SMGWA Online Comment

Name: Eric Brune

Address: Scotts Valley

Comment:
First, thank you for such a great document. The plan does not seem to directly address the large number of new developments and growth in the Scotts Valley area. Will there be recommendations about curbing the number of new developments in the area? The plan seems to imply that there will be a large push for more efficient water use, but no limit on the number households / commercial developments that can be supported. Whether or not a limit or curb is required; sustainable development is a huge concern that should be directly addressed in this type of report. Thank you.

SMGWA Online Comment

Name: Frank Cheap

Organization: Private Well Owner

Address: Scotts Valley

Comment:

First of all, I appreciate the years of work, the long hours, and expense that the Santa Margarita Groundwater Basin Agency invested into this draft plan.As a member of the public, I've attended many meetings and sat through numerous presentations to understand some of the goals and science applied to the undertaking of Groundwater Management in this basin. Though private well owners (PWO) have two seats on the agency, the thrust in the draft plan appears to be dominated by the water districts with deeper aquifers and surface water that supply those districts vs the PWO drafting from the more shallow Santa Margarita Aquifer. Note, there are estimated 800 to 1100 private well owners and small water systems within this water management basin, primarily drawing upon the Santa Margarita Aquifer, little effort has been applied to proactively managing this aquifer, aside from a small number monitor wells. Convention wisdom is PWO will be very conservative with water consumption. In the same breath, the PMOs and small water agencies and little or no resources to manage at scale or recharge this Santa Margarita Aquifer, other than land conservation practices, as mentioned, and of watershed protection of their respective properties. Private well owners and small water systems are the most risk for reduction in groundwater due to climate and/or drought conditions. My request is that the groundwater agency consider language into the draft for protection of private well owners who in most cases have no alternative source of water, as stated. In addition, active plans for aquifer management, specifically conservation education efforts, monetary incentives to conserve and voluntary metering (anonymised data collection) as well as active plans to assist in recharge the aquifer above and beyond annual rainfall: options include: dormant quarries, recharge ponds and temporary inflatable dams, water injection wells, are some of the potential options. Currently, the County has a voluntary well water depth sounding program as free service to PWOs, collection of this data and publication should be a resource for current and future assessment of aquifer conditions and health. Analysis and publication of this data is a low inertia and cost effective way of both and historic view and ongoing monitoring of the Santa Maria Aquifer, Thank you for your consideration of my comments. Frank Cheap

SMGWA Online Comment

Name: Angela Franklin

Organization: Private Well Owner

Address: Scotts Valley

Comment:

Not happy to see you are still threatening to take away private wells when they are a VERY small percentage of the water usage. I can see this being miss-used considering we will be continuing a mega drought for who knows how long. It IS only a matter of time before we run out of water due to increased growth in SV and the drought situation. To take away private wells when they really are the stewards of proper water management is ridiculous in my mind. Santa Margarita Aquifer Private Pumpers Connect to Public Water System Group 3 Existing Sources Public water systems incorporate parcels or developments dependent on private wells extracting from the Santa Margarita aquifer if it was found that private pumping was impacting surface water sources, or if there was concern about shallower private wells going dry.

SMGWA Online Comment

Name: Bob Fultz

Address: Boulder Creek

Comment:
I want to thank everyone who participated in the SMGA, past and present, who served our community and who produced this Groundwater Sustainability Plan. There is a lot in the plan with which I agree. I think we must also recognize that our community has made tremendous strides in reducing per capita water usage to levels that beat the state's ultimate requirement for indoor water use by almost 20%. And early indications are that we are seeing substantial gains in reducing outdoor use as well. We should also recognize Scotts Valley Water District's significant improvements in its use of groundwater over these past decades, arresting a negative trend and placing our aquifer in a position where it was designated as moderately impacted when the Act was implemented. However, as is the case with many plans like this, the financial implications are not explored in enough depth (for example, min/max and inflation scenarios) and do not bring the reality of the financial pain our water customers will endure should any of the expensive plans be implemented. In summary, anything past the 2nd line in the Group 2, Tier 1 table is simply not financially feasible given the scale of our District. Or even all of the Districts together. Let's bring it down to numbers more understandable for everyone. The rule of thumb is that 30-year financing results in a payback of about double the principal. So if an agency borrows $10 million it will pay back about $20 million. However, should the current inflationary pressures continue for some time, the artificial suppression of interest rates will not be sustainable over the long run and so the costs of borrowing could go up even more. The SLVWD has approximately 8,000 customers. Every $10 million in capital costs translates into an increase of $7 a month in each customer's water bill—If we qualify for the loan given the debt coverage ratio required. But, for the purposes of these calculations, let's say it's covered. And every $100,000 in operating costs translates to about $1 a month in each customer's water bill. Implementing the projects in the last two lines of Table 4-3, Group 2, Tier 1 requires $76.5 in capital and $4 million in operating expenses. Assuming a 50/50 split between SLVWD and SVWD, that's about $47 per month on top of the existing SLVWD 4-unit bill of about $100 a month—and that's before the SLVWD considers any further rate increases. For perspective, the SLVWD already has approximately $30 million of historical unfunded capital obligations which ultimately have to be paid as well. Now, let's say that the taxpayers of the State or Federal governments provide grants to cover 100% of the capital costs. We're still looking at an increase of $21 a month just for operating expenses—again, at a 50/50 split. Plus, at the rate construction costs are increasing, by the time these projects are implemented, the construction costs could increase by 50% - 100%, driving the bills even higher. Are the returns we get for this worth this kind of rate increase? Because by making the decision to proceed with projects like this we are essentially saying that, within a decade or so, only high-income people will be able to afford to live in the San Lorenzo Valley since these costs will be much more than a reasonable 1.0 - 1.5% of gross median household income (in a high-cost state like California). This isn't including the higher costs of living, e.g., an unreliable power grid (and generators) or the costs of vehicle maintenance associated with the light road maintenance in the San Lorenzo Valley. Let's look at Group 2, Tier 2. Capital costs are a bit higher—about $83 million—with annual operating expenses likewise a bit higher--$5 million. Fortunately, the GSP states that these projects won't be done IF we do the projects in Group 2, Tier 1. Now that is some

choice—the unaffordable costs of Group 2, Tier 1 or the even more unaffordable costs of Group 2, Tier 2. And then we get to Group 2, Tier 3. I sincerely hope that everyone on the SMGA Board views this group, collectively, as being well beyond the reach of the scale that we have in SLVWD and SVWD combined. The capital costs outlined in Table 4-7 total just shy of $600 million with operating costs of $16 million. Applying the same formula would take us to an increase of almost $200 a month for these projects or triple the current cost of 4 units of water in the SLVWD. I'm hopeful that this table exists merely to satisfy some state requirement that we look at all options exhaustively, regardless of community feasibility. Because these options are clearly nowhere near feasible for the size of our communities. I hope the SMGA Board seriously considers modifying the report to move the unaffordable projects in Table 4-3 into Table 4-7, enabling the SLVWD and SVWD to focus on the affordable projects that will, in my opinion, deliver a much better return on investment while still meeting our groundwater sustainability goals. Doing this simple edit will result in a win-win for this multi-year process. Thank you for your attention. Bob Fultz

SMGWA Online Comment

Name: Thomas Hogye

Address: Ben Lomond

Comment:

Disgusting - Scotts Valley let's the "Chair" build apartments on land that's never required water before and now will require more than 5,000 gallons per day - first 19 condos and now 16 more? Where will all the water come from. Carbonero and Bean Creek are already dry. Some of the last "wooded" spaces in Scotts Valley. You guys should be ashamed of yourselves. Do the math - 58 gallons of water per person, per day - 19+16 = 35 condos + average 2.5 persons per condo - 5,075 gallons - average - per day. Then he gets accolades from the rest of the city officials on what a "beautiful" project it is? How many empty buildings are already in Scotts Valley taking up permeable land paved and roofed over? He'll want to tap into the San Lorenzo River Watershed next and it will be most certain death to Steelhead and Salmon. Then he'll take his money, move and retire somewhere where the grass will surely be greener while this county sits as a tinder box. You need to stop building, not build more. Already unsustainable.

