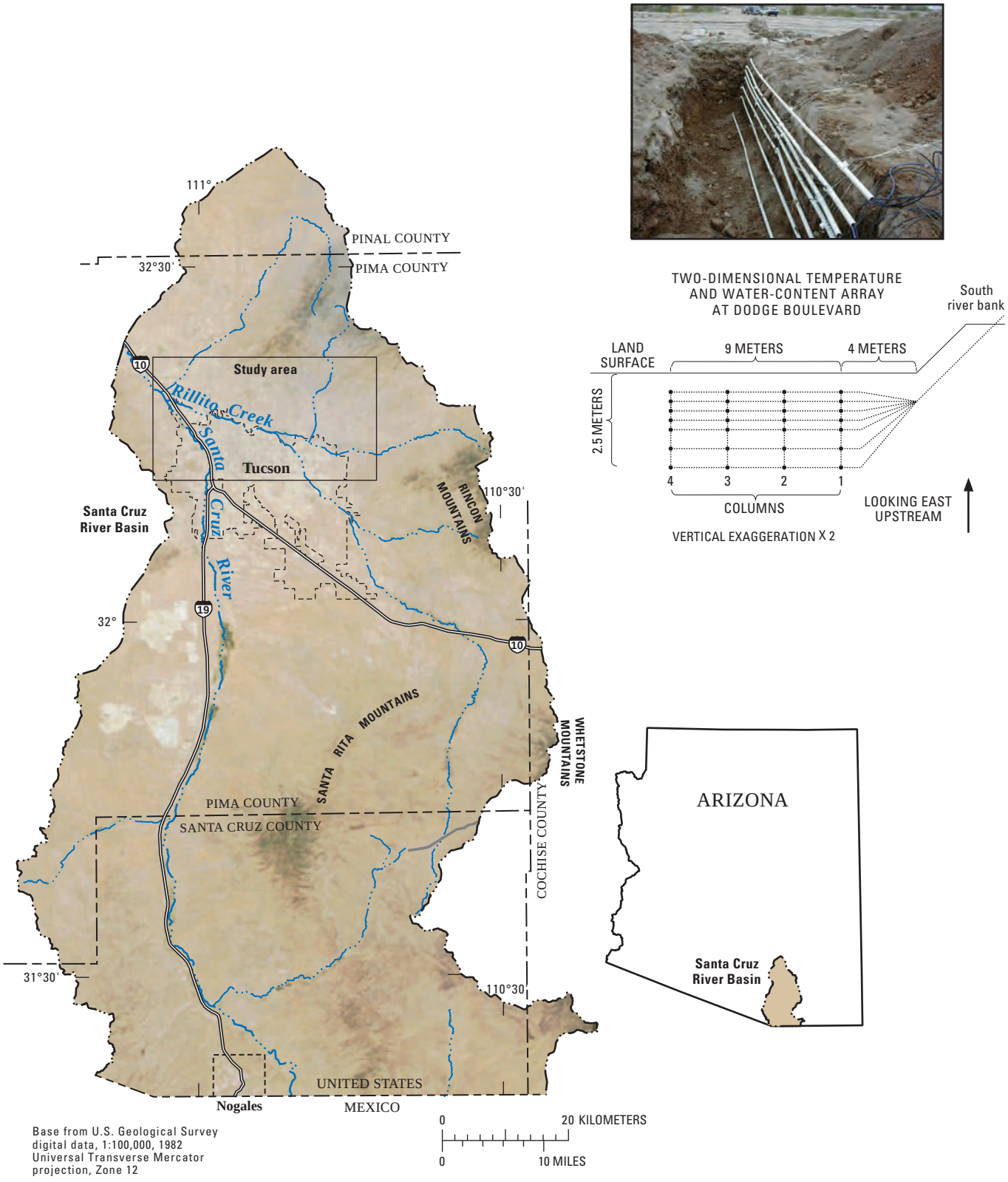


Figure 1. Location of study area, Pima County, Arizona.

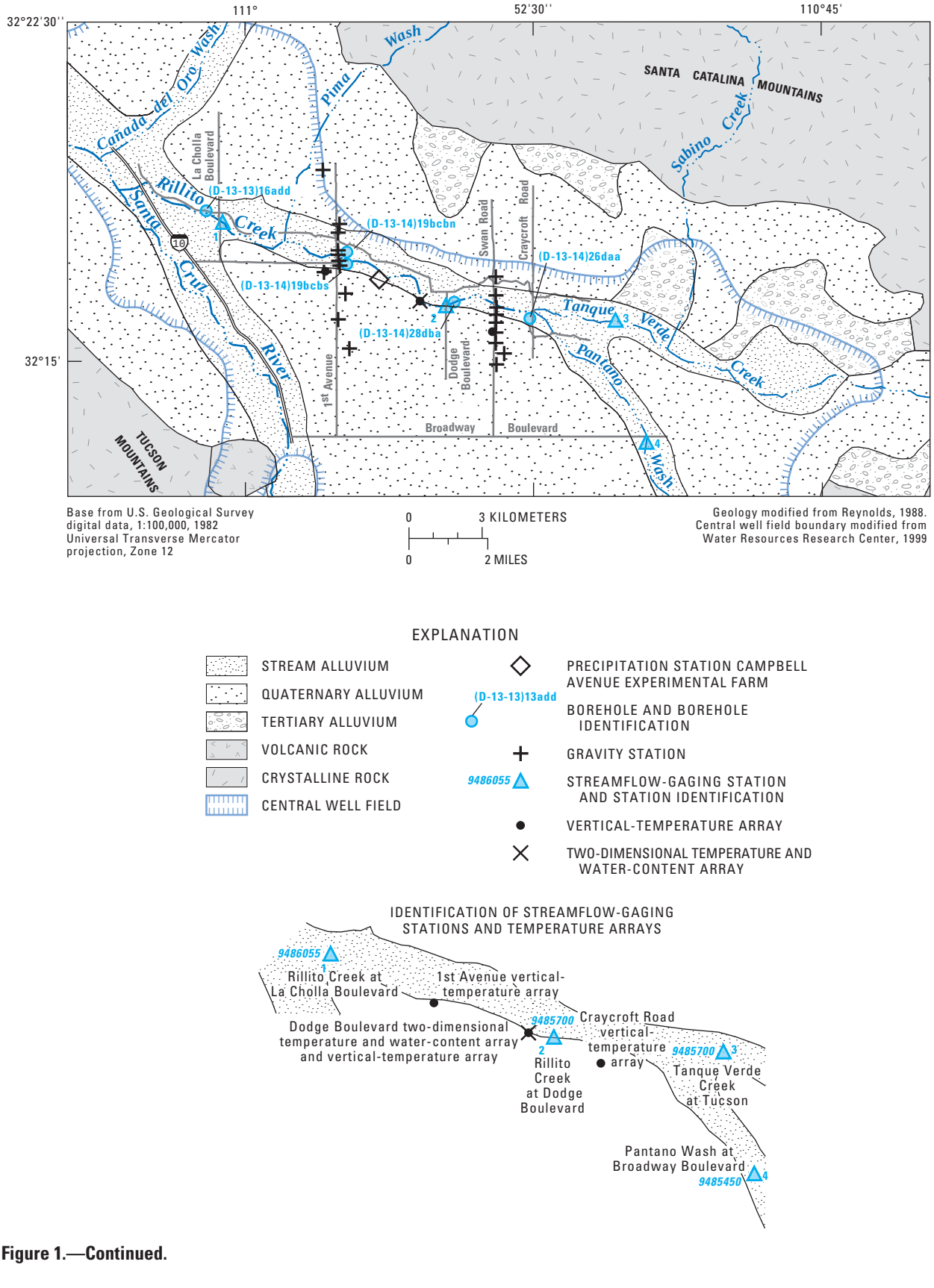
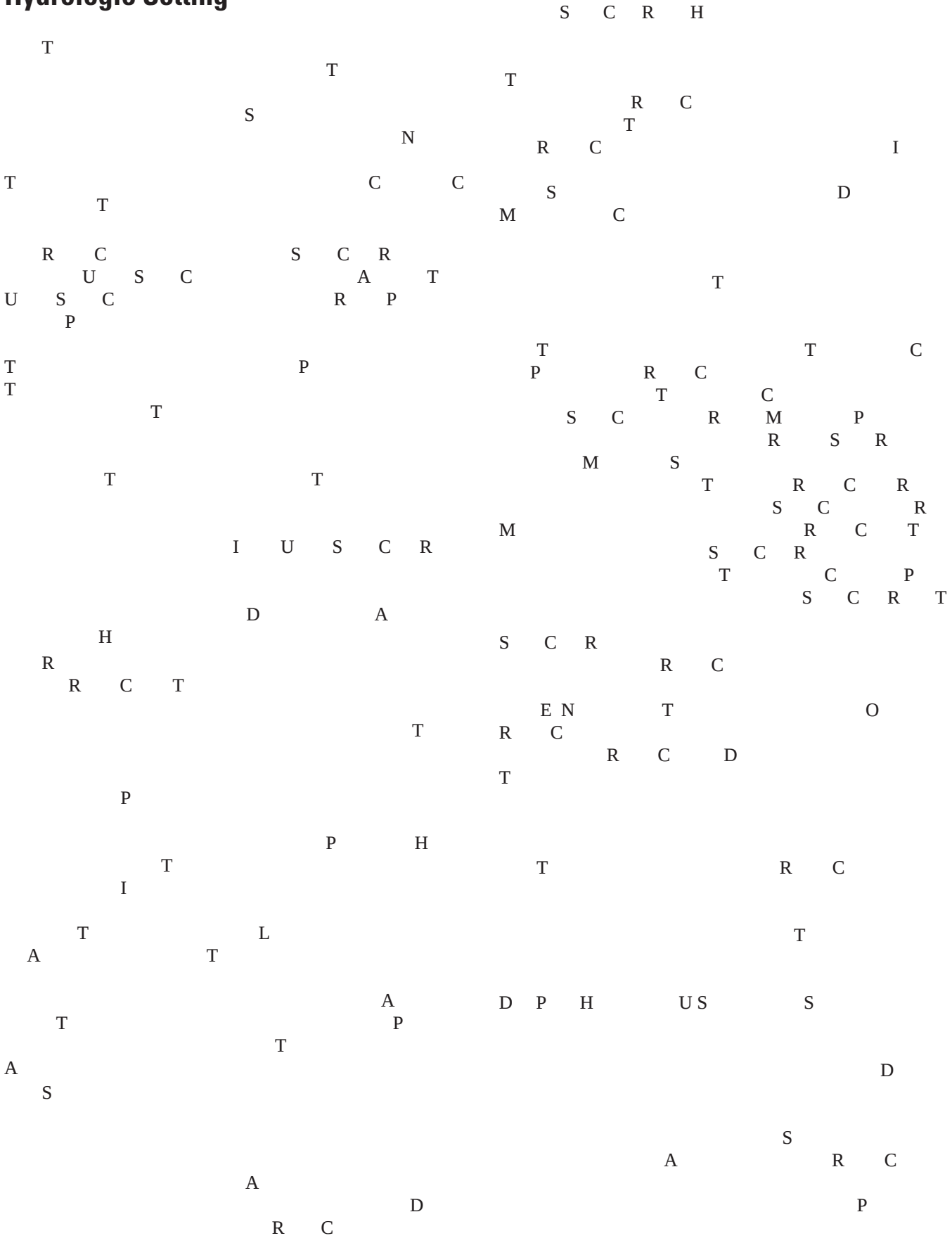


Figure 1.—Continued.

Hydrologic Setting



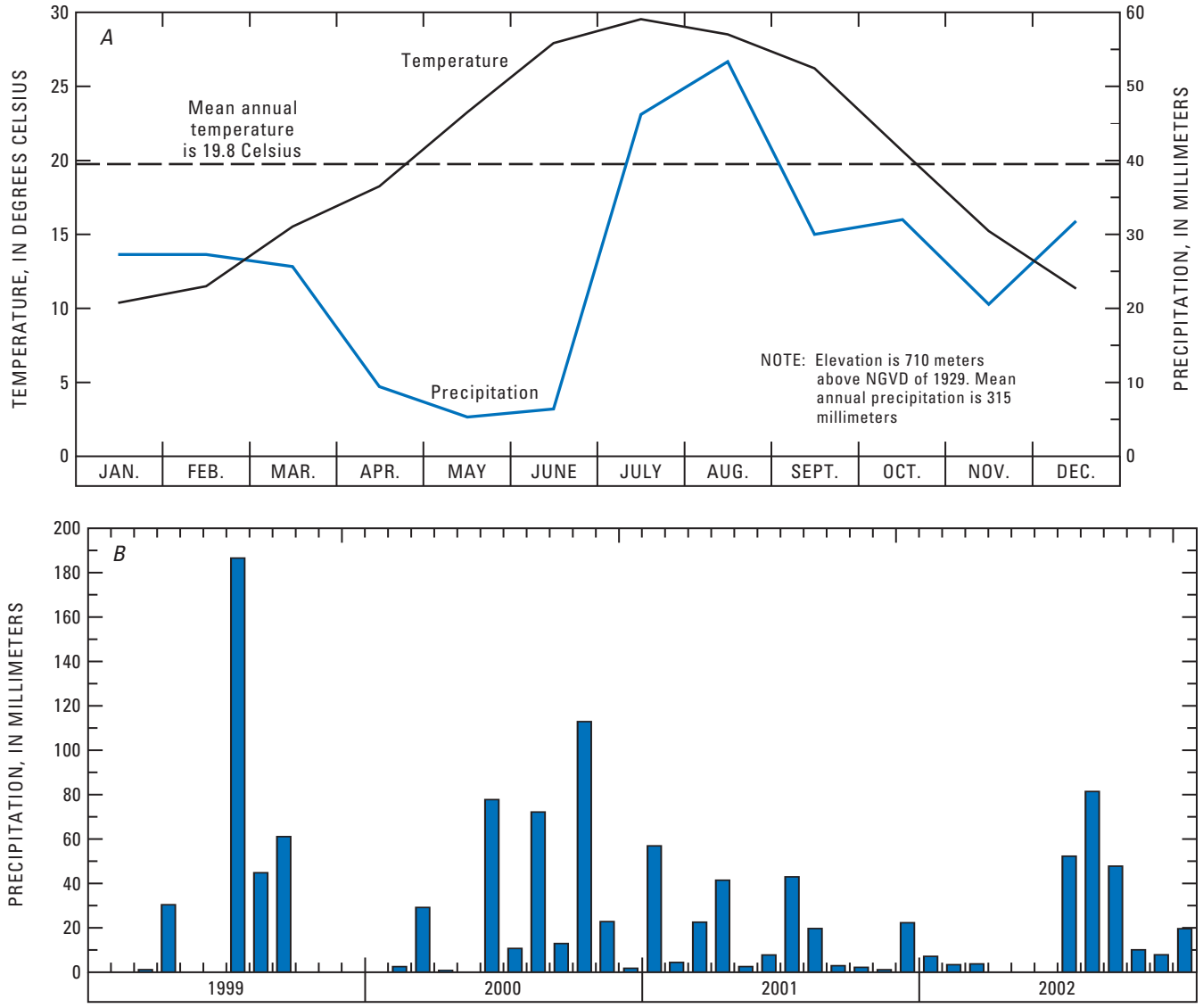


Figure 2. *A*, Monthly average temperature and precipitation, 1972–2002, at National Weather Service Station Campell Avenue Experimental Farm near Rillito Creek, Pima County, Arizona; *B*, monthly precipitation near Rillito Creek during period of study, 1999–2002.