Thank you for the opportunity to submit comments on the SMGWA GSP July 2021 draft report.

As an interested member of the public, I'm familiar with both the previous Santa Margarita interagency group and the present SMGA groundwater agency.

SMGWA work towards the present GSP overall has greatly contributed to refining and understanding parameters and conditions within the Basin. The GSP seems to indicate positive conditions on groundwater use, as it unifies and amplifies pre-existing monitoring done by both water districts. The emphasis in the GSP draft seems to be on stream flow monitoring and habitat.

My understanding is the State formed SMGA to ensure that water use is equitably distributed, that no user or agency takes more than their fair share, and that the common asset of water is available to all. I think a key phrase in the State Water Board mission is also the universal affordability of drinking water as an essential need.

For the above reasons I would like the GSP to better emphasize the importance of taking incremental steps towards attaining sustainability. The first is a request to state that and strike the following phrase:

~~These projects and management actions do not achieve sustainability on their own~~. Group 1 projects include:

- Water use efficiency programs
- SVWD low-impact development
- SLVWD conjunctive use
- SVWD recycled water use

I believe the GSP undervalues these four steps and their effect in favor of more expensive and risky solutions, and their dismal is unwarranted. Please consider the following:

Water use efficiency: I believe it's been shown that progress to reduce leaks in our water mains can be very effective, that greater efficiencies in residential water use are worthwhile, and further the use of recaptured or recycled water is possible.
As an example, the draft GSP report cites there is no official record of cannabis cultivation in the Basin (section 2-9 2.1.1.6) but acknowledges their presence. As big water users I believe they are of some significance and should statistically be included in agricultural use profile. Agriculture is now described as "very limited" (3-68) at 0.1% versus residential 25.9% (2.8), both numbers which will alter if adjusted and refined to include cannabis growers. The County's cannabis commission could likely help with those estimates; for instance known unpermitted commercial size growers in my area using wells have had an acknowledged affect on other well users, notably the former Lompico Water District's. It is likely the same for surface water users, as per studies done throughout California on the significant effect on stream flows. Those using metered residential water are easiest to identify, with those numbers moved to agricultural. Under an efficiency program to address all agricultural growers, a GSP could then, in steps: steer towards , assist, or require use of recycled water or rainwater catchment to provide majority of their water needs. This may greatly reduce the residential water demand.

Land Use Elements 2.1.3.1 and **Potential Water Demand** 2.1.3.2
A changing parameter in housing element is coming top-down from the State. Based on current levels this report concludes that water demand reductions from water use efficiency will be outpaced by

demand from increasing growth. As a direct relation, it seems key to address this as an agency. I believe SGMA collaborators and agencies should be pursuing legislative action to reduce housing growth mandates driving the current explosive trend in both Scotts Valley and City of Santa Cruz, as it impacts all users of our aquifer. This is particular to Santa Cruz County as is regularly stated in the news as having limited water resources and no access to State projects.

The GSP notes that the State general plan was revised 2017 and that the issue of water supply within the housing element will be in their next, intended to trigger their SGMA mandate to consider impacts of development on groundwater supply. The GSP report states both Scotts Valley and County of Santa Cruz are in the process of updating their general plans, but have not yet adopted consideration of water availability. It therefore seems premature to consider any actions or studies beyond Group one actions, and I would like the GSP to include such observation.

Actions beyond Group 1 eliminated, or noted and frozen

The GSP draft report shows largely stabilized groundwater elevations starting in the 2000's (2.111) (2.118), with Quail Hollow and Olympia subareas have remained consistent (2.120) and did not show change in the 1980s-1990s severe drought. The report cites no clear association to groundwater extractions and reductions in fish have been made (Executive Summary). I'd therefore like to see SMGWA committed to successful implementation of Group one actions as fulfilling both its mission and that of the State to provide a clean, affordable and sustainable drinking water supply.

In particular, I am opposed to inclusion or any language supporting Aquifer Storage and Recovery (ASRs) as in Group 2 tier 2, injection wells, and Group 2 tier 3 wastewater recharge. The GSP notes that the injection well is to be implemented next year and ASR studies to currently continue. I would like both comments struck from the report and SMGWA instead commit to Group one actions only.
Altering water chemistry in our aquifers is a high risk, as has been documented in studies, and ASRs elsewhere in our State have been reported as causing nearby wells to become contaminated or fail. I am familiar with studies done for an EIR here in California on both injection wells and ASRs, with the benefits of both given by engineers as uncertain, and risk assessments that include catastrophic, with damages non-recoverable. I do not believe the draft GSP study results support any those actions nor warrant their risk. I would favor the Group 3 water use restriction as being moved in the draft GSP report to a lower tier, and injection wells or ASRs eliminated, or noted and frozen.

Thank you

Debra Loewen
Lompico Canyon

SMGWA Online Comment

Name: Bret McLeod

Address: Scotts Valley

Comment:

I would like to know what steps are being taken and what steps will be taken to care for the Santa Margarita Watershed no and in the future. I would also like to have these actions/plans detailed in the upcoming management plan for the water board.

SMGWA Online Comment

Name: Amanda McLeod

Organization: Private citizen

Address: Scotts Valley

Comment:

Thank you for your work on this project! I hereby request that sustainability plan plan to be amended to cover sustainability of the Santa Margarita aquifer and, specifically, plans around recharge. I appreciate the language that was added to underscore that consistent with current law, taxation of private well owners is unlawful.

SMGWA Online Comment

Name: Phil McReynolds

Address: Scotts Valley

Comment:

I would like to have a plan for the Santa Margarita Aquifer. Most of all a recharge plan.

SMGWA Online Comment

Name: J. Pablo Ortiz-Partida

Comment:

Subject: Comments on Draft Groundwater Sustainability Plan for Santa Margarita Basin

Hello, I am writing on behalf of Audubon California, Clean Water Action, Clean Water Fund, Local Government Commission, The Nature Conservancy, and Union of Concerned Scientists with the attached comments on the draft Groundwater Sustainability Plan for this basin. We know that SGMA plan development and implementation is a major undertaking, and we want every basin to be successful. We would be happy to meet with you to discuss our evaluation as you finalize your Plan for submittal to DWR. Feel free to contact us at ngos.sgma@gmail.com for more information or to schedule a conversation. Sincerely, J. Pablo Ortiz-Partida, Ph.D. Western States Climate and Water Scientist Union of Concerned Scientists

September 20, 2021

Santa Margarita Groundwater Agency

Submitted via web: https://www.smgwa.org/publicfeedbackform

Re: Public Comment Letter for the Santa Margarita Groundwater Basin Draft GSP

Dear Sierra Ryan,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Santa Margarita 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 **needs additional plans** 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 Santa Margarita 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 Santa Margarita 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, Drinking Water Users, and Tribes
The identification of Disadvantaged Communities (DACs), drinking water users, and tribes is **insufficient**. We note the following deficiencies with the identification of these key beneficial users.