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Infiltration, Percolation, and Recharge Rates

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T

Physical and Hydraulic Properties of Stream-Channel and Basin-Fill Deposits

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R C T

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I R C

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O

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θ
$K(\theta)$ L/T

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$$\partial\theta/\partial t = \nabla q$$

q

Table 1. Annual streamflow measured at Rillito Creek at Dodge Boulevard (streamflow-gaging station 09485700), Pima County, Arizona, during period of study.

Water year[1]	Total annual streamflow, in cubic meters	Annual flow as a percentage of long-term annual streamflow	Percentage of annual stream-flow that occurred in summer	Percentage of annual stream-flow that occurred in winter
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	×			
	×			
	×			

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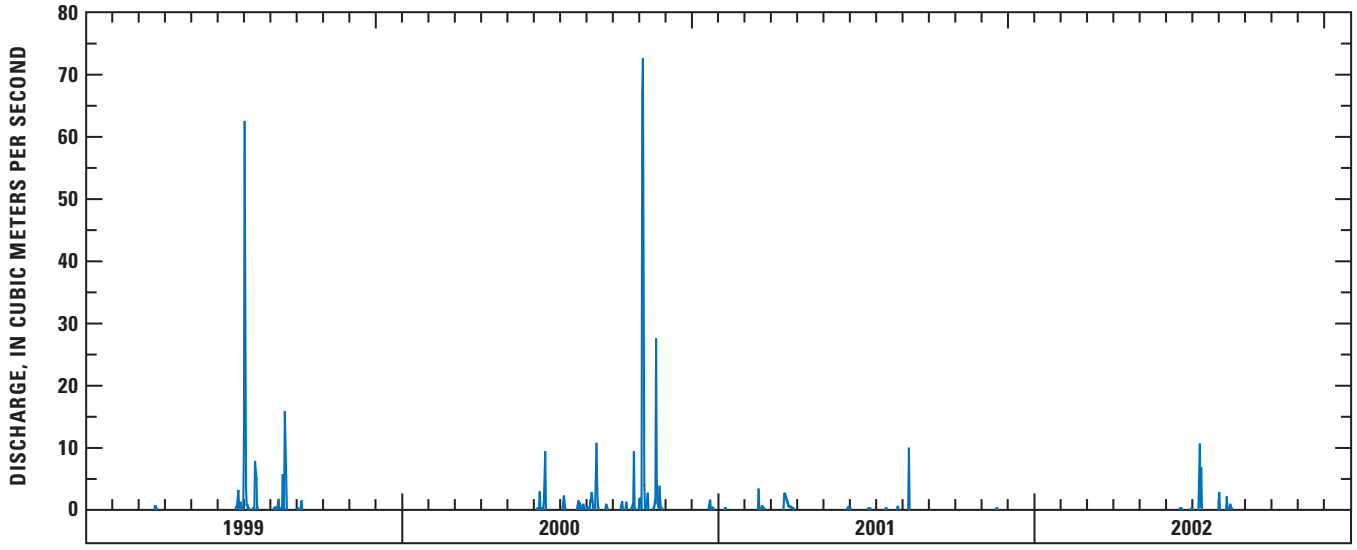

Figure 3. Mean discharge at Rillito Creek at Dodge Boulevard (streamflow-gaging station 09485700), 1999–2002, Pima County, Arizona.

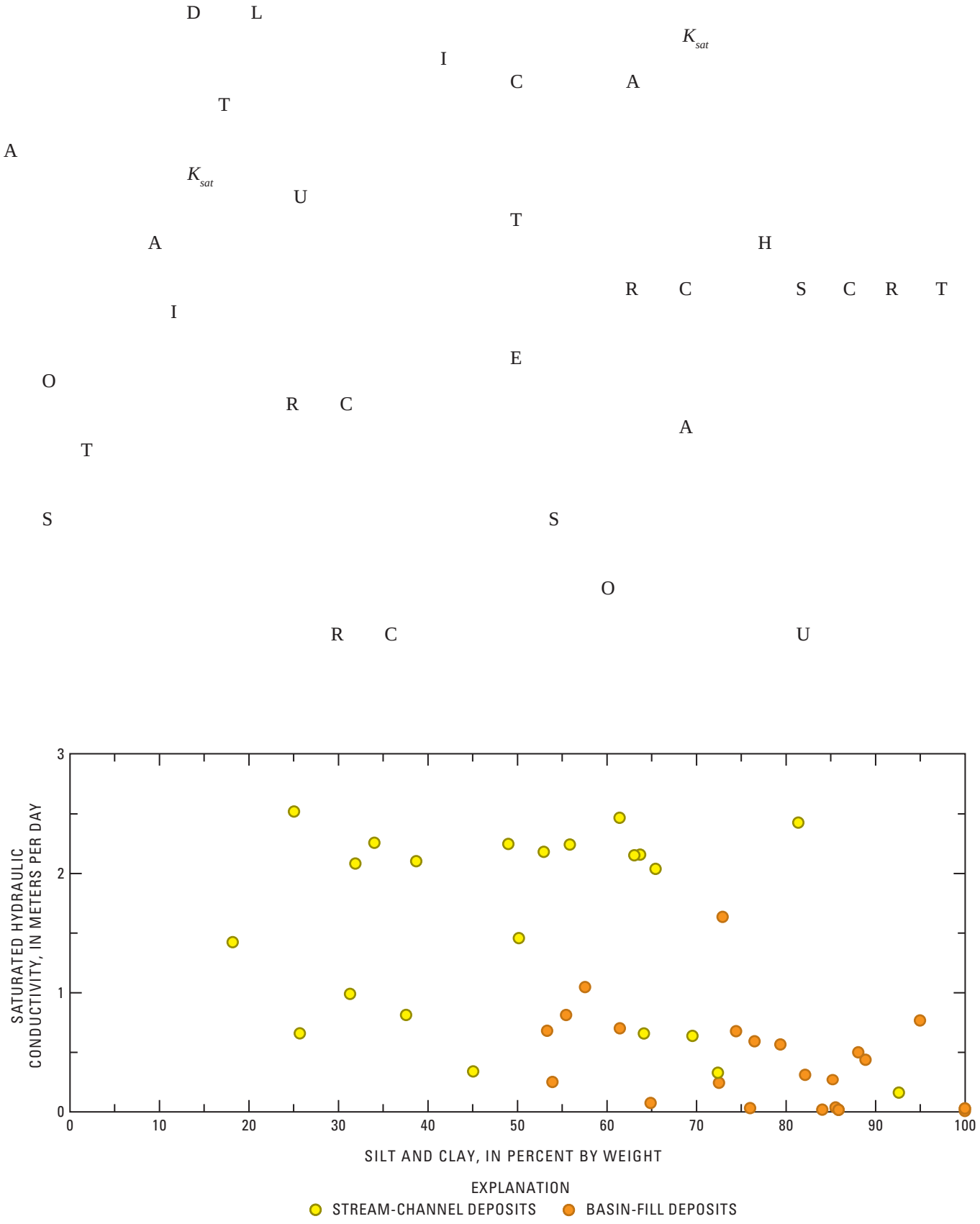

Figure 4. Relation of saturated hydraulic conductivity to sand, silt, and clay content for cores collected from boreholes drilled along Rillito Creek, Pima County, Arizona.

Environmental Tracers

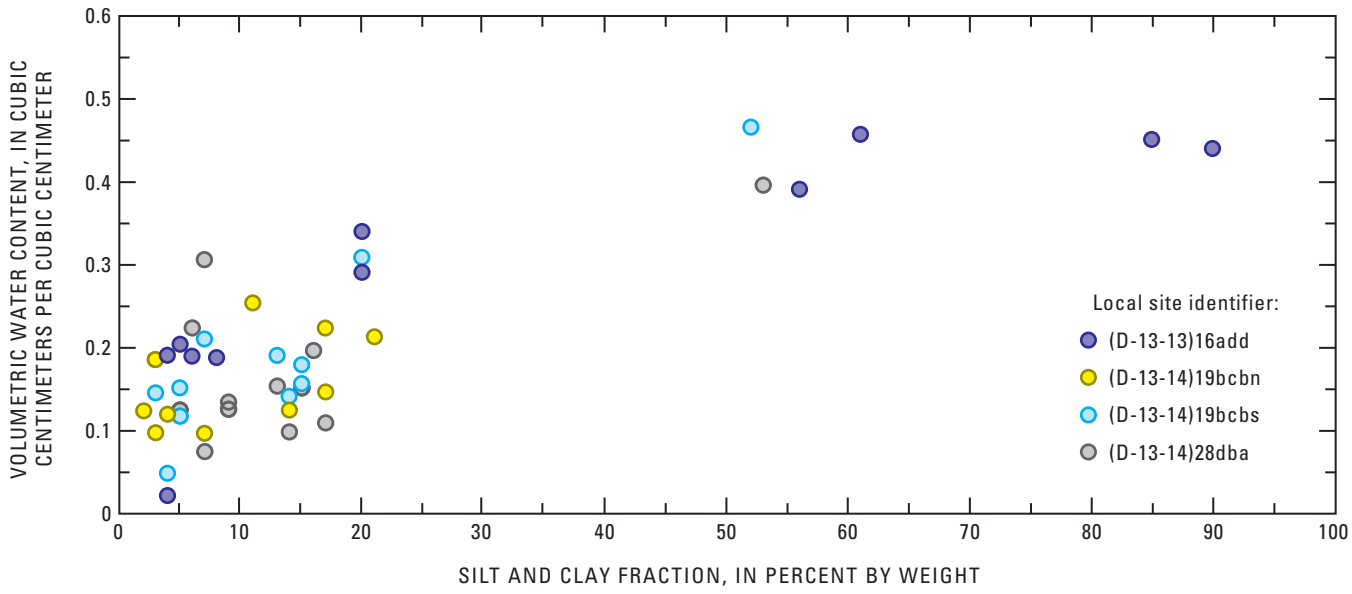

Figure 5. Relation of volumetric water content to sand, silt, and clay content for cores collected from boreholes drilled along Rillito Creek, Pima County, Arizona.

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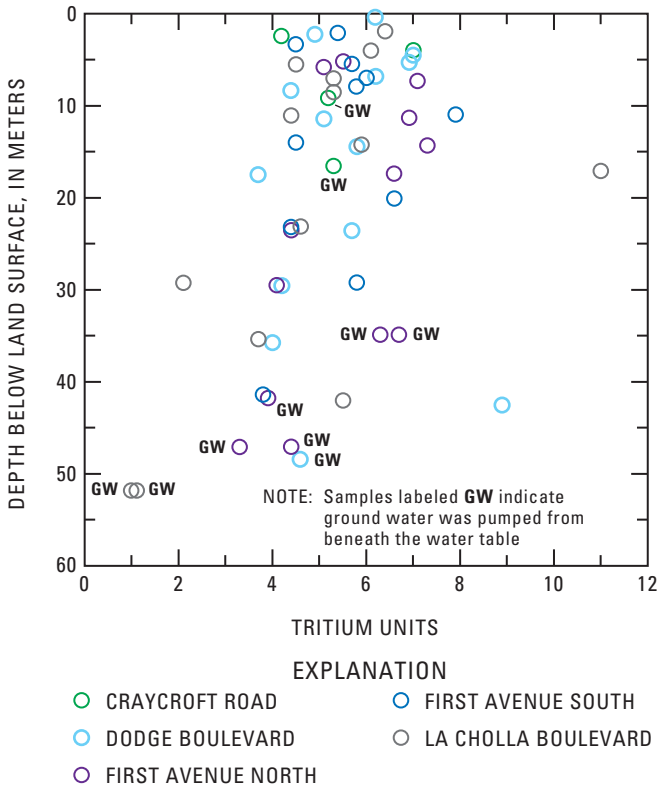

Figure 6. Profile of tritium content in water collected from boreholes drilled along Rillito Creek, Pima County, Arizona.

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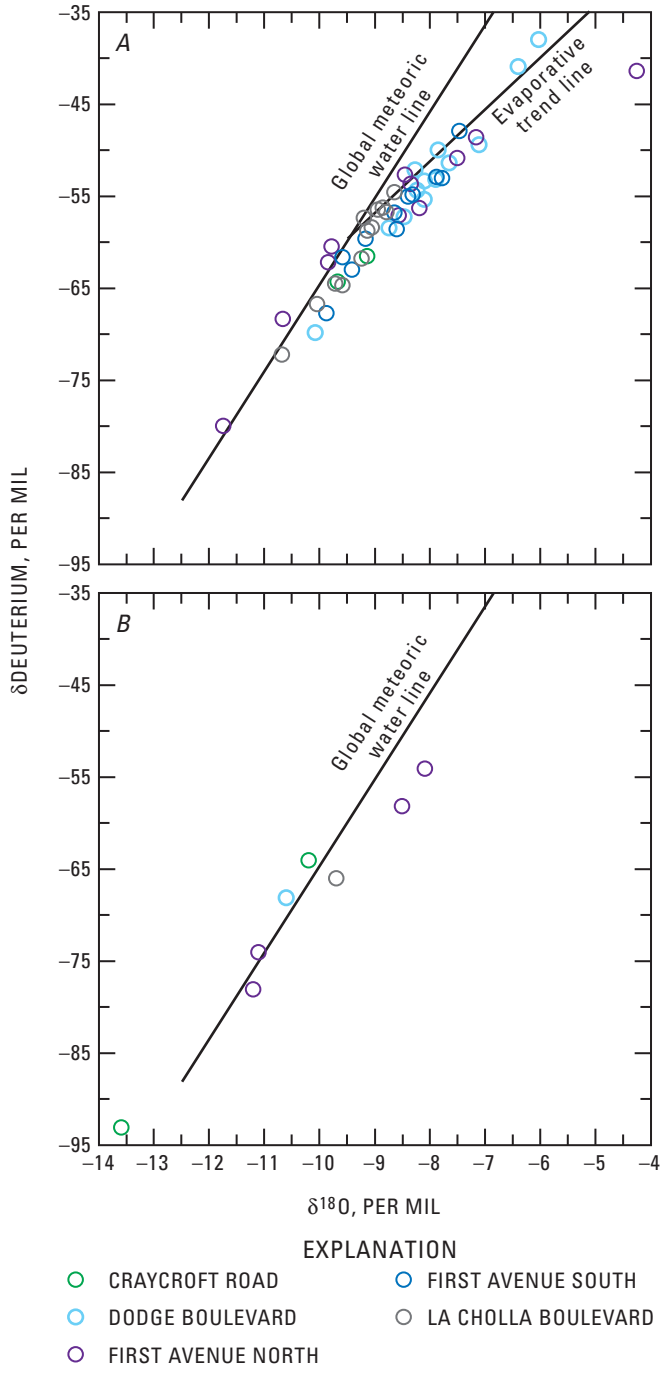

Figure 7. Stable isotope data of pore water collected from cores collected from boreholes drilled along Rillito Creek, Pima County, Arizona. *A*, unsaturated zone; *B*, below the water table.