- The GSP states that there are two DAC census block groups, both of which are partially located within the basin (Figure 2-9). Within the basin, the DACs include part of the Census Designated Places of Boulder Creek, Brookdale, and Ben Lomond. The GSP, however, does not describe the size of the population in each DAC.

- The GSP shows the estimated location of private residential groundwater use (Figure 2-31), but provides no information on depth of these domestic wells. The GSP provides a well density map showing the number of all water supply wells, including municipal, small water systems, private domestic, and industrial (Figure 2-32), but all water supply wells are grouped together in this single figure.

- Figure 2-9 maps locations of small water systems and private domestic wells. However, specifics are not given about how much each community relies on a particular water supply (e.g., what percentage is supplied by groundwater).

- The GSP states: “The [Amah Mutsun] Tribal Band is petitioning the federal government for tribal recognition and has formed the Amah Mutsun Land Trust to access, protect, and steward lands important to the tribe.” The location of these lands, however, is not provided.

These missing elements are required for the GSA to fully understand the specific interests and water demands of these beneficial users, to support the development of water budgets using the best available information, and to support the development of sustainable management criteria and projects and management actions (PMAs) that are protective of these users.

RECOMMENDATIONS
• Include a map showing domestic well locations and average well depth across the basin. • Include a well density map for domestic wells only, not all water supply wells. • Provide the population of each identified DAC block group and include details on the population dependent on groundwater for their domestic water use. • Describe tribal interests in the basin, including lands with historical importance to the tribe.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **incomplete**, due to the lack of a complete description of data gaps for ISWs.

We commend the GSA for the thorough, comprehensive evaluation of ISWs in the basin presented in the GSP. Figure 2-72 presents the spatial and temporal distribution of interconnected surface water. To analyze ISWs in the basin, the GSP uses accretion studies and comparisons between stream bed elevations and 30 years of proximal monitoring wells data (Figures 3-8 and 3-9). Findings from these studies and observations are combined with model-simulated groundwater elevations to produce the ISW map presented in Figure 2-72.

The following recommendations would strengthen the clarity and completeness of the ISW evaluation.

RECOMMENDATIONS
• While the GSP identifies data gaps and their locations in GSP Section 2.2.4.11 (Hydrogeologic Conceptual Model Data Gaps), please also describe the data gaps in the ISW section. • On the ISW map (Figure 2-72), clearly label the areas with data gaps. We recommend that the GSP considers any segments with data gaps as *potential* ISWs and clearly marks them as such on the ISW map.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**, due to a lack of comprehensive, systematic analysis of the basin's GDEs.

The GSP states (p. 2-98) that the Natural Communities Commonly Associated with Groundwater dataset (NC dataset) was used as a starting point, and "[i]n addition, several known springs, seeps, or other groundwater-dependent wetlands were identified as likely GDEs." We commend the GSA for starting with the NC dataset and using additional sources to identify GDEs in the basin.

Further description in the GSP, however, of the GDE analysis process is very sparse. The GSP states (p. 2-98): "The GDE analysis in this GSP includes assessment of the extent of GDE indicator vegetation, groundwater elevations in shallow aquifers, and impacts of seasonal surface water and groundwater interaction or accretion. Where groundwater level data are unavailable, the groundwater model is used to identify where surface water and groundwater are likely connected." This statement is the only description of how the GDEs were identified. The GSP does not discuss how the NC dataset was verified with the use of groundwater data from the shallow aquifer or model output (e.g., which locations were verified with each method). Without an analysis of groundwater data to verify the NC dataset polygons, it will be difficult or impossible to adequately monitor and manage the basin's GDEs throughout GSP implementation.

RECOMMENDATIONS

- Develop and describe a systematic approach for analyzing the basin's GDEs. For example, provide a map of the NC Dataset. On the map, label polygons retained, removed, or added to/from the NC dataset (include the removal reason if polygons are not considered potential GDEs, or include the data source if polygons are added). Discuss how local groundwater data was used to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. 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.

- 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.

- 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.

- 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.

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 native vegetation into the water budget is **insufficient**. The water budget did not explicitly include the current, historical, and projected demands of native vegetation. The omission of explicit water demands for native vegetation 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. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin.

RECOMMENDATIONS

- 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. If native vegetation is included as one of the land use types in the numerical model, specifically state this in the GSP and provide a separate line item in water budget tables.
- State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders[3] is not fully met by the description in the Stakeholder Communication and Engagement Plan included in the GSP (Appendix 2A).

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 maintenance of the SMGWA website; continued social media presence through Facebook and Instagram; email newsletter; youth engagement efforts; promoting and conducting community meetings, workshops and events; coordination with member agencies to share information; and developing print materials.
- Private domestic pumpers, small water systems, and the Amah Mutsun Tribal Band are listed as private users. Disadvantaged communities, environmental justice groups, and human service nonprofits are listed under the human right to water category (p. 8 in the Stakeholder Communication and Engagement Plan). However very little information is

[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]
[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)]

provided other than stating that their participation is invited in the GSP development process.

- The Stakeholder Outreach Plan does not include enough detail describing plans for continual opportunities for engagement through the *implementation* phase of the GSP for stakeholders.

RECOMMENDATIONS

- Include a more detailed and robust Stakeholder Communication and Engagement Plan that describes active and targeted outreach to engage DACs, 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 during all phases of the GSP process.

- Describe efforts to consult and engage with tribes within the basin. Refer to the DWR guidance entitled *Engagement with Tribal Governments* for specifics on how to consult with tribes.[4]

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[5] and establishing minimum thresholds.[6,7]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, while the GSP does describe or analyze direct or indirect impacts on domestic drinking water wells when defining undesirable results (p. 3-54), the GSP does not sufficiently describe how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results in the basin.

For degraded water quality, the GSP sets SMC for all identified Contaminants of Concern (COCs) in the basin. Water quality minimum thresholds are based on the Maximum Contaminant levels (MCLs). The GSP does not, however, specifically analyze direct and indirect impacts on DACs or

[4] DWR Guidance Document for Engagement with Tribal Governments https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Doc-for-SGM-Engagement-with-Tribal-Govt_ay_19.pdf

[5] “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)]

[6] “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)]

[7] “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)]

tribes when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs or tribes. The GSP may group DACS under rural residents. The GSP states: "When developing the GSP, the SMGWA considered impacts on all beneficial uses and users, including domestic well owners, Disadvantaged Communities (DACs), and priority species." We recommend that undesirable results specifically describe direct and indirect impacts to DACs and tribes.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on DACs and tribes when defining undesirable results for chronic lowering of groundwater levels, in addition to describing impacts to drinking water users.
- Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on DACs, drinking water users, and tribes within the basin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be de-watered at the minimum threshold.

Degraded Water Quality

- Describe direct and indirect impacts on DACs and tribes when defining undesirable results for degraded water quality. For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[8]
- Evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs and tribes.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

The GSP sets minimum thresholds for chronic lowering of groundwater levels to the average of the five lowest historical minimum elevations, and states that "[b]ecause historical levels have not appeared to cause significant and unreasonable conditions in the past, these levels should continue to support similar beneficial use in the future." As a proxy for the depletion of interconnected surface water SMC, two monitoring wells from the existing monitoring network adjacent to creeks and screened in the aquifer connected to the creek will be used as RMPs for the depletion of interconnected surface water. Consistent with the approach used for chronic lowering of groundwater level minimum threshold, historical data from the two existing surface water depletion RMPs are used to develop surface water depletion minimum thresholds.