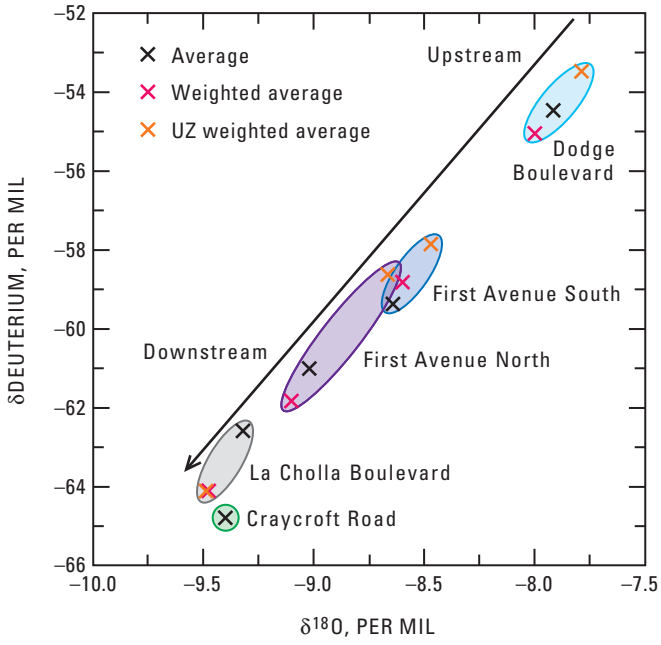

Figure 8. Weighted average of stable isotope values from pore water collected from boreholes along Rillito Creek Pima County, Arizona.

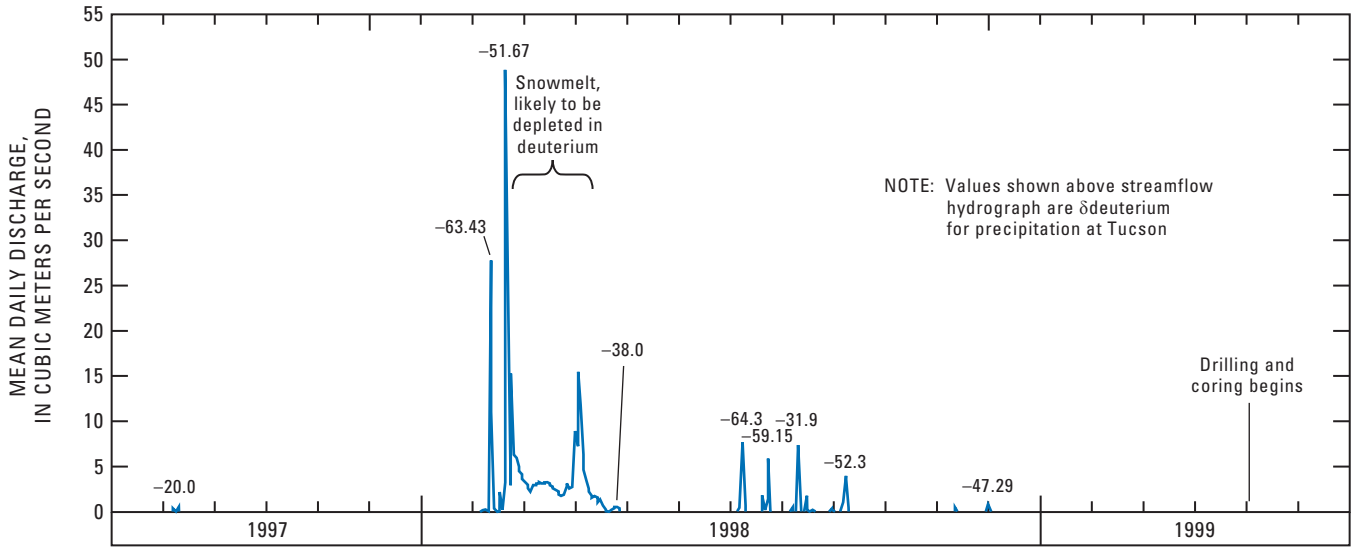

Figure 9. Hydrograph of streamflow gaging station 09485700 Rillito Creek near Dodge Boulevard (09485700) and associated stable isotope values determined for precipitation.

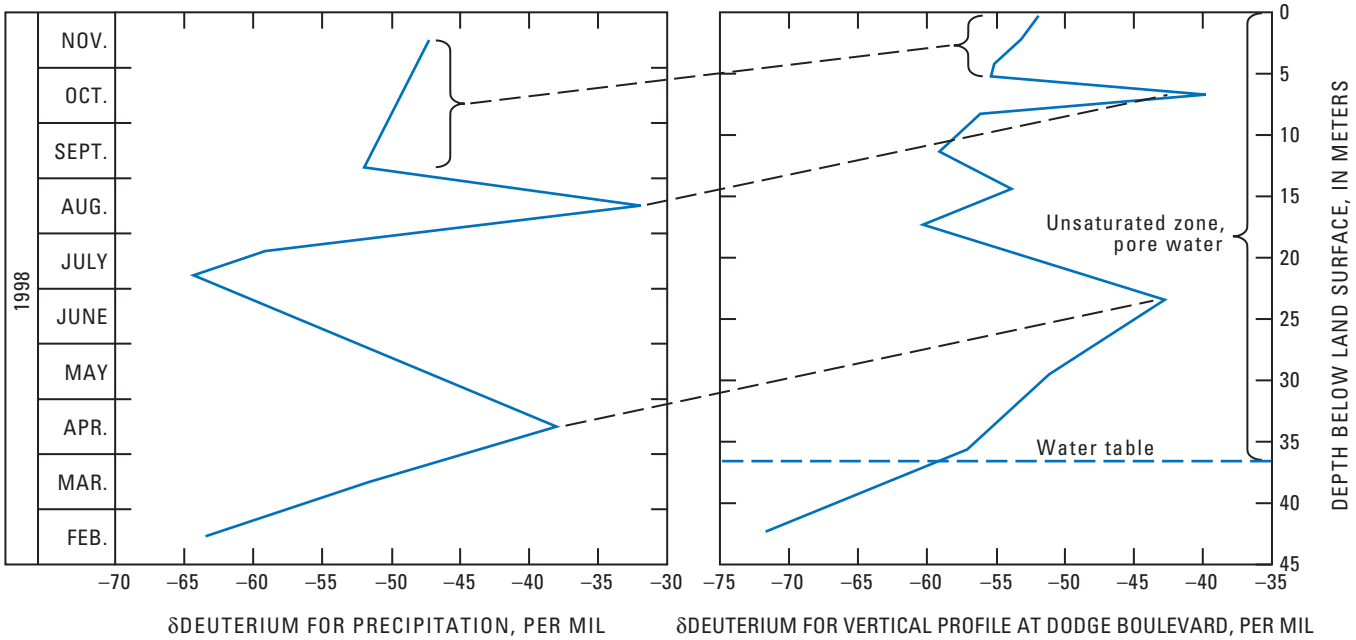

Figure 10. Comparison of stable isotope values in vertical profile to stable isotopic values of precipitation.

Seepage Measurements

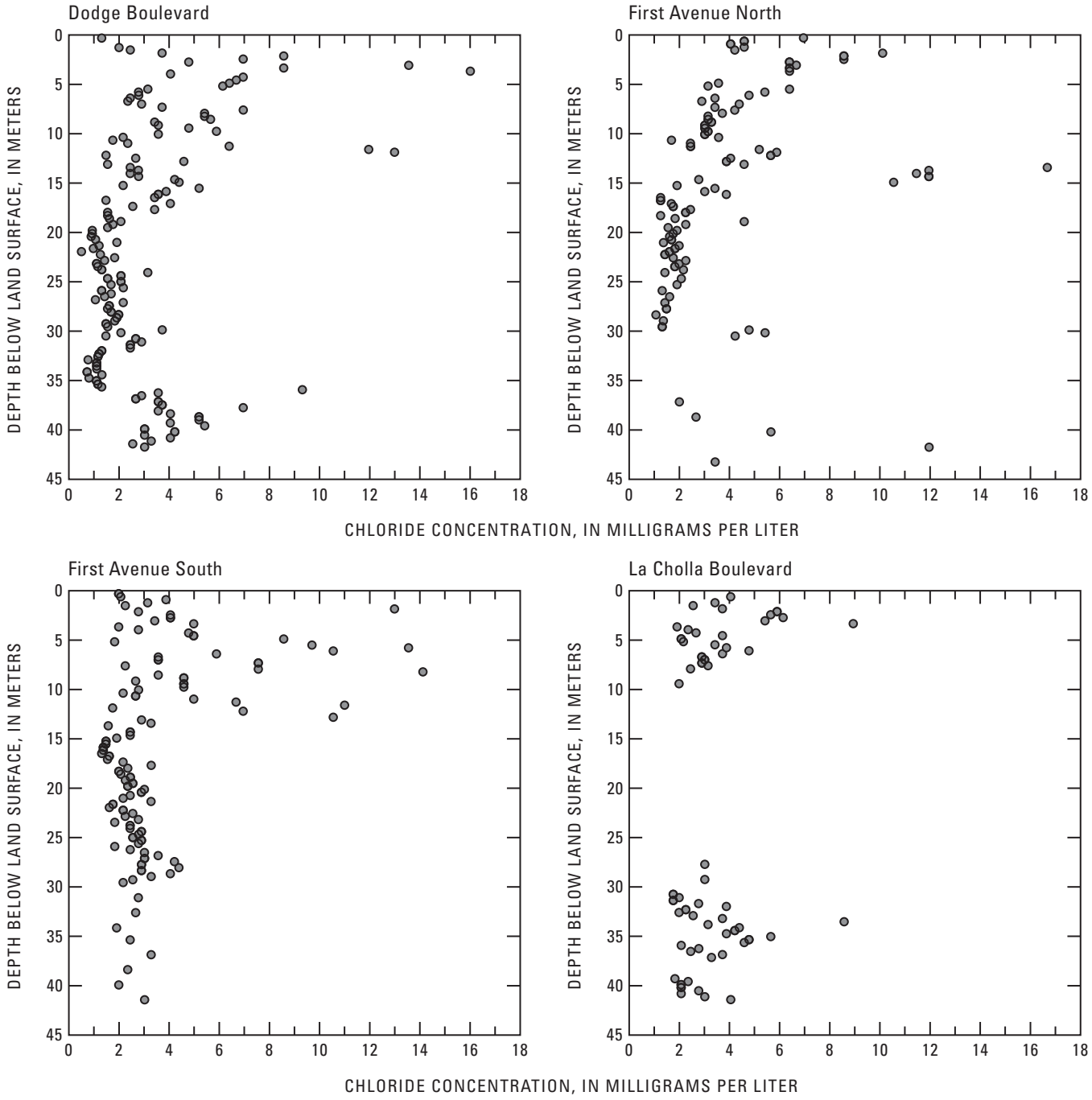

Figure 11. Profile of concentration of chloride from cuttings leachate from boreholes drilled along Rillito Creek, Pima County, Arizona.

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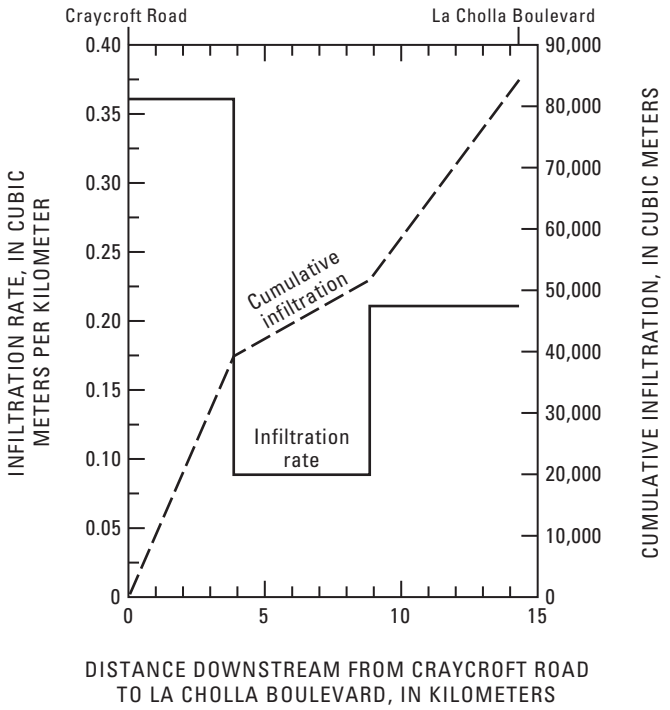

Figure 12. Seepage loses during October 8, 2000 streamflow in Rillito Creek, Pima County, Arizona.

Temperature and Water Content

One-Dimensional Temperature Monitoring and Modeling

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PEST A

Infiltration at Craycroft Road Site

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C

Infiltration at Dodge Boulevard and First Avenue sites

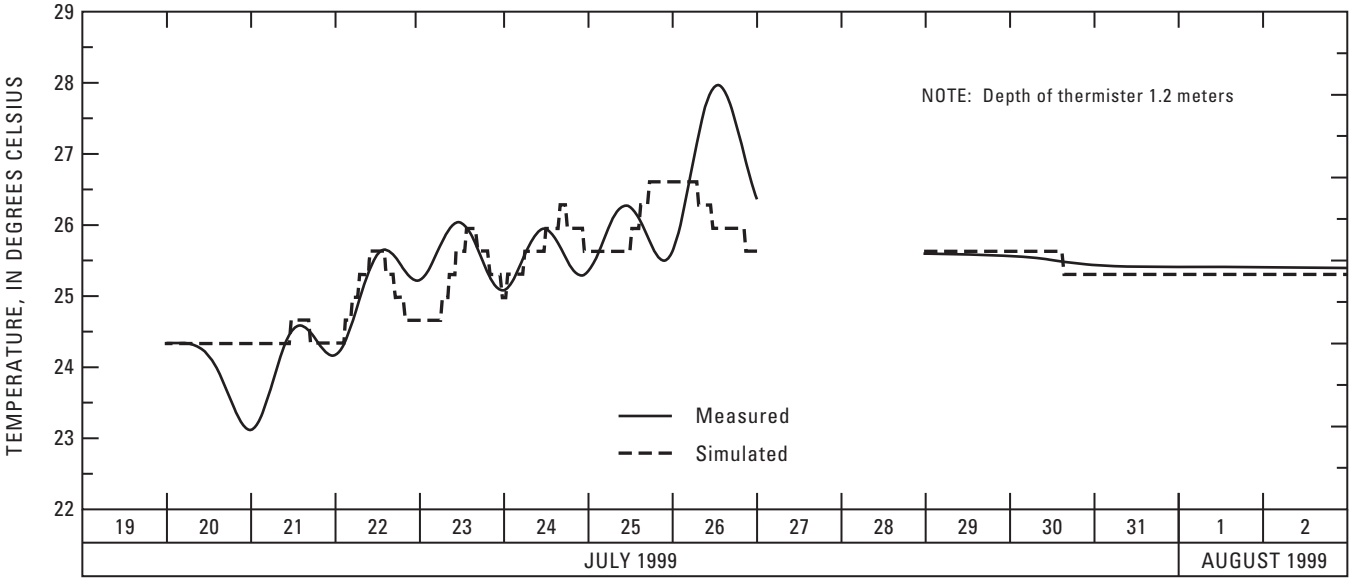

Figure 13. Measured and simulated thermographs in Rillito Creek near Craycroft Road, Pima County, Arizona.

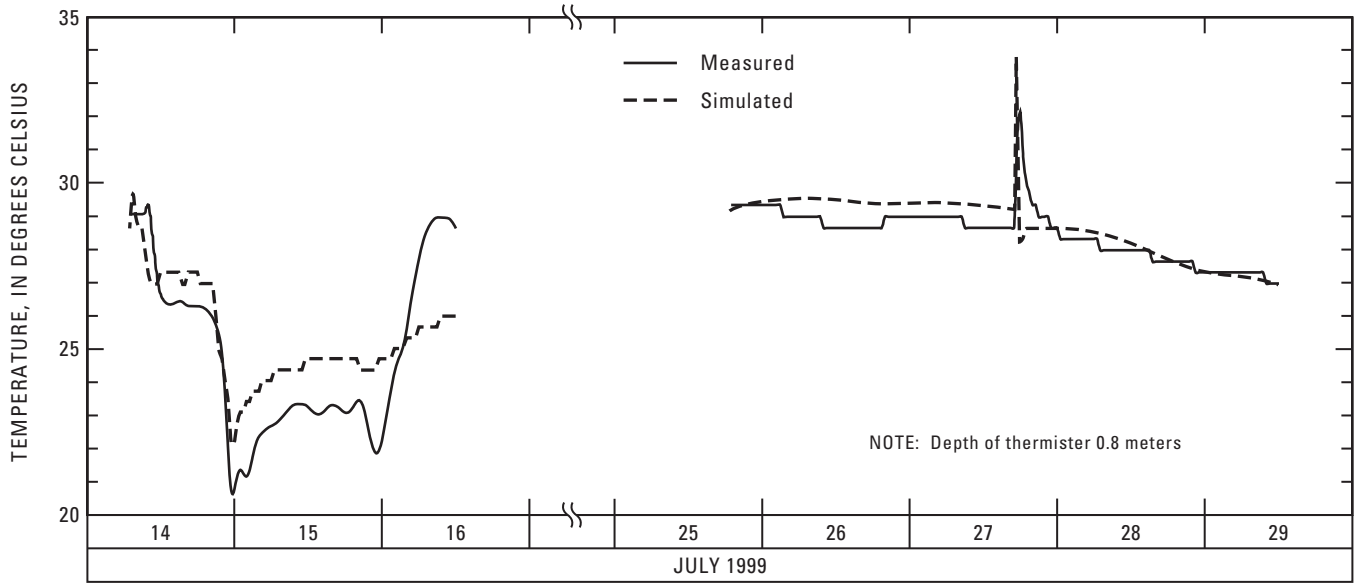

Figure 14. Measured and simulated thermographs in Rillito Creek near Dodge Boulevard, Pima County, Arizona.

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Two-Dimensional Temperature and Water-Content Monitoring

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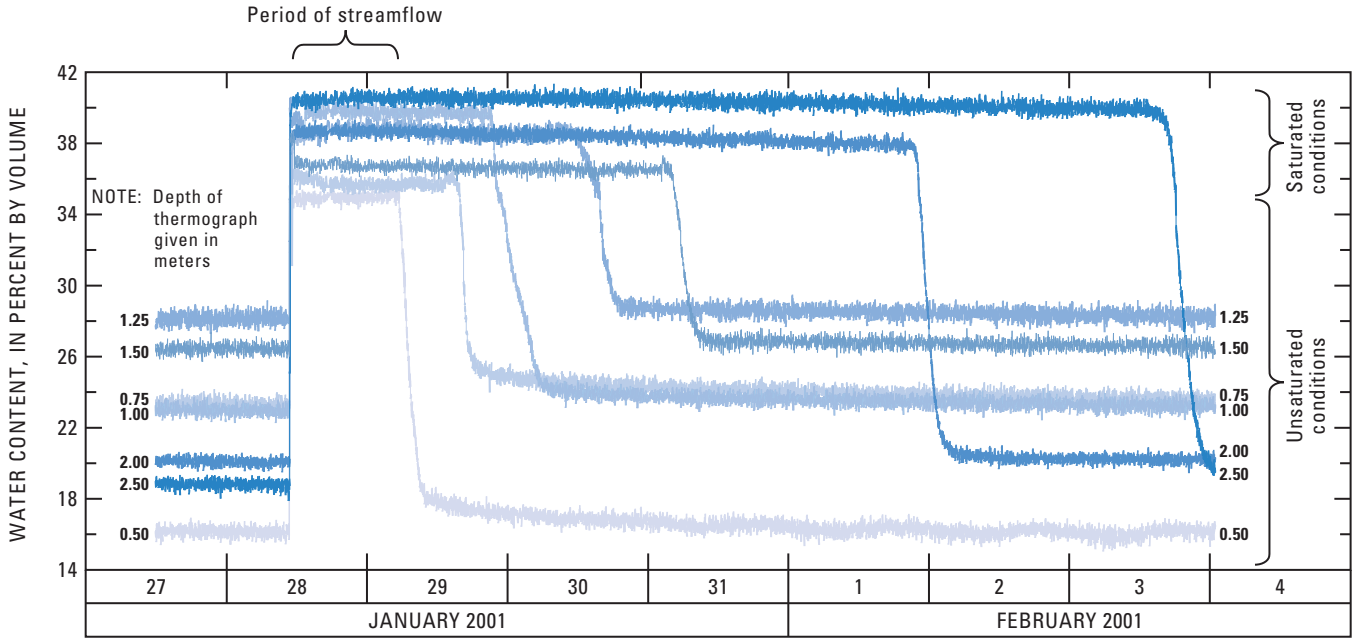

Figure 15. Water content of stream-channel sediments for duration of a streamflow event including onset and cessation, from within two-dimensional array in Rillito Creek near Dodge Boulevard, Pima County, Arizona.

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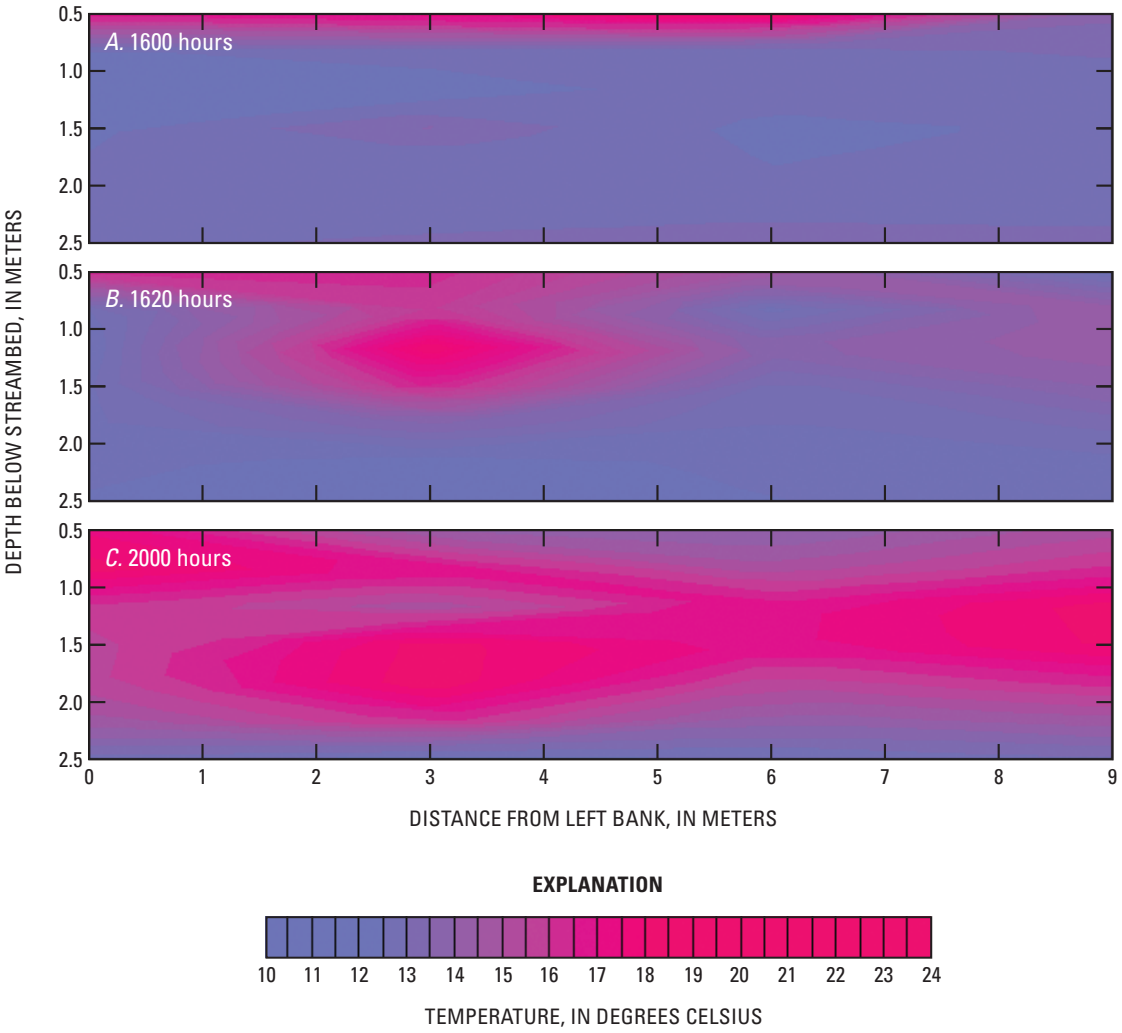

Figure 16. Two-dimensional distribution of temperature during different streamflow conditions in Rillito Creek on September 10, 2000, near Dodge Boulevard, Pima County, Arizona. *A*, Thermal transport through conduction before the onset of streamflow; *B*, thermal transport through a combination of advection and conduction at the onset of streamflow exhibiting multidimensional flow through the sediments; *C*, combined advection and conduction thermal transport to the deeper sediments several hours after the onset of streamflow.

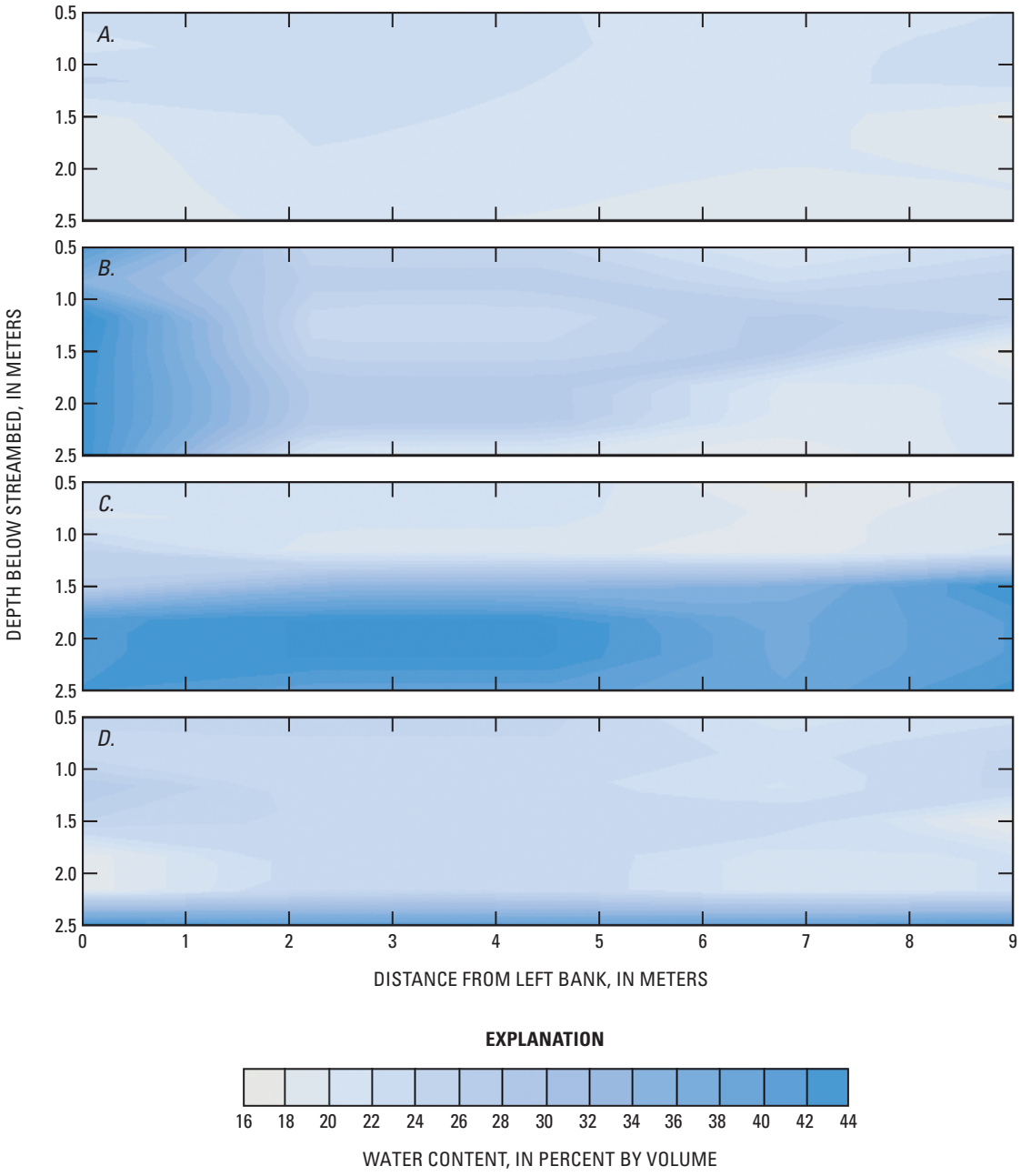

Figure 17. Two-dimensional plot of soil-water content during different streamflow conditions in Rillito Creek near Dodge Boulevard, Pima County, Arizona; *A*, Before the onset of streamflow, September 10, 2000, at 1600; *B*, five minutes after the onset of streamflow, September 10, 2000, at 1605; *C* , immediately after the cessation of streamflow September 12, 2000; *D*, approximately 2 days after the cessation of streamflow, September 14, 2000.

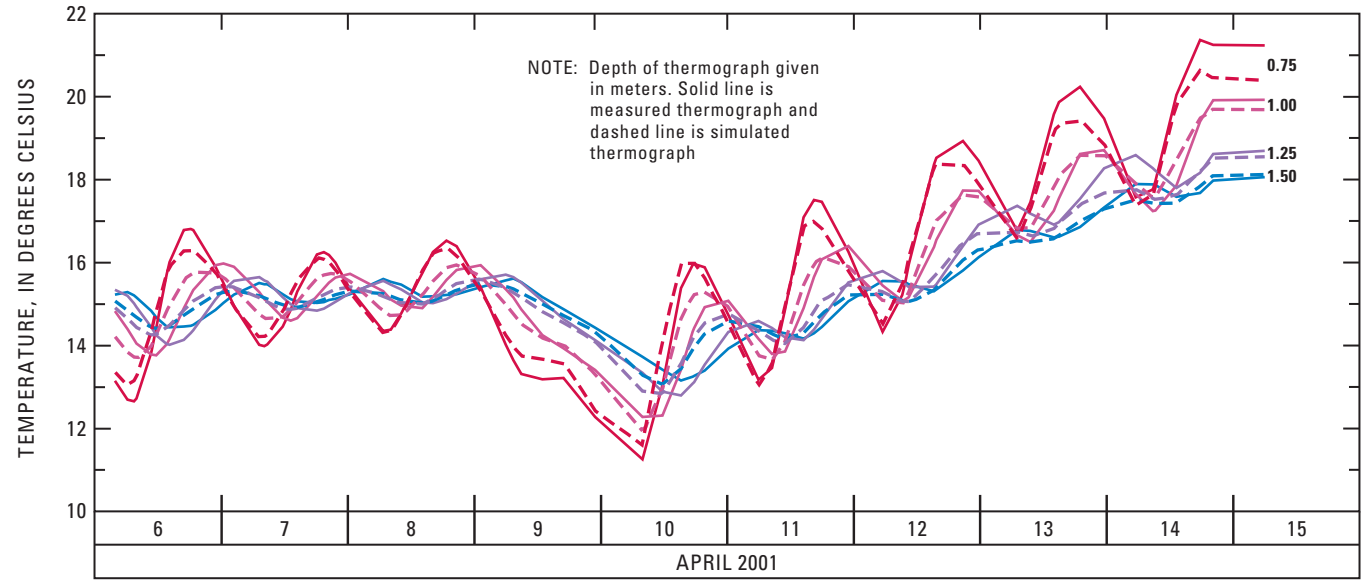

Figure 18. Typical measured and simulated thermographs from two-dimensional temperature array from column 1 (see fig. 1 for column location) in Rillito Creek near Dodge Boulevard, Pima County, Arizona.