The GSP makes the following statement under effects of minimum thresholds on beneficial users for ecological land uses and users (p. 3-61): "Maintaining groundwater elevations at or above historical levels will maintain the very connected nature of groundwater and surface water in the Basin. This will protect GDE habitat used by priority species, and generally benefit ecological land uses and users." However, the true impacts to ecosystems under this scenario are not fully

[8] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

discussed in the GSP. In fact, the GSP states (p. 2-47): "Impacts to GDEs within the Basin have yet to be identified. The groundwater model shows a Basin-wide reduction in streamflow from pumping, but without GDE monitoring data, a quantifiable correlation has yet to be established."

If minimum thresholds are set to historic low groundwater levels and the basin is allowed to operate at 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 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.

RECOMMENDATIONS

- When defining undesirable results for chronic lowering of groundwater levels, 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[9] in the basin. Defining undesirable results is the crucial first step before the minimum thresholds[10] 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[11]. 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[6,12].

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[13] require integration of climate

[9] "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)]
[10] 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)]
[11] "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)]
[12] 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
[13] "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,

change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.

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 transient climate projection based on an ensemble of four commonly used global climate models. However, the GSP did not consider multiple climate scenarios (e.g., the 2070 extremely wet and 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.

We acknowledge and commend the inclusion of climate change into key inputs (e.g., precipitation, evaporation, and surface water flow) of the projected water budget. Additionally, the sustainable yield is calculated based on the projected pumping with climate change incorporated. However, if the water budgets are incomplete, including the omission of extremely wet and dry scenarios, 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, DACs, and domestic well owners.

RECOMMENDATIONS

- Integrate extreme wet and dry scenarios into the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of clarity around the Representative Monitoring Points (RMPs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around DACs, domestic wells, and GDEs.

The GSP states that areas with data gaps in the shallow aquifer include communities where there are a large number of private domestic wells pumping from either the Santa Margarita Sandstone or Monterey Formation, and areas where shallow groundwater is connected to surface water and groundwater pumping may be causing depletion of surface water. Figure 3-6 shows the locations of eight new monitoring wells to be installed in 2022. However, these wells are not shown on Figure 3-7 (Representative Monitoring Points for Groundwater Levels) or on Figure 3-13 (Representative Monitoring Points for Groundwater Quality). It is therefore difficult to determine if existing or proposed monitoring sites adequately represent shallow groundwater conditions in areas of the basin with DACs, domestic wells, and GDEs.

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land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow.” [23 CCR §354.18(e)]

We commend the GSA for including GDE-related biological monitoring in the monitoring network. The GSP states that this will include use of the Nature Conservancy's GDE Pulse tool, and field assessments that will take place twice a year to include photo monitoring and site observations of GDEs.

RECOMMENDATIONS

- Provide a complete set of maps that overlay monitoring well locations (both existing RMPs and new RMPs) with the locations of DACs, domestic wells, and GDEs to clearly identify potentially impacted areas. Ensure that existing and proposed RMPs adequately cover DAC, domestic well, and GDE portions of the basin.
- Evaluate how the gathered data will be used to identify and map GDEs and ISWs, and to identify DACs and shallow domestic well users that are vulnerable to undesirable results.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to failing to completely identify benefits or impacts of identified projects and management actions to key beneficial users.

The GSP incorporates project and management actions into projected water budgets and sustainable yield. Additionally, the GSP acknowledges that SMGWA-approved projects and management activities might impact beneficial users of groundwater and lists the ways in which some beneficial users could be impacted, depending on the approved project. However, there is very little discussion of the manner in which DACs and tribes may be benefitted or impacted from identified projects and management actions. Therefore, potential project and management actions may not protect these beneficial users.

Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for all beneficial users. GDEs, DACs, and tribes were not sufficiently identified in the GSP. Therefore, potential project and management actions may not protect these beneficial users of groundwater. The following recommendations can improve the projects and management actions section of the GSP.

RECOMMENDATIONS

- 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"[14].

- For DACs and 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 DACs and 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. Impacts to supply wells are discussed, but not to DACs and domestic well owners.

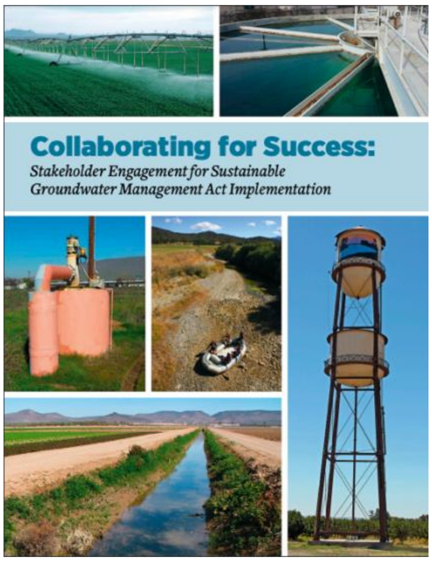
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[14] 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/

Attachment B

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

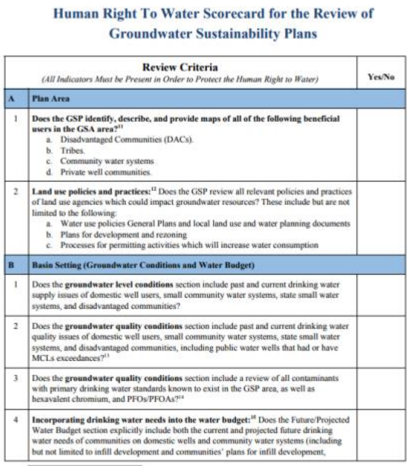
Stakeholder Engagement and Outreach



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

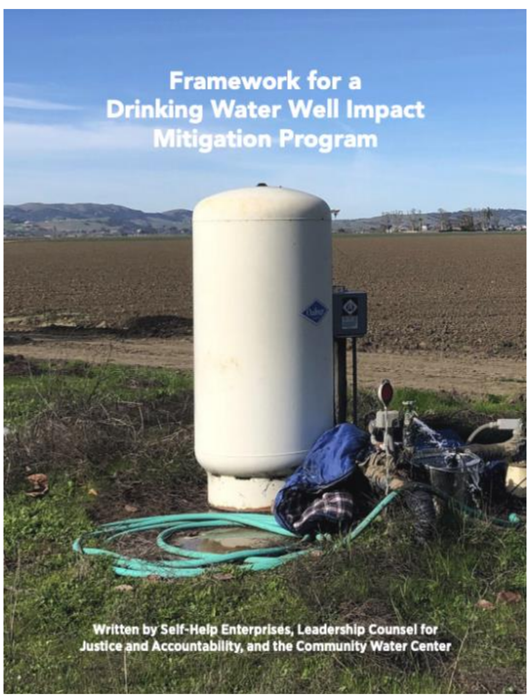


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	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?**[11] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems d. Private well communities.	
2	**Land use policies and practices:**[12] 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?[13]	
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?[14]	
4	**Incorporating drinking water needs into the water budget:**[15] 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,	

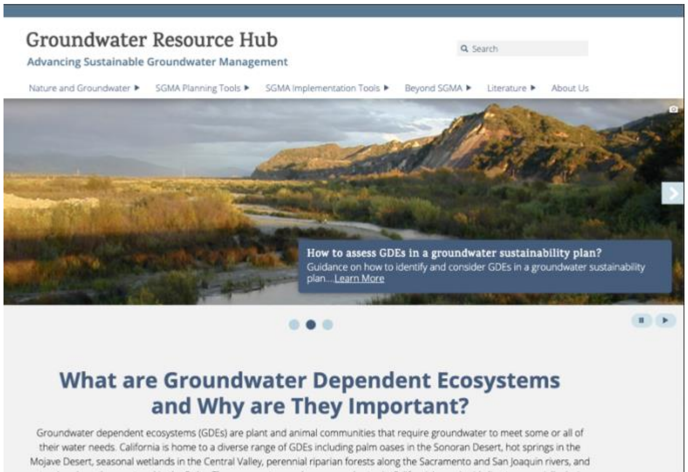
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in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

Drinking Water Well Impact Mitigation Framework



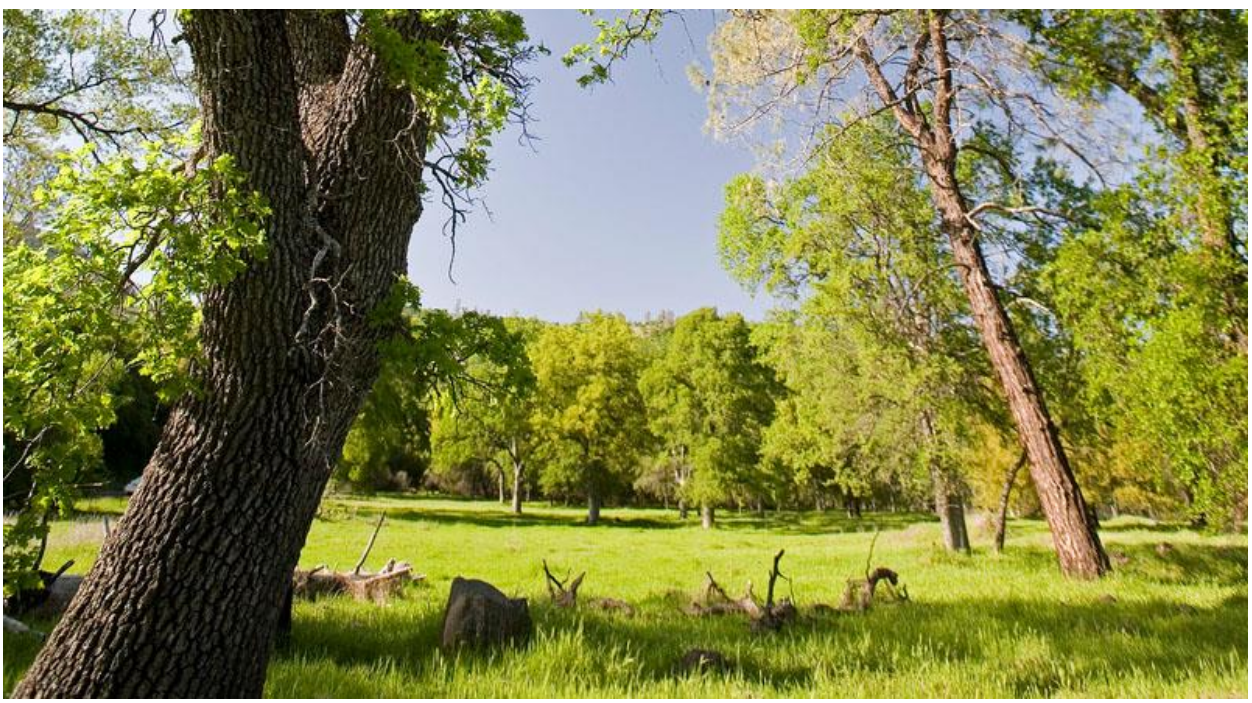
The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure 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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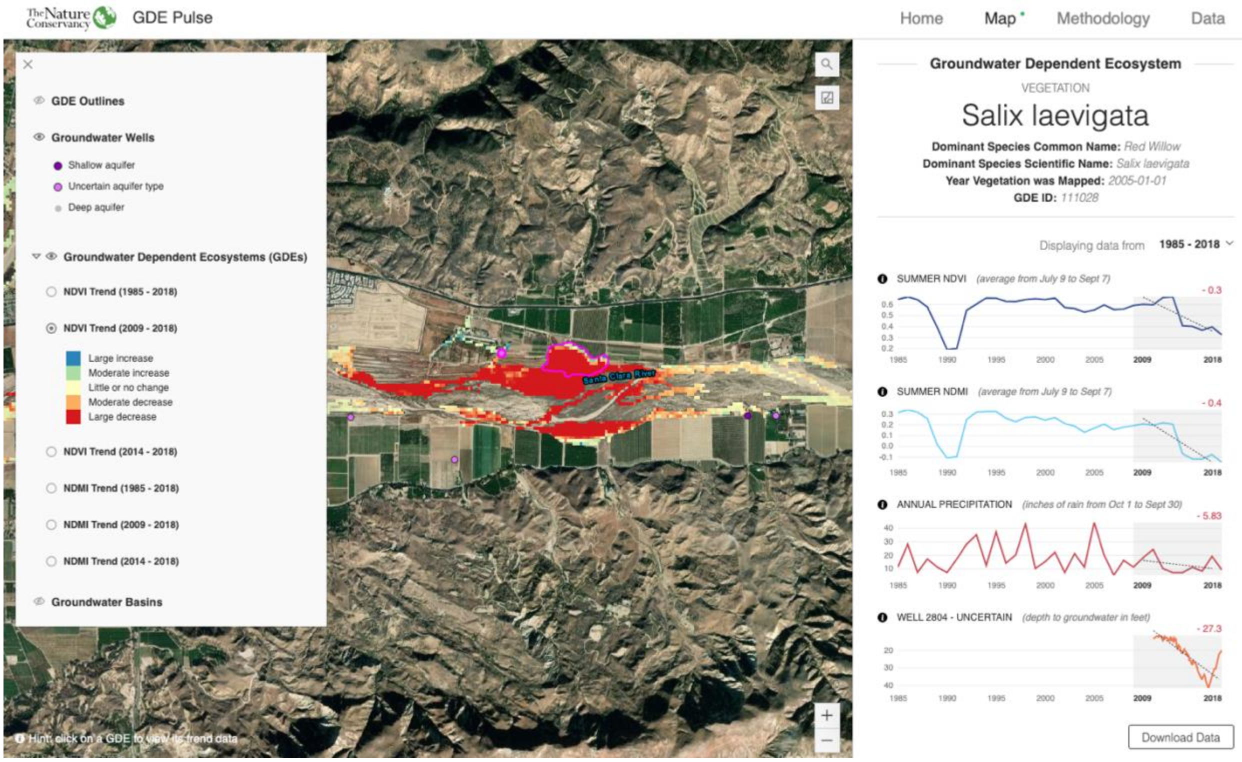
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

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.