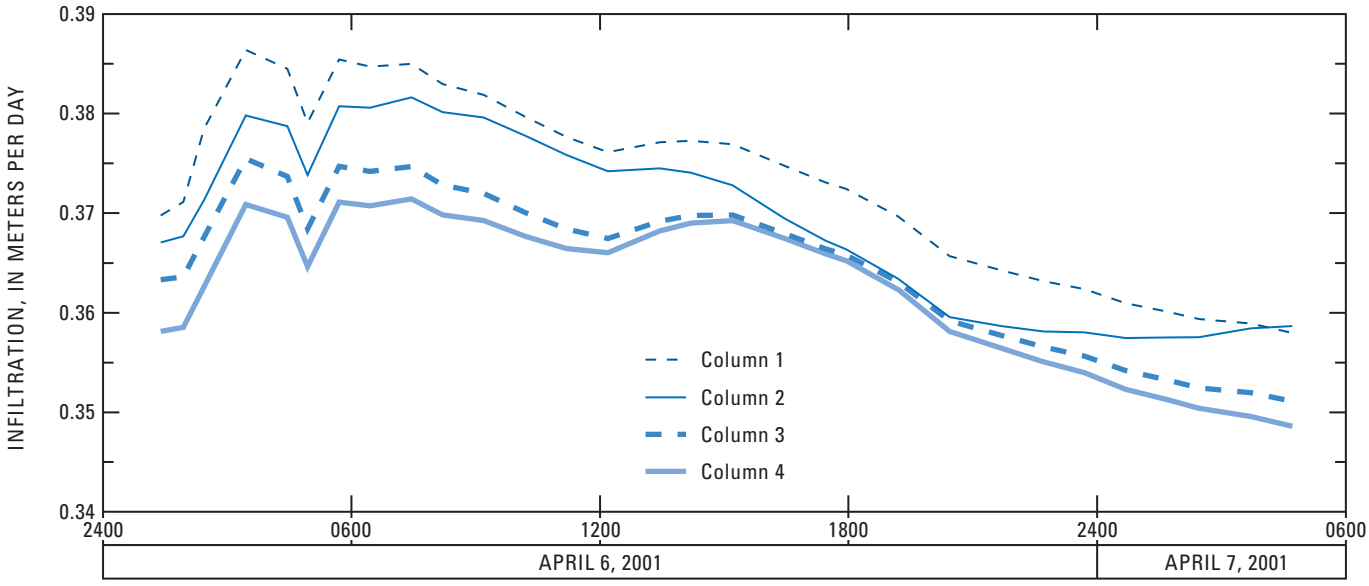

Figure 19. Simulated infiltration rates during period of flow at the two-dimensional temperature array near Dodge Boulevard, Pima County, Arizona.

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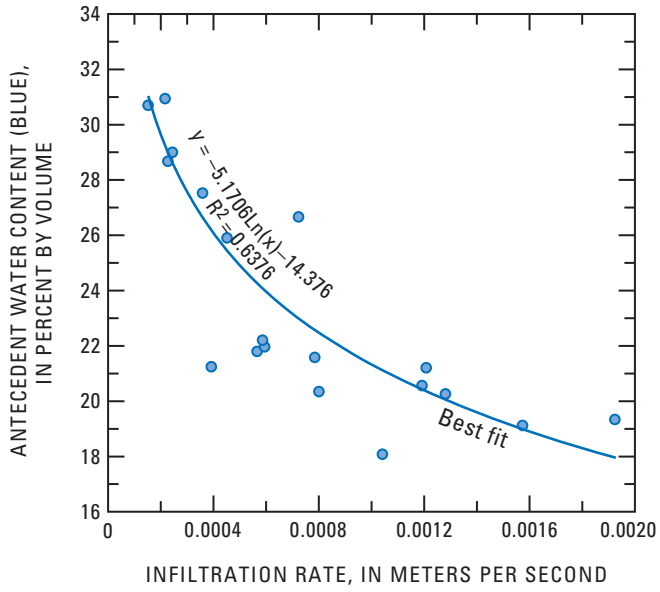


Figure 20. Correlation of onset infiltration rate to antecedent water content.

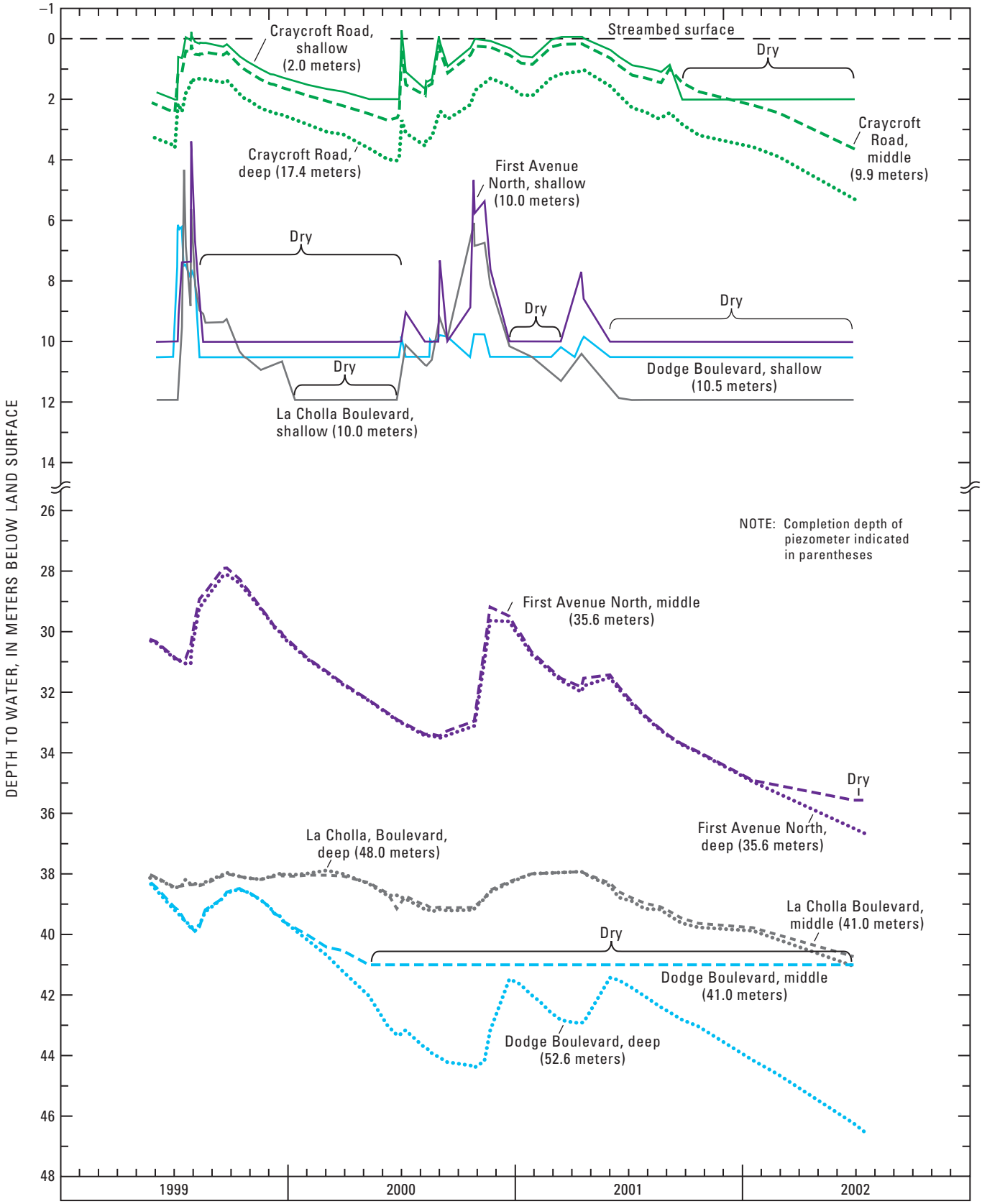
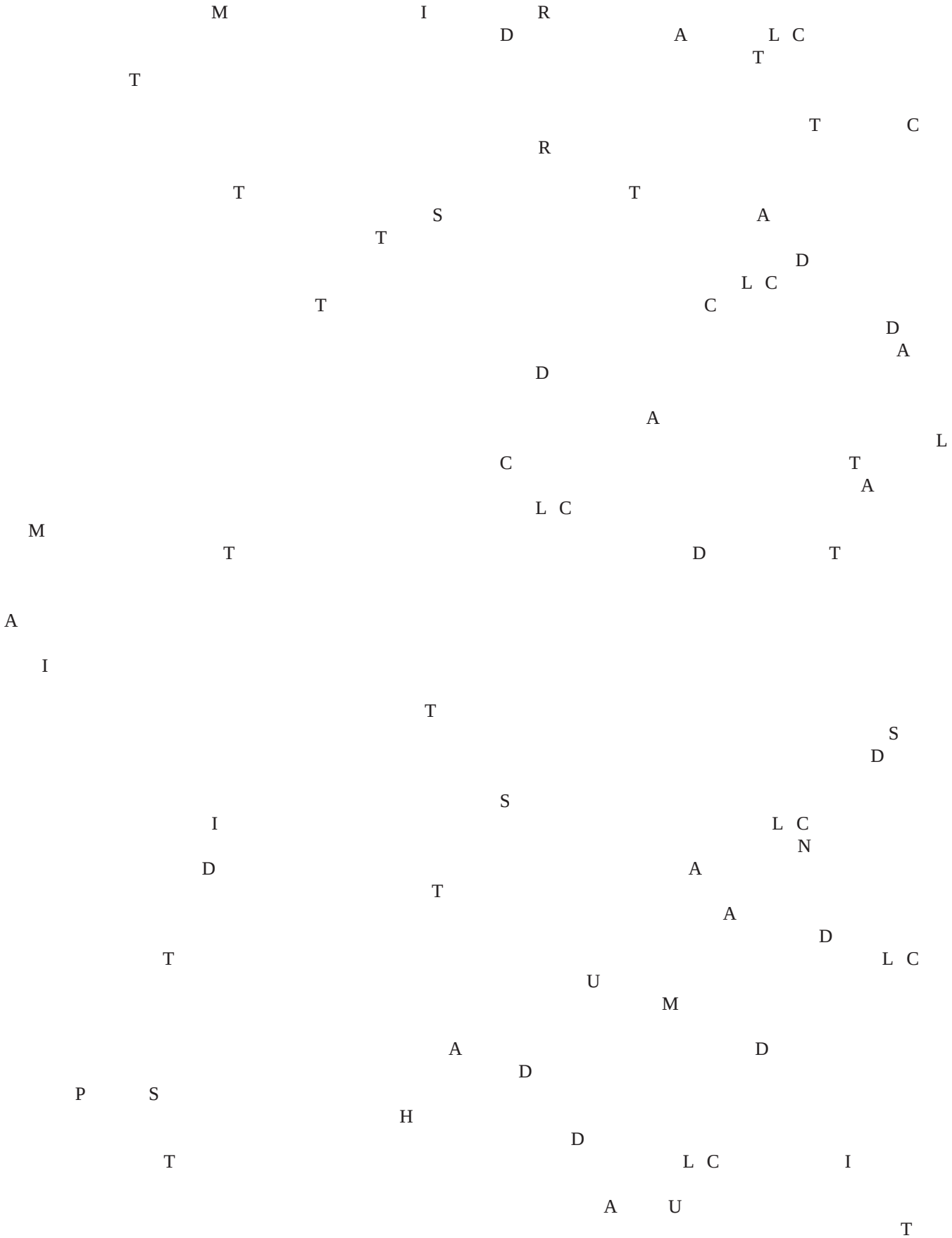


Figure 21. Hydrographs of selected piezometers within Rillito Creek, Pima County, Arizona.



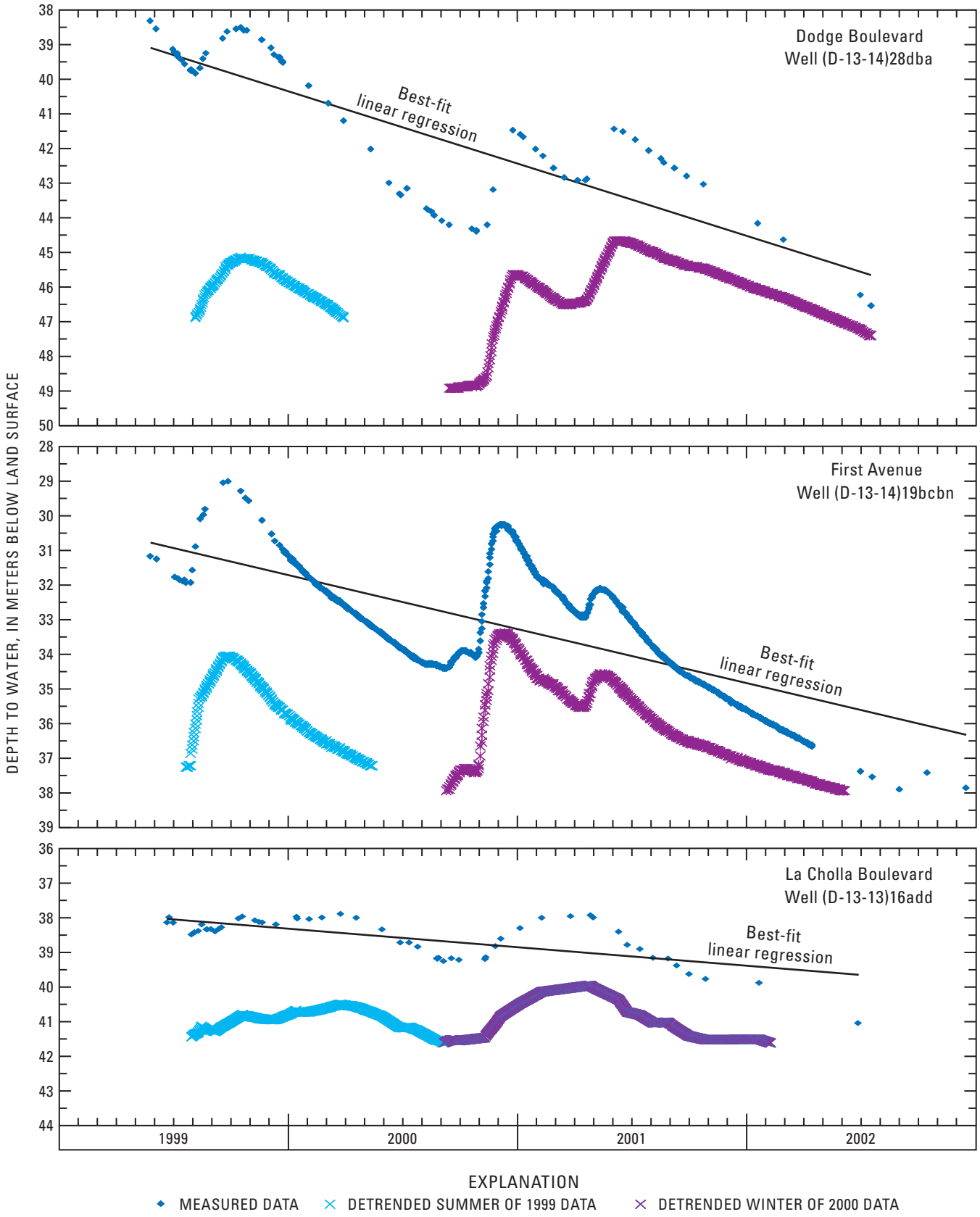


Figure 22. Measured and detrended hydrographs of selected piezometers within Rillito Creek, Pima County, Arizona.