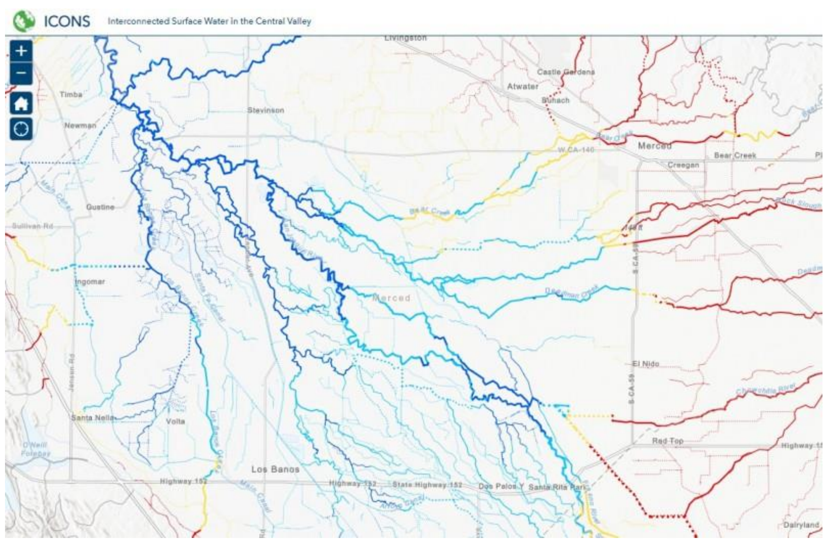
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water 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 Santa Margarita Subbasin

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 Santa Margarita Subbasin. 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				
Actitis macularius	Spotted Sandpiper			
Aechmophorus clarkii	Clark's Grebe			
Aechmophorus occidentalis	Western Grebe			
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			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya collaris	Ring-necked Duck			
Aythya marila	Greater Scaup			
Aythya valisineria	Canvasback		Special	
Botaurus lentiginosus	American Bittern			
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			

[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

Butorides virescens	Green Heron			
Calidris minutilla	Least Sandpiper			
Chen rossii	Ross's Goose			
Cinclus mexicanus	American Dipper			
Cistothorus palustris palustris	Marsh Wren			
Cypseloides niger	Black Swift	Bird of Conservation Concern	Special Concern	BSSC - Third priority
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Phalacrocorax auritus	Double-crested Cormorant			
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Rallus limicola	Virginia Rail			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa solitaria	Solitary Sandpiper			
CRUSTACEANS				
Gammarus spp.	Gammarus spp.			
FISH				
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
Oncorhynchus mykiss - CCC winter	Central California coast winter steelhead	Threatened	Special	Vulnerable - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Ambystoma californiense californiense	California Tiger Salamander	Threatened	Threatened	ARSSC

Anaxyrus boreas boreas	Boreal Toad			
Dicamptodon ensatus	California Giant Salamander			ARSSC
Rana boylii	Foothill Yellow-legged Frog	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Taricha granulosa	Rough-skinned Newt			
Taricha torosa	Coast Range Newt		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
Pseudacris regilla	Northern Pacific Chorus Frog			
Pseudacris sierra	Sierran Treefrog			
Thamnophis atratus atratus	Santa Cruz Gartersnake			Not on any status lists
Thamnophis elegans elegans	Mountain Gartersnake			Not on any status lists
Thamnophis elegans terrestris	Coast Gartersnake			Not on any status lists
INSECTS & OTHER INVERTS				
Aeshnidae fam.	Aeshnidae fam.			
Agabus spp.	Agabus spp.			
Agapetus spp.	Agapetus spp.			
Amiocentrus aspilus	A Caddisfly			
Antocha monticola				Not on any status lists
Antocha spp.	Antocha spp.			
Argia spp.	Argia spp.			
Argia vivida	Vivid Dancer			
Baetis spp.	Baetis spp.			
Baetis tricaudatus	A Mayfly			
Brachycentridae fam.	Brachycentridae fam.			
Brillia spp.	Brillia spp.			
Calineuria californica	Western Stone			
Callibaetis spp.	Callibaetis spp.			
Centroptilum spp.	Centroptilum spp.			
Cheumatopsyche spp.	Cheumatopsyche spp.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Chloroperlidae fam.	Chloroperlidae fam.			
Cinygmula spp.	Cinygmula spp.			
Cladotanytarsus spp.	Cladotanytarsus spp.			
Cleptelmis addenda				Not on any status lists

Conchapelopia spp.	Conchapelopia spp.			
Cordulegaster dorsalis	Pacific Spiketail			
Corixidae fam.	Corixidae fam.			
Cricotopus spp.	Cricotopus spp.			
Cryptochironomus spp.	Cryptochironomus spp.			
Dicrotendipes spp.	Dicrotendipes spp.			
Diphetor hageni	Hagen's Small Minnow Mayfly			
Drunella coloradensis	A Mayfly			
Drunella flavilinea	A Mayfly			
Drunella spp.	Drunella spp.			
Enallagma basidens	Double-striped Bluet			
Enallagma cyathigerum				Not on any status lists
Enallagma praevarum	Arroyo Bluet			
Epeorus spp.	Epeorus spp.			
Ephemerella maculata	A Mayfly			
Ephemerella spp.	Ephemerella spp.			
Ephemerellidae fam.	Ephemerellidae fam.			
Eubrianax edwardsii				Not on any status lists
Eukiefferiella spp.	Eukiefferiella spp.			
Glossosoma spp.	Glossosoma spp.			
Glossosomatidae fam.	Glossosomatidae fam.			
Gyrinus spp.	Gyrinus spp.			
Heptageniidae fam.	Heptageniidae fam.			
Hesperoperla spp.	Hesperoperla spp.			
Heterotrissocladius spp.	Heterotrissocladius spp.			
Holorusia hespera				Not on any status lists
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila spp.	Hydroptila spp.			
Ischnura cervula	Pacific Forktail			
Ischnura perparva	Western Forktail			
Isoperla spp.	Isoperla spp.			
Kogotus nonus	Smooth Springfly			
Lepidostoma spp.	Lepidostoma spp.			
Leucotrichia pictipes	A Micro Caddisfly			
Libellula pulchella	Twelve-spotted Skimmer			
Libellula saturata	Flame Skimmer			
Limnephilus frijole	A Caddisfly			

Malenka spp.	Malenka spp.			
Maruina lanceolata				Not on any status lists
Matriella teresa	A Mayfly			
Micropsectra spp.	Micropsectra spp.			
Microtendipes spp.	Microtendipes spp.			
Mideopsis spp.	Mideopsis spp.			
Nanocladius spp.	Nanocladius spp.			
Narpus spp.	Narpus spp.			
Nemouridae fam.	Nemouridae fam.			
Neophylax rickeri	A Caddisfly			
Neophylax spp.	Neophylax spp.			
Neotrichia spp.	Neotrichia spp.			
Octogomphus specularis	Grappletail			
Optioservus quadrimaculatus				Not on any status lists
Optioservus spp.	Optioservus spp.			
Oreodytes spp.	Oreodytes spp.			
Pachydiplax longipennis	Blue Dasher			
Paltothemis lineatipes	Red Rock Skimmer			
Pantala hymenaea	Spot-winged Glider			
Paracladopelma spp.	Paracladopelma spp.			
Parakiefferiella spp.	Parakiefferiella spp.			
Paraleptophlebia spp.	Paraleptophlebia spp.			
Parametriocnemus spp.	Parametriocnemus spp.			
Paraphaenocladius spp.	Paraphaenocladius spp.			
Parapsyche almota	A Caddisfly			
Parapsyche spp.	Parapsyche spp.			
Paratanytarsus spp.	Paratanytarsus spp.			
Paratendipes spp.	Paratendipes spp.			
Perlidae fam.	Perlidae fam.			
Perlodidae fam.	Perlodidae fam.			
Petrophila spp.	Petrophila spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Plathemis lydia	Common Whitetail			
Plumiperla spp.	Plumiperla spp.			
Polycentropus spp.	Polycentropus spp.			
Polypedilum aviceps				Not on any status lists
Polypedilum scalaenum				Not on any status lists
Polypedilum spp.	Polypedilum spp.			
Polypedilum tritum				Not on any status lists

Protanyderus spp.	Protanyderus spp.			
Pseudochironomus spp.	Pseudochironomus spp.			
Rheotanytarsus spp.	Rheotanytarsus spp.			
Rhionaeschna multicolor	Blue-eyed Darner			
Rhyacophila spp.	Rhyacophila spp.			
Robackia spp.	Robackia spp.			
Serratella micheneri	A Mayfly			
Serratella spp.	Serratella spp.			
Sialis spp.	Sialis spp.			
Sigara mckinstryi	A Water Boatman			Not on any status lists
Sigara spp.	Sigara spp.			
Simuliidae fam.	Simuliidae fam.			
Simulium spp.	Simulium spp.			
Siphlonurus spp.	Siphlonurus spp.			
Skwala spp.	Skwala spp.			
Sperchon spp.	Sperchon spp.			
Sublettea spp.	Sublettea spp.			
Suwallia spp.	Suwallia spp.			
Sweltsa spp.	Sweltsa spp.			
Sympetrum corruptum	Variegated Meadowhawk			
Sympetrum illotum	Cardinal Meadowhawk			
Tanypus spp.	Tanypus spp.			
Tanytarsus spp.	Tanytarsus spp.			
Telebasis salva	Desert Firetail			
Thienemannimyia spp.	Thienemannimyia spp.			
Timpanoga hecuba	A Mayfly			
Tricorythodes spp.	Tricorythodes spp.			
Tvetenia spp.	Tvetenia spp.			
Wormaldia spp.	Wormaldia spp.			
Zaitzevia spp.	Zaitzevia spp.			
Zoniagrion exclamationis	Exclamation Damsel			
MOLLUSKS				
Anodonta californiensis	California Floater		Special	
Ferrissia spp.	Ferrissia spp.			
Gyraulus spp.	Gyraulus spp.			
Hydrobiidae fam.	Hydrobiidae fam.			
Menetus opercularis	Button Sprite			CS
Physa spp.	Physa spp.			
Pisidium spp.	Pisidium spp.			
Pyrgulopsis spp.	Pyrgulopsis spp.			
Sphaeriidae fam.	Sphaeriidae fam.			
PLANTS				

Alopecurus saccatus	Pacific Foxtail			
Ammannia coccinea	Scarlet Ammannia			
Beckmannia syzigachne	American Sloughgrass			
Callitriche marginata	Winged Water-starwort			
Campanula californica	Swamp Harebell		Special	CRPR - 1B.2
Carex densa	Dense Sedge			
Cirsium douglasii douglasii	Douglas' Thistle			
Cyperus erythrorhizos	Red-root Flatsedge			
Eleocharis macrostachya	Creeping Spikerush			
Eleocharis rostellata	Beaked Spikerush			
Galium trifidum	Small Bedstraw			
Hydrocotyle ranunculoides	Floating Marsh-pennywort			
Hydrocotyle verticillata verticillata	Whorled Marsh-pennywort			
Juncus falcatus falcatus	Sickle-leaf Rush			
Juncus phaeocephalus phaeocephalus	Brown-head Rush			
Lilium pardalinum pardalinum	Leopard Lily			
Ludwigia palustris	Marsh Seedbox			
Lupinus polyphyllus polyphyllus	Bigleaf Lupine			
Lysichiton americanus	Yellow Skunk-cabbage			
Mimulus cardinalis	Scarlet Monkeyflower			
Mimulus guttatus	Common Large Monkeyflower			
Panicum dichotomiflorum	NA			
Phacelia distans	NA			
Plagiobothrys chorisianus	NA		Special	CRPR - 1B.2
Platanus racemosa	California Sycamore			
Psilocarphus tenellus	NA			
Rhododendron columbianum				Not on any status lists
Rhododendron occidentale occidentale	Western Azalea			
Salix lasiandra lasiandra				Not on any status lists
Salix sitchensis	Sitka Willow			

Sequoia sempervirens				
Solidago elongata				Not on any status lists
Spiranthes romanzoffiana	Hooded Ladies'-tresses			
Triglochin scilloides	NA			Not on any status lists
Veronica americana	American Speedwell			

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.

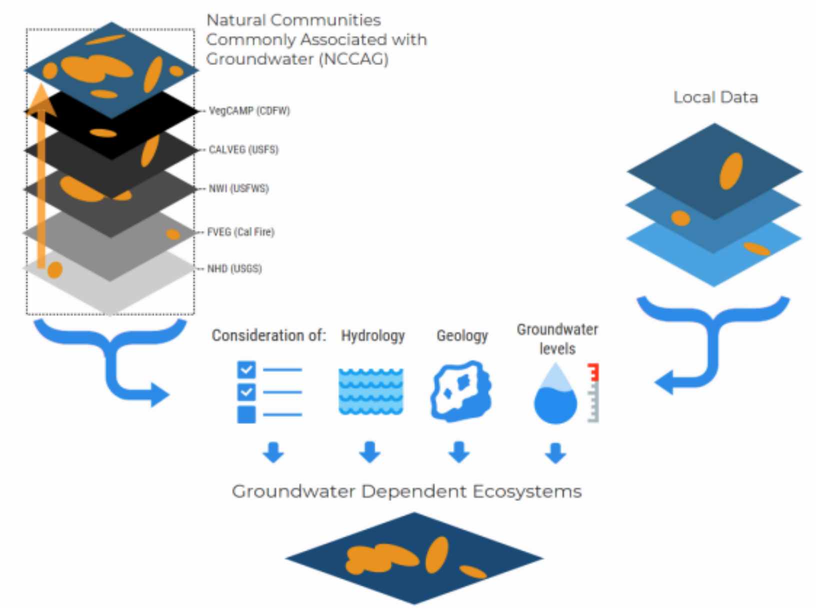


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[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*.

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[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