Table 2. Recharge estimates for sites in Rillito Creek, Pima County, Arizona, using the Moench and Kisiel (1970) analytical-model method.

Site location	Distance of well from center of Rillito Creek channel, in meters	Recharge	1999		2000	
			Transmissivity = 1.6×10^{-3} m^2/s	Transmissivity = 6.5×10^{-3} m^2/s	Transmissivity = 1.6×10^{-3} m^2/s	Transmissivity = 6.5×10^{-3} m^2/s
D		L				
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Temporal Gravity Measurements

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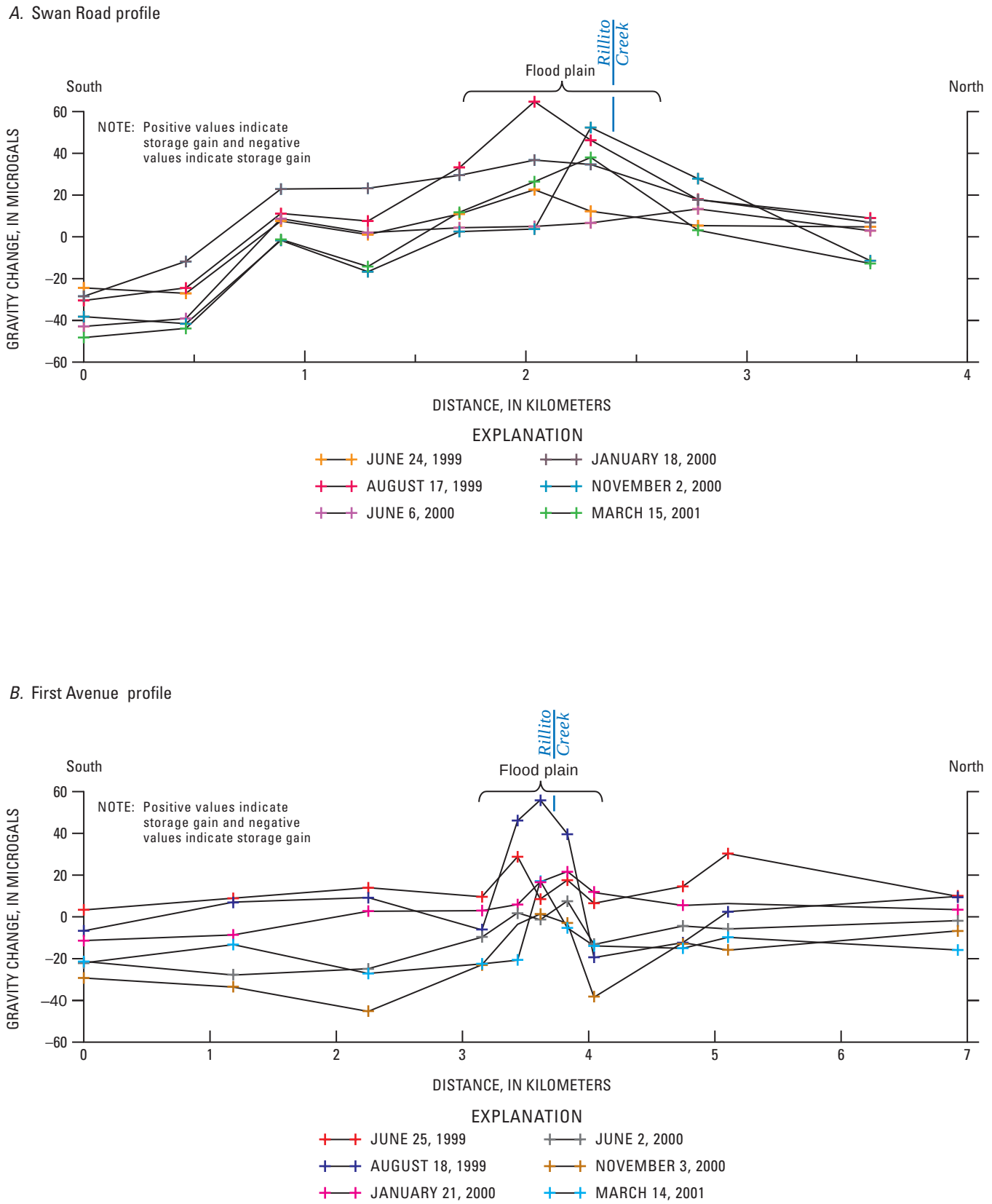

Figure 23. Gravity changes along profiles crossing Rillito Creek, Pima County, Arizona, since December 1997. *A*, Swan Road; *B*, First Avenue.

Summary and Conclusions

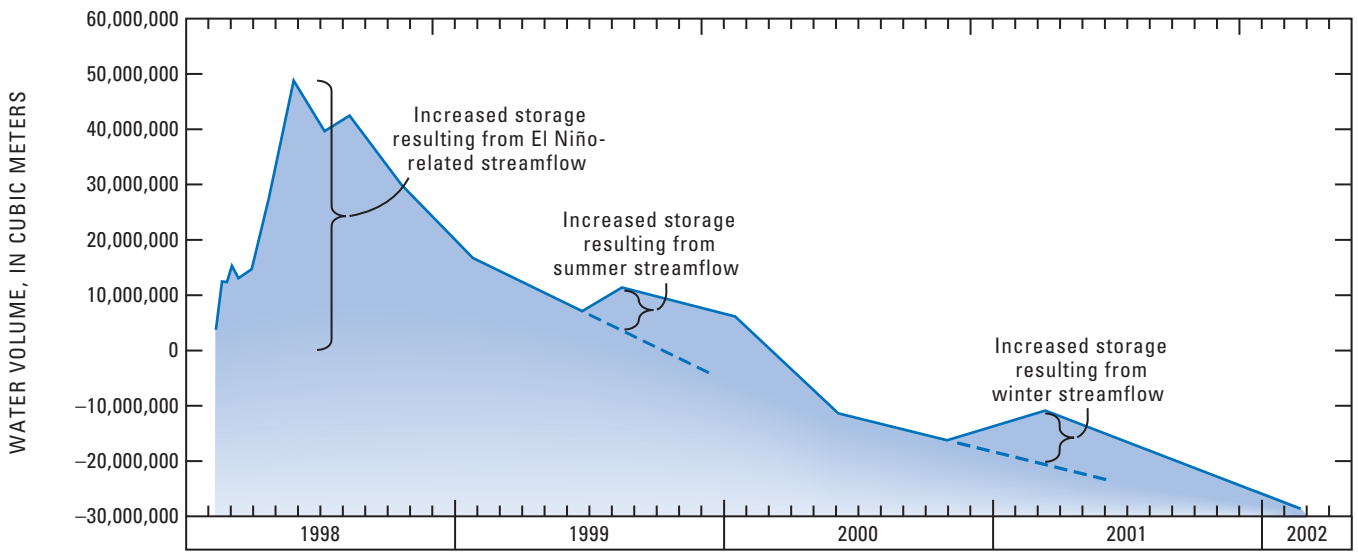

Figure 24. Storage changes measured along Rillito Creek, Pima County, Arizona, from Craycroft Road to La Cholla Boulevard relative to a measurement made in December 1997.

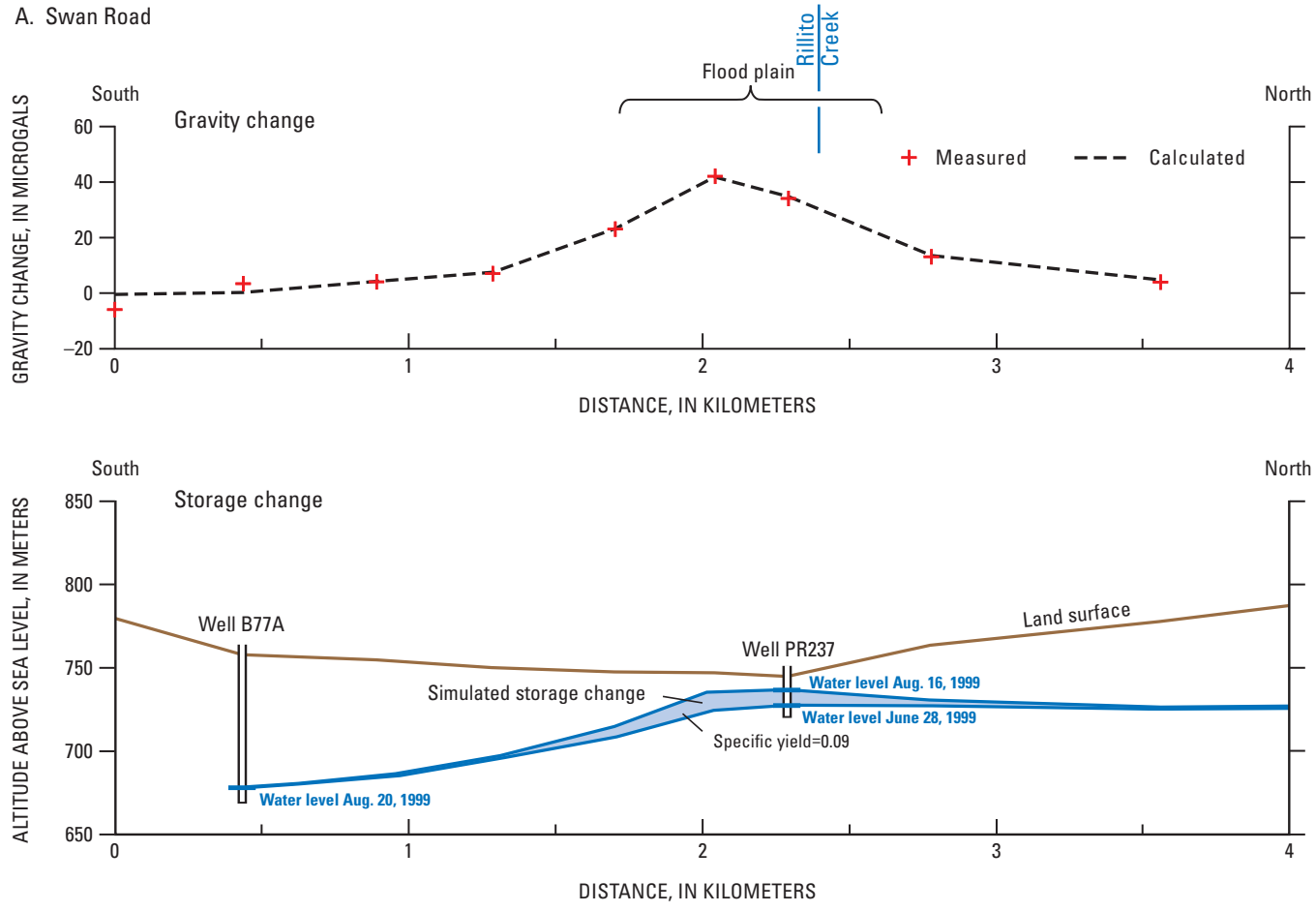

Figure 25. Gravity-model results for profiles crossing Rillito Creek, Pima County, Arizona. *A*, Swan Road; *B*, First Avenue.

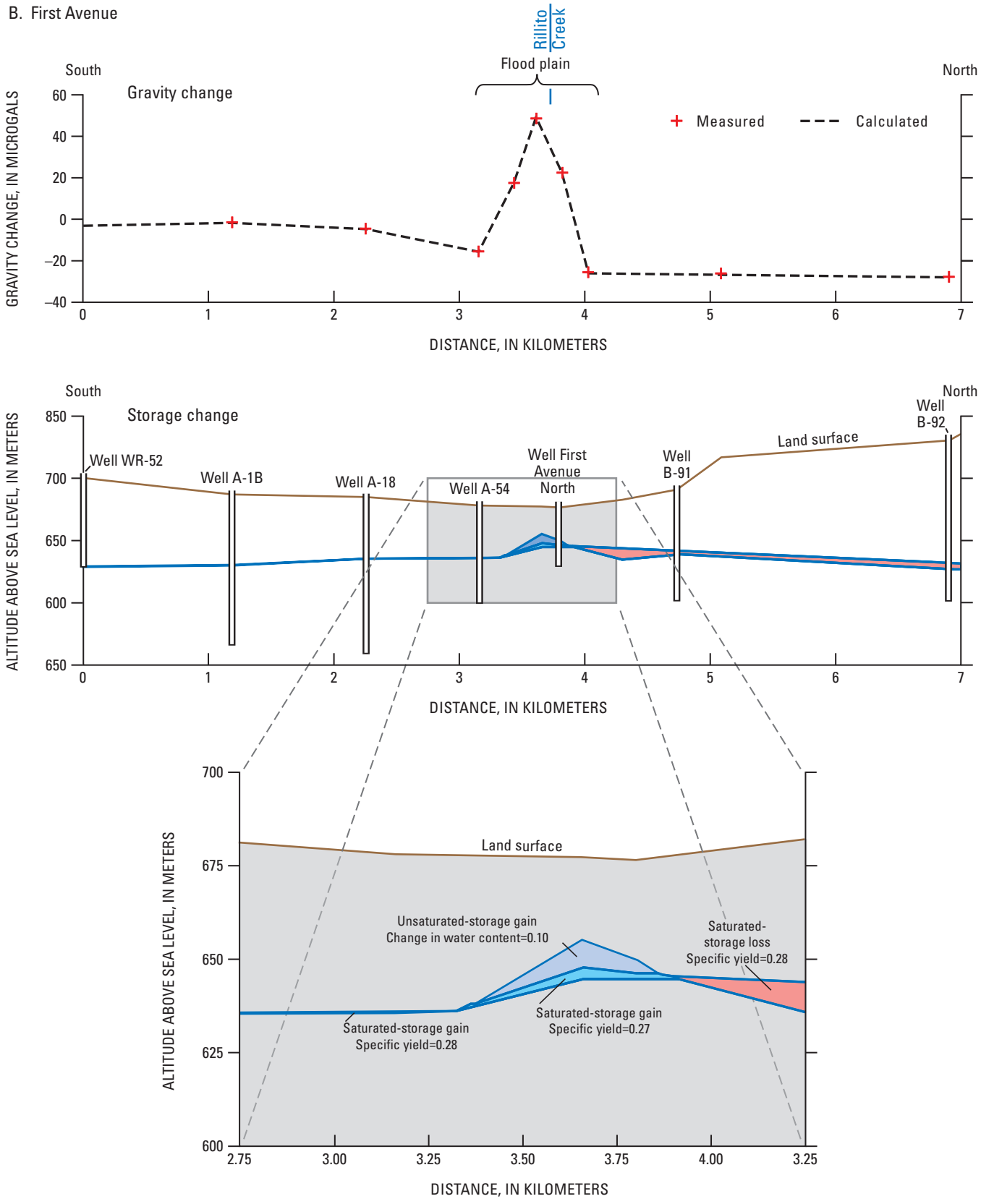

Figure 25.—Continued.

Table 3. Summary of methods used and estimated rates of infiltration, percolation, and recharge along Rillito Creek, Pima County, Tucson, Arizona.

Method	One-dimensional infiltration rate, m/d	Vertical percolation rate, m/d	Volumetric rate, m^3/s per kilometer of streamflow (wetted perimeter of 25 meters is used for temperature-method estimates)	Potential annual average recharge; assumes 36 days of flow in the 20 kilometer reach, m^3/yr	Comments
P		N	N		D L T
S	N		N	N	M
C	N		N	N	M
S		N			M S T
O		N			R O
T	A N	N			T
	N	N		N	M
C R L C	N	N		N	M S R L C A C R A

References Cited

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Exhibit 14

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San Pasqual Groundwater Management

State of the Basin Report Update

WT0205151016KCO

City of San Diego

September 2015

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San Pasqual Groundwater Management State of the Basin Report Update

Prepared for

City of San Diego

Public Utilities Department
Long Range Planning and Water Resources
525 B Street, Suite 300, MS906
San Diego, CA 92101-4409

September 2015

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Suite 1450
San Diego, CA 92101

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Figure 2-4
CASGEM Depth to Groundwater Levels
San Pasqual Groundwater Management State of the Basin Report Update

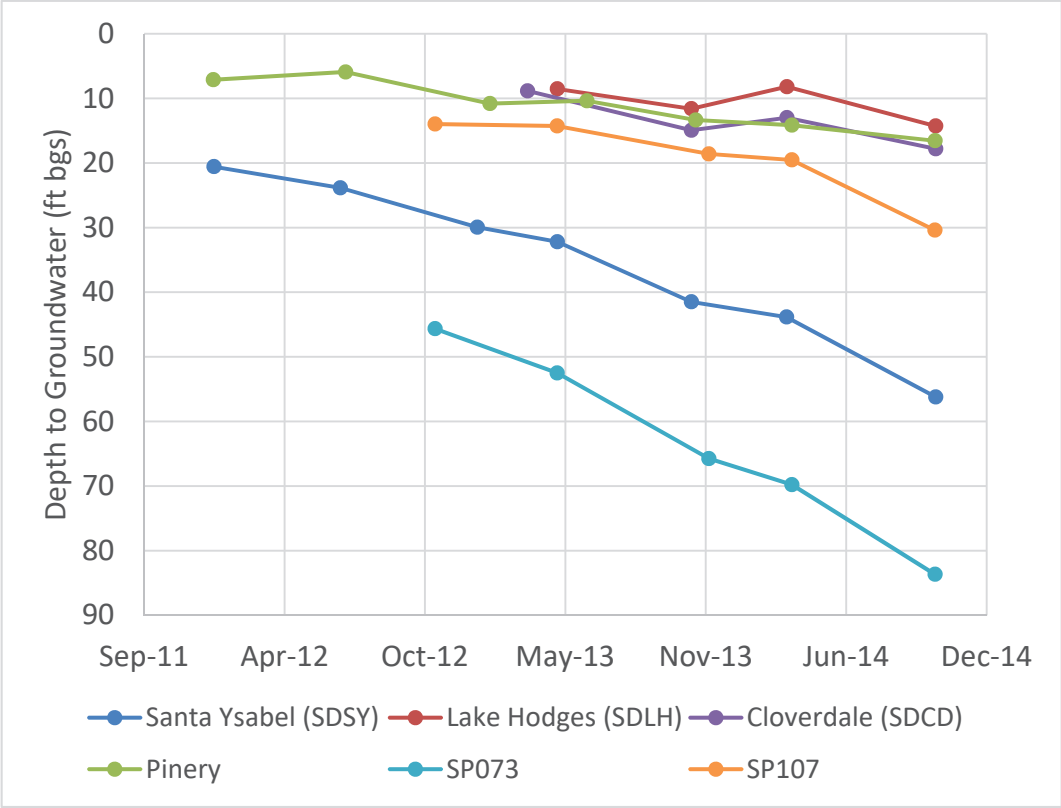

Figure 2-4 shows the depth-to-water measurements of the monitoring wells included in the CASGEM Program. The deepest groundwater is in the eastern part of the Basin, east of the confluence of Guejito Creek. Groundwater in this area is as deep as 83 feet below ground surface (bgs) (at SP073). The shallowest groundwater measured was adjacent to Lake Hodges (14 feet bgs at SDLH).

2.2.2 Groundwater Elevations

Figure 2-5 shows groundwater elevations for the City monitoring network measured between 2010 and 2014. Groundwater generally flows from the east to the west through the Basin. The highest groundwater elevation was measured to be 440 feet msl, at SP093. The lowest groundwater elevation was measured at 318 feet msl, at SP106.

2.3 Water Quality

The City has measured and monitored groundwater quality in the Basin for decades, including as part of the SPGMP. Groundwater monitoring is ongoing at several locations, because total dissolved solids (TDS) and nitrogen (as nitrate [NO_3]) concentrations have been of particular concern.

2.3.1 Groundwater Quality

Water quality objectives (WQO) for the Basin were established by the San Diego Regional Water Quality Control Board (RWQCB) as part of the Water Quality Control Plan for the San Diego Basin (RWQCB, 1994), which is available online (http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/). Groundwater quality in some areas of the Basin does not meet the objective and include chloride, nitrate (as NO_3), sulfate, TDS, iron, and manganese, as noted in Table 2-1. The groundwater WQOs are protective of beneficial uses that are consistent with the Basin management objectives and Basin utilization goals of the City.

The City attempts to collect and analyze groundwater samples quarterly; however, often only one or two sampling events occur in a year. The samples are analyzed for a variety of inorganics, organics, and metals. Because TDS and NO_3 have been evaluated as the constituents of interest, the most recent concentrations in groundwater have been graphed (see Figures 2-6 and 2-7). The overall trend shows that nitrate increases from east to west, and TDS is highest toward the middle of the Basin, which can be attributed to the variety of land uses in the Basin and general movement of groundwater through the aquifer. However, the westernmost sampling location, SP010, has much lower concentrations than the other western groundwater sites. Table 2-1 presents a summary of groundwater quality in the Basin.

2.3.1.1 Total Dissolved Solids

TDS concentrations is one way to quantify groundwater salinity within the Basin. More salts are currently entering the aquifer than are being removed, which has resulted in an overall increase in groundwater concentrations of TDS over time. Evapoconcentration of groundwater salts from irrigation pumping and passive use by riparian vegetation is a significant factor contributing to elevated TDS concentrations in groundwater. In addition, with more than 90 percent of the total nitrogen (TN) contributions to the Basin coming from fertilizer and manure use, and given the historical elevated nitrate concentrations in groundwater, effective nutrient management across agricultural and urban landscapes has been identified as an important component of Basin water quality management.

TDS concentrations in the westernmost well (SP010) range from 604 to 1,050 milligrams per liter (mg/L), which indicates that groundwater is leaving the Basin with TDS concentrations that exceed the recommended secondary maximum contaminant level (MCL) of 500 mg/L and in some instances exceed the WQO of 1,000 mg/L. An analysis of existing historical data indicates that TDS concentrations in the western portion of the Basin have generally increased since 1950; however, constituent concentration trends seem to have become more constant in the western portion of the Basin over approximately the last decade.

2.3.1.2 Nitrates

Although the most recent nitrate concentrations in well SP010 are relatively low, average NO_3 concentrations in the western Basin are 40 mg/L, with a maximum concentration of 174 mg/L; thus, the primary MCL for nitrate (as NO_3) of 45 mg/L as well as the WQO of 10 mg/L is exceeded in some areas. Historical data show that the general trend for nitrate concentrations has increased, with the exception of wells SP089 and SP061, which have decreased.

State of California – Natural Resources Agency
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South Coast Region
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San Diego, CA 92123
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

August 12, 2021

Via Electronic Mail and Online Submission

Ms. Karina Danek
Public Utilities Department
City of San Diego
525 B Street
San Diego, CA 92101
KDanek@sandiego.gov

Subject: Comments on the San Pasqual Valley Basin Groundwater Sustainability Plan

Dear Ms. Danek:

The California Department of Fish and Wildlife (CDFW) is providing comments on the draft San Pasqual Valley Basin Groundwater Sustainability Plan (SPV-GSP). As Trustee Agency for the State's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species [Fish & Game Code Sections §§ 711.7 and 1802]. CDFW has an interest in the sustainable management of groundwater, as many sensitive ecosystems and public trust resources depend on groundwater and interconnected surface waters.

The San Pasqual Valley Groundwater Sustainability Agency (SPV GSA) was developed through a Memorandum of Understanding (MOU) between the City of San Diego (City) and the County of San Diego (County) and developed to comply with California's Sustainable Groundwater Management Act (SGMA) and its requirement to sustainably manage the San Pasqual Valley Groundwater Basin (Basin). SGMA, which became effective January 1, 2015, provides a framework to regulate groundwater by requiring local agencies to form Groundwater Sustainability Agencies (GSAs) and providing those GSAs with the necessary tools to manage groundwater use (California Water Code [CWC] Section 10720, et seq.)

COMMENT OVERVIEW

CDFW is writing to support ecosystem preservation and enhancement under SGMA implementation in the context of the following SGMA statutory mandates and CDFW ecological and biological expertise.

SGMA affords ecosystems specific statutory and regulatory consideration:

- GSPs must consider **impacts to groundwater dependent ecosystems** [Water Code §10727.4(l)].
- GSPs must identify potential **effects on all beneficial uses and users of groundwater**, including fish and wildlife preservation and enhancement [Title 23 California Code of Regulations § 666], that may occur from undesirable results [Title 23 California Code of Regulations § 354.26(b)(3)].

- GSPs must **account for groundwater extraction for all Water Use Sectors** including managed wetlands, managed recharge, and native vegetation [Title 23 California Code of Regulations § 351(al), § 356.2(b)(4)].

Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d 419). Accordingly, groundwater plans should consider potential impacts to and appropriate protections for interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, groundwater dependent ecosystems, and interconnected surface waters. CDFW supports ecosystem preservation and enhancement in compliance with SGMA and its implementing regulations based on CDFW expertise and best available information and science. CDFW offers the following comments and recommendations to assist SPV GSA in evaluating effects to GDEs.

COMMENTS AND RECOMMENDATIONS

Groundwater Dependent Ecosystems

Comment #1: Assessment of Interconnected Streams and Groundwater Dependent Ecosystems (GDEs). (SPV-GSP Volume 1 Section 4.6, SPV-GSP Volume 2 Appendices J and L, page 4-42)

Issue: The SPV-GSP conclusion that streams and wetlands in the eastern portion of the Basin (eastern Basin) are disconnected from the Basin's aquifer (i.e., not GDEs) is not fully supported by the data provided in the SPV-GSP or in Appendices J and L. Readily available scientific data indicates that the riparian and wetland vegetation in the eastern Basin likely maintain some connectivity to groundwater and should still be considered GDEs. Under SGMA, a GSP is required to avoid unreasonable adverse impacts on the beneficial uses of interconnected surface waters, defined as, "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer, and the overlying surface water is not completely depleted" (Water Code §§ 10721(x)(6) and 10727.2(b); 23 CCR § 351(o).).

Concern: The SPV-GSP's reliance on the 2015 to 2019 baseline analysis to identify disconnected portions of the Basin and eliminate potential GDEs with a depth to groundwater greater than 30 feet is not representative of current climate conditions. The 2015 to 2019 baseline analysis begins several years into a historic drought when groundwater levels throughout the Basin were trending lower than usual due to reduced surface water availability. As such, this period of groundwater elevations does not account for GDEs that can survive a finite period without groundwater access (Naumburg et al. 2005). The following are additional factors which support the need to further analyze GDEs and groundwater levels:

a. The distance to groundwater within the riparian/wetland habitat may be less than the distance to groundwater at the well location, given that riparian and wetlands are located in

topographical depressions compared to adjacent well locations; therefore, calculations for GDE's should be corrected for actual ground surface elevation (The Nature Conservancy 2019). The corrected distance to groundwater elevation should be used in the GDE analysis.

b. As shown in Appendix L, some hydrographs in the eastern Basin show measurement at or around 30 feet in 2019, yet the SPV-GSP categorized streams in the eastern Basin as disconnected due to depth to groundwater being greater than 30 feet since 2015. Wells in the eastern reaches show recent connection to groundwater and should be considered GDEs.

c. Appendix J notes that, "[t]he major drainages in the San Pasqual Valley have significant riparian or wetland vegetative communities with an abundance of woody phreatophytes such as willows (*Salix* spp.), salt cedar (*Tamarisk ramosissima*), Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and California fan palm (*Washingtonia filifera*)" (pg. 14). Some of these trees, such salt cedar, can have a rooting depth up to 70 feet (Gries et al. 2003). These species, while not native to southern California, provide habitat for the California Endangered Species Act (CESA)-listed least Bell's vireo (*Vireo bellii pusillus*).

d. Riparian areas in the eastern Basin remain functional without perennial surface flow and were able to persist through drought conditions; for these reasons, they are likely connected to groundwater. The GDE Pulse tool by The Nature Conservancy (TNC) also identifies the eastern Basin's riparian and wetland habitats as GDEs (Klausmeyer et al. 2019). Naumburg et al. (2005) presents several models that evaluate how GDEs rely on fluctuating groundwater elevations for long-term survival. GDEs have been sustained by groundwater, despite the depth of the groundwater table being greater than 30 feet below ground surface (bgs), due to these fluctuating groundwater elevations. Figure 3-25 shows that the Santa Ysabel catchment, which is in the watershed furthest east, provided more than 20 acre-feet of groundwater recharge even at the height of the drought in 2014. This surface to groundwater connection sustains the riparian vegetation that is habitat for various endangered species, such as the CESA-listed least Bell's vireo and CESA-listed tricolored blackbird (*Agelaius tricolor)*. This should be identified as a beneficial use.

e. Riparian areas that are considered gaining reaches may be considered GDEs even if groundwater levels are greater than 30 feet bgs. Further guidance on riparian vegetation as GDEs can be found in Groundwater Dependent Ecosystems Under the Sustainable Groundwater Management Act Guidance for Preparing Groundwater Sustainability Plans and Identifying GDEs Under SGMA Best Practices for Using the NC Dataset. (The Nature Conservancy 2018 and 2019 respectively).

Recommendation: The SPV GSA should clarify depth to groundwater for GDEs in the eastern Basin and conduct additional studies as recommended in Appendix J. CDFW also recommends including areas classified as wetland and riparian habitats as GDEs. This includes areas where groundwater depth is greater than 30 feet bgs but habitat is still sustained by groundwater. CDFW suggests these habitat areas be identified as GDEs in the final GDE map in the SPV-GSP.

Water Budgets

Comment #2: Water Budgets and Projected Deficits and Sustainability Goals (SPV-GSP Section 5.5.3, page 5-15)

Issue: Figure 5-5 of Appendix H shows that project groundwater surface levels at the representative wells in the eastern Basin will hit their planning or minimum threshold by 2035, which is prior to the sustainable planning horizon of 2040 required under SGMA. Additionally, the SPV-GSP already has identified a small deficit in groundwater storage. The model seems to indicate that diminishing groundwater storages may be a long-term trend based on projected data.

Concern: The SPV-GSP fails to identify specific actions which will determine if the deficit is a trend, and potential management actions which will be implemented if the deficit is determined to be a trend.

Recommendation: Thresholds should be revised to provide an earlier indicator of undesirable reductions in groundwater storage. Management actions may need to be implemented to prevent undesirable results both for chronic lowering of groundwater storage and potential impacts to interconnected surface waters and GDEs.

Comment #3: Water Budgets and Impacts to GDEs (GSP Section 5.5.3, page 5-15)

Issue: The Average Annual Surface Water System Water Budget (Table 5-4) shows that during SPV-GSP implementation, groundwater discharge to streams will decrease significantly, while stream inflow from adjacent areas will double due to a few large storms. Fay et al. (2000) found that, “[a]boveground net primary productivity, soil carbon dioxide flux, and flowering duration were reduced by the increased inter rainfall intervals and were mostly unaffected by reduced rainfall quantity” (pg. 308). It is unclear in the SPV-GSP how the change in water timing and type will affect beneficial uses in the stream, such as vegetative growth and blooming periods, especially during drought conditions.

Concern: Changes in water inputs that may impact GDE health should be monitored as part of the SPV-GSP. This monitoring data will help to inform future water budgets.

Recommendation: Annual monitoring of GDE health, the use of Normalized Derived Vegetation Index (NDVI) which estimates greenness, and Normalized Derived Moisture Index (NDMI) which estimates vegetation moisture, should be used as metrics for interconnected surface water and GDE impacts.

Undesirable Results

Comment #4: Groundwater Level as a Proxy for Interconnected Surface Waters and GDE’s. (SPV-GSP Section 6.3.6, page 6-7)

Issue: Although groundwater levels are a simple proxy for many sustainability indicators, it is not sensitive to changes in ecosystem health and noticeable changes to groundwater levels as representative wells may lag real time impacts to GDEs due to relative location to the groundwater surface.

Concern: Current sustainability indicators will not detect changes, which will affect other beneficial uses and GDEs.

Recommendation: NDVI and NDMI should be used as early indicators of water stress on GDEs. NDVI and NDMI are remotely sensed color data that can be used as a refined proxy for vegetation health in the Basin. The TNC GDE Pulse tool provides both a web viewer and access to the raw data to analyze these metrics over different periods of time (Klausmeyer et al. 2019).

Comment #5: Degraded Water Quality (SPV-GSP Section ES, 4.1.6, 6.3.4, pages ES-4, 4-16, 6-5)

Issue: Water quality within the Basin is being impacted by land use practices adjacent to the Basin.

Concern: The SPV-GSP notes that the SPV GSA only has authority over issues related to groundwater pumping in the Basin. Although nitrogen and Total Dissolved Solids sources are outside of the Basin, CDFW is concerned that there are downstream impacts to water quality in the Basin that could be addressed by managing entities outside of the MOU for the SPV GSA.

Recommendation: Although the SPV GSA only has authority over issues pertaining to groundwater pumping, both the City and the County have planery authority and can address water quality issues within their management areas, including upstream watersheds. CDFW recommends that the SPV GSA coordinate with relevant municipal jurisdictions and landowners on potential water quality projects to ameliorate the water quality issues upstream of the Basin.

Minimum Thresholds

Comment #6: Minimum Thresholds Are Set Lower Than Historic Baseline (SPV-GSP Section 8.2.1, page 8-2)

Issue: Minimum thresholds are set well below historic minimums and are not protective of beneficial uses. Setting minimum and planning thresholds at 50 to 100 percent lower than historic minimums does not account for how current conditions may already be trending towards a groundwater storage deficit (Comment #3). Additionally, the future range of groundwater levels may fall within or near the historic range, which also included severe drought conditions.

Concern: Setting the minimum and planning thresholds below the historic range may not be enough to allow for protection against undesirable results. Furthermore, as presented in the SPV-GSP, the planning threshold for wells adjacent to GDEs is less protective than the threshold set for wells that are further from GDEs. Given CDFW's concern that riparian and wetland vegetation in the eastern Basin may also be GDEs, the absence of established protective thresholds is of particular concern. Although the SPV GSA is not currently experiencing an overdraft, trends of overdraft conditions, if they persist, may cause undesirable results prior to reaching either the proposed planning or minimum threshold.

Recommendation: CDFW recommends following TNC's guidance by setting minimum thresholds at levels that prevent adverse impacts to GDEs (TNC 2018). The planning and minimum thresholds for wells closer to GDEs should also be more protective of the GDEs than

wells that are further, and the planning threshold should be closer to the measurable objective rather than the minimum threshold in areas adjacent to GDEs.

Comment #7: Monitor GDEs Should Be A Tier 0 Project (SPV-GSP Figure 9-2, page 9-3)

Issue: Section 9 of the SPV-GSP includes monitoring of GDEs as a Tier 1 project that would be implemented once the planning threshold is reached.

Concern: Given CDFW's many concerns pertaining to interconnected surface waters and GDEs for the Basin, we are concerned that undesirable results may occur well before Tier 1 projects are implemented, particularly given that planning and minimum thresholds set for the representative wells is not protective of GDEs and beneficial uses.

Recommendation: Additional studies and monitoring pertaining to GDE's should be implemented, as identified in Appendix J, as a Tier 0 project that can be implemented at any time after plan adoption. Again, NDVI and NDMI should be used to assess habitat health on an annual basis and should inform the revision of both the planning and minimum thresholds for the representative wells to within or near the historic baseline.

Comment #8: Use of CNDDB Data to Presume Absence (SPV-GSP Volume 2 Appendix J Groundwater Dependent Ecosystems Technical Memo Table 1, page 6)

Issue: Appendix J notes that presence and/or absence of sensitive species is based on California Natural Diversity Database (CNDDB) occurrence data. CNDDB only provides positive occurrence data where studies have been conducted and cannot be relied upon to presume absence due to lack of data in a specific location.

Concern: Species-specific studies conducted in suitable habitat according to species-specific protocols are required to determine species absence from a particular area. Only presence can be assumed and should be assumed in suitable habitat where species-specific surveys have not been conducted.

Recommendation: In the absence of species-specific protocol surveys, the GSP should assume presence for sensitive species in areas where suitable habitat exists.

Comment #9: Species Dependence on Groundwater and Mischaracterization as Not Applicable (SPV-GSP Volume 2 Appendix J Groundwater Dependent Ecosystems Technical Memo Table 1, page 6)

Issue: Table 1 of Appendix J states that the reliance of many of the sensitive plants and invertebrates on groundwater is Not Applicable (NA) based on omission from the Critical Species LookBook (Rohde et al. 2019). The Critical Species LookBook Appendix I *Other Threatened or Endangered Species Relevant to SGMA* includes many of the species noted as NA. Although groundwater relationships may be less apparent and not fully discussed in the LookBook, groundwater relationships between plants and vernal pool habitats do exist and have been described in the scientific literature. In one study in the Central Valley, "[p]erched groundwater discharge accounted for 30–60% of the inflow to the vernal pools during and immediately following storm events. (Rains et al. 2006, pg. 1157). Endangered plants such as the threadleaf brodiaea (*Brodiaea filifolia*) which CNDDB notes as potentially present in the eastern Basin may also be impacted by changes to groundwater.

Concern: Although these groundwater relationships are not well understood for the Basin, CDFW is concerned that additional monitoring of known sensitive populations have not been included in the SPV-GSP.

Recommendation: Sensitive plants and invertebrates should be included in Appendix I of the Critical Species LookBook as having a potential reliance on groundwater rather than 'NA.' The SPV GSA should also coordinate with the City and County to include periodic monitoring of sensitive species populations within the Basin, beginning with baseline studies where suitable habitat exists.

Editorial Comments

Comment #10: Pictures Were Not Provided for Eastern Field Data Points That Were Determined to Not Be GDEs (GSP Volume 2 Appendix J Groundwater Dependent Ecosystems Technical Memo Attachment 1)

Issue: Appendix J does not include representative photos of field surveys in the eastern Basin. The SPV-GSP makes the conclusion that the riparian and wetland habitat in the eastern portion are not GDEs due to the depth of groundwater being greater than 30 feet.

Concern: Pictographic evidence regarding GDEs was not included to support the GDE analysis provided.

Recommendation: Representative photographs of the field surveys conducted in the eastern Basin should be included in Appendix J. The Final SPV-GSP should contain updated analysis in Appendix J to addressed issues discussed in this letter.

CONCLUSION

In conclusion, the SPV-GSP does not comply with all aspects of SGMA statute and regulations, and CDFW deems the SPV-GSP inadequate to protect fish and wildlife beneficial users of groundwater. CDFW recommends that the SPV-GSP consider CDFW's comments for the following reasons:

1. the assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [CCR § 355.4(b)(1)] (See Comments # 1, 2, and 6);

2. the SPV-GSP does not identify reasonable measures and schedules to eliminate data gaps. [CCR § 355.4(b)(2)] (See Comments # 1, 2, 8, and 9);

3. the sustainable management criteria and projects and management actions are not commensurate with the level of understanding of the Basin setting, based on the level of uncertainty, as reflected in the SPV-GSP. [CCR § 355.4(b)(3)] (See Comments # 1, 2, and 7);

4. the interests of the beneficial uses that are potentially affected by the use of groundwater in the Basin have not been considered. [CCR § 355.4(b)(4)] (See Comments # 1, 8, and 9); and,

5. the SPV-GSP does not include a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft if present. [CCR § 355.4(b)(6)] (See Comment # 2, 3, 4, and 6)

CDFW appreciates the opportunity to provide comments. Please contact Mary Ngo, Senior Environmental Scientist (Specialist) at Mary.Ngo@wildlife.ca.gov or (562) 477-0743 with any questions.

Sincerely,

DocuSigned by:
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Enclosures (Literature Cited)

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From: Alicia Appel <aappel@escondido.org>
Sent: Tuesday, August 17, 2021 10:54 AM
To: Danek, Karina <KDanek@sandiego.gov>
Subject: San Pasqual GSP comments

Hi Karina,
My sincere apologies -something came up last week and I failed to send our comments on the Draft GSP. I hope they may still be considered for the final version.
Hope you're well!
Alicia

Page #	Section	Figure/Table/ Paragraph	Comment
4-4	4.1.2	Fig 4-2	Update map or add footnote to denote errors on this map. Santa Ysabel should be named San Dieguito and San Dieguito River should read Cloverdale Creek. The map on the next page is correct.
5-3	5.1	Title	Approach (sp)
8-1	8	General	Is there a different term that can be used rather than "exceedance"? Exceedance is going "over" a limit but in the case of groundwater levels it would be falling below a threshold. This term is often used in stormwater compliance. It would make sense for the water quality metrics (e.g. nitrate and TDS)
9-7	9.5	Last paragraph	Delete repeated table reference (9-2)
Vol 2 Pdf Page 648		Figure 3-27	Water District Source map does not match the Escondido Water boundaries. See attached map and contact me if you want the GIS layer.

Alicia Appel
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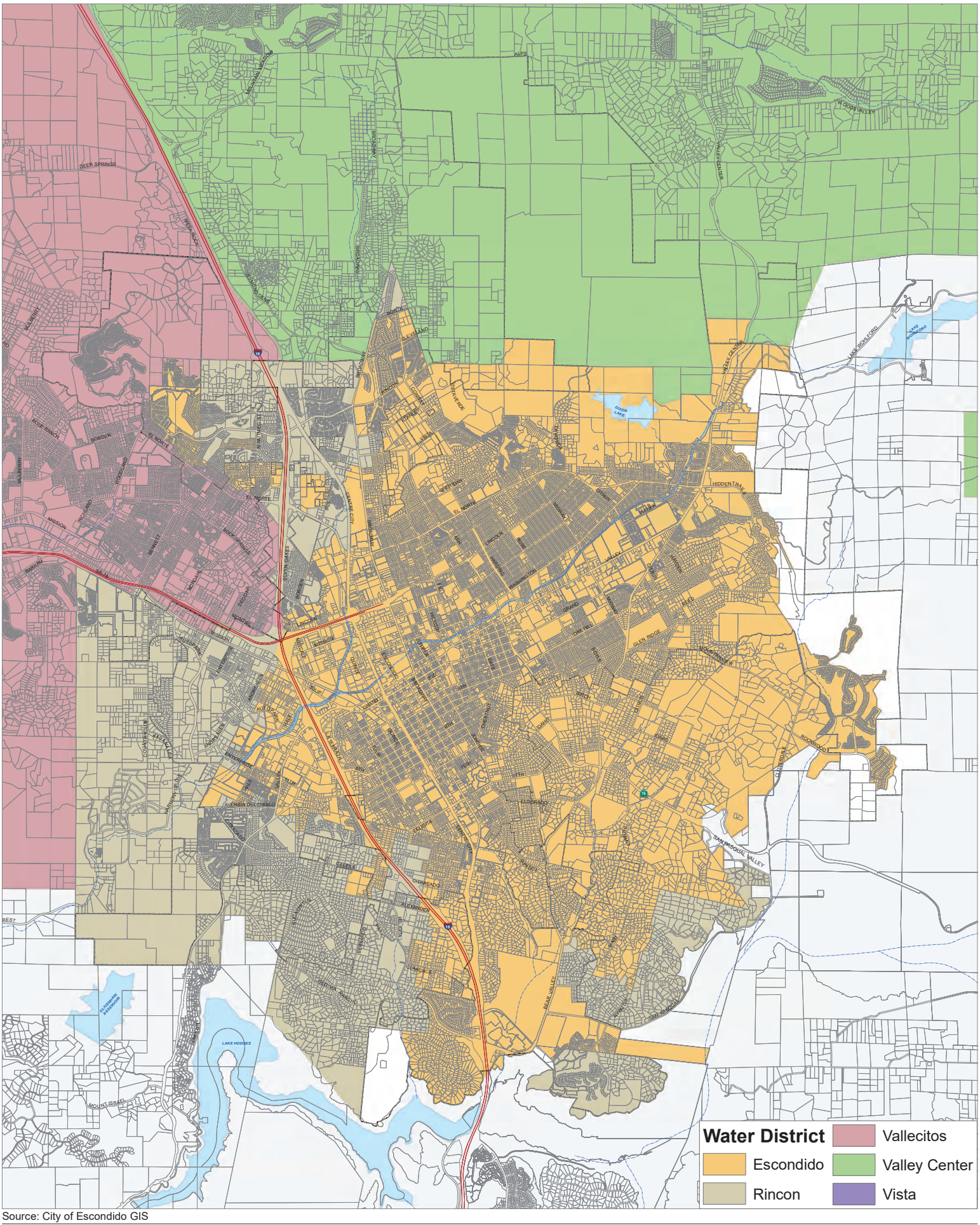

Source: City of Escondido GIS

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City Of Escondido Water Service District Operation Areas

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