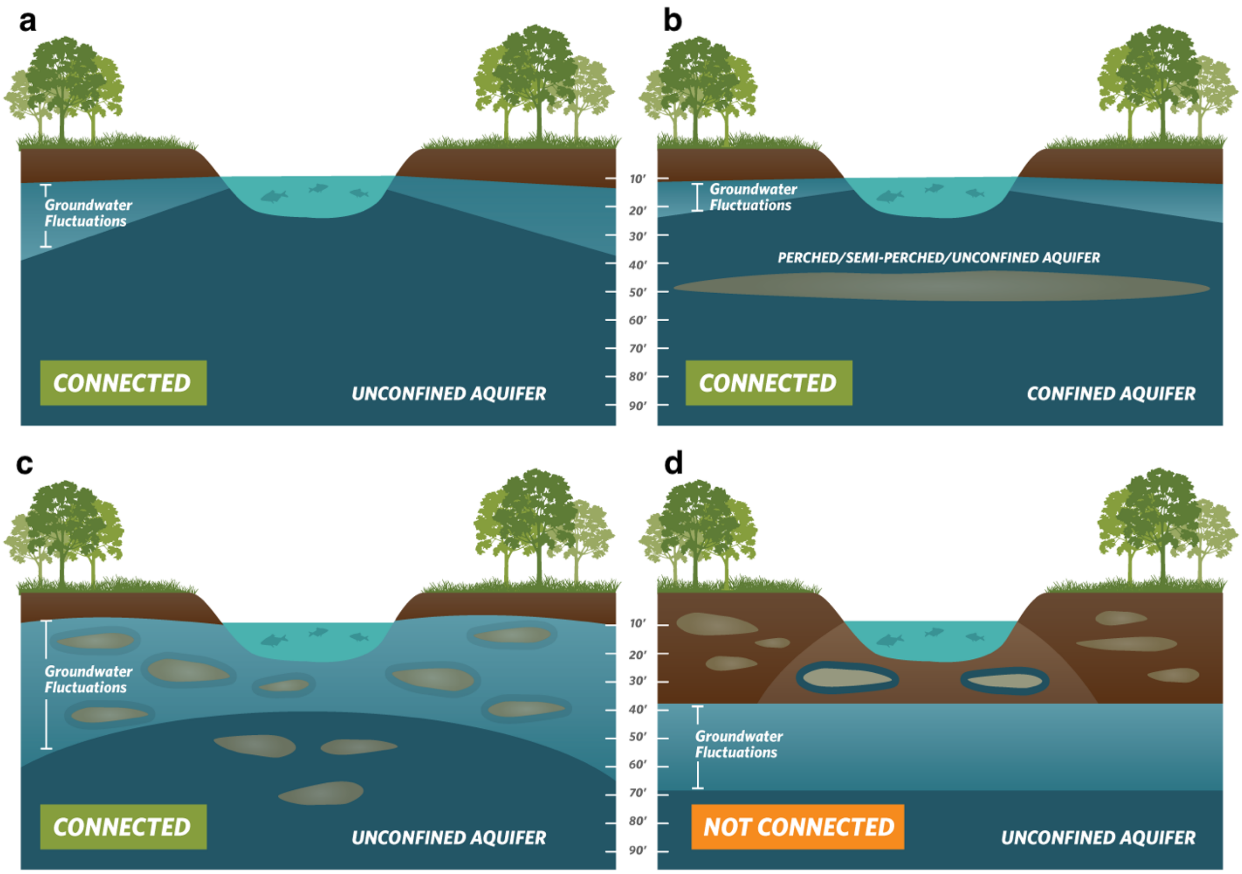

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying 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 <u>until</u> data gaps are reconciled in the monitoring network (see Best Practice #6).

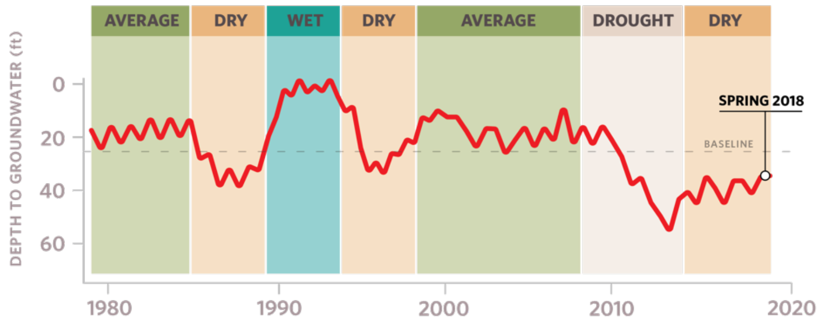

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so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

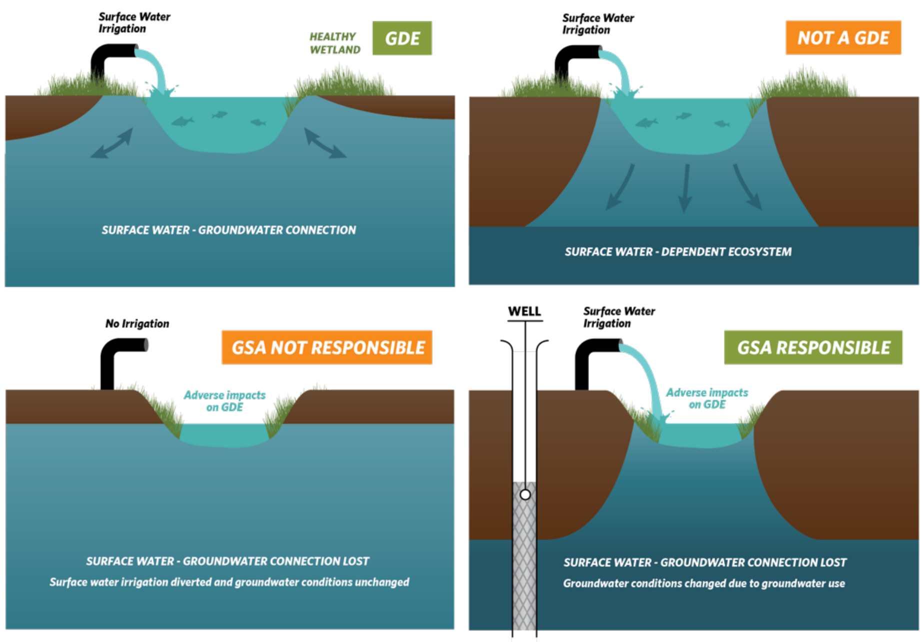

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent.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

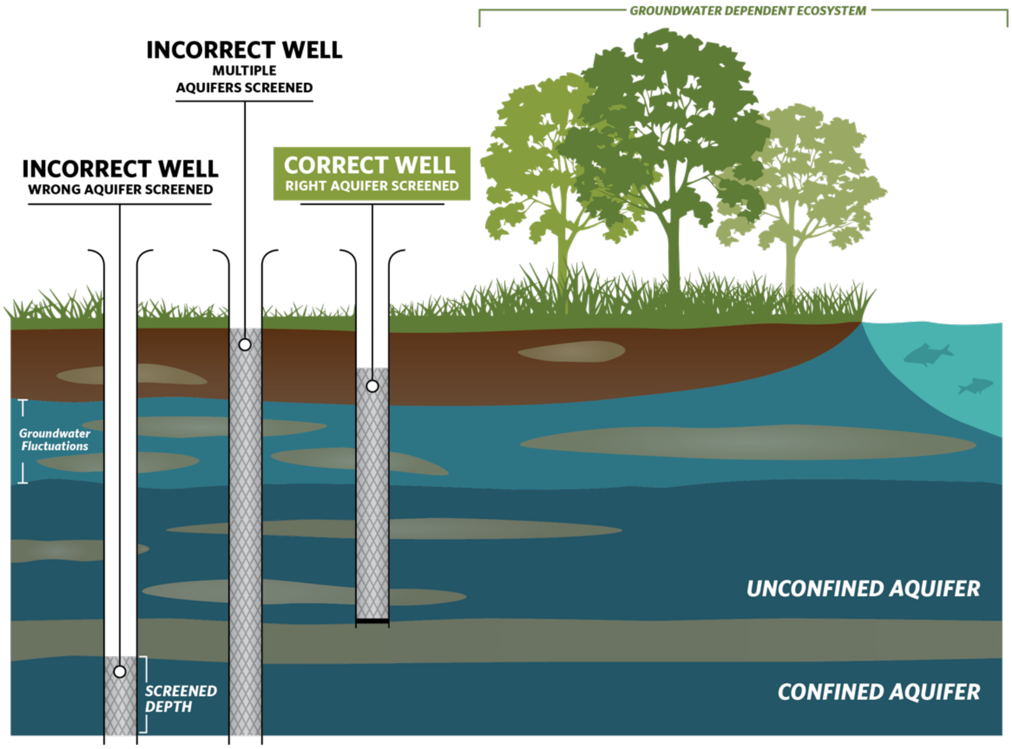

Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

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.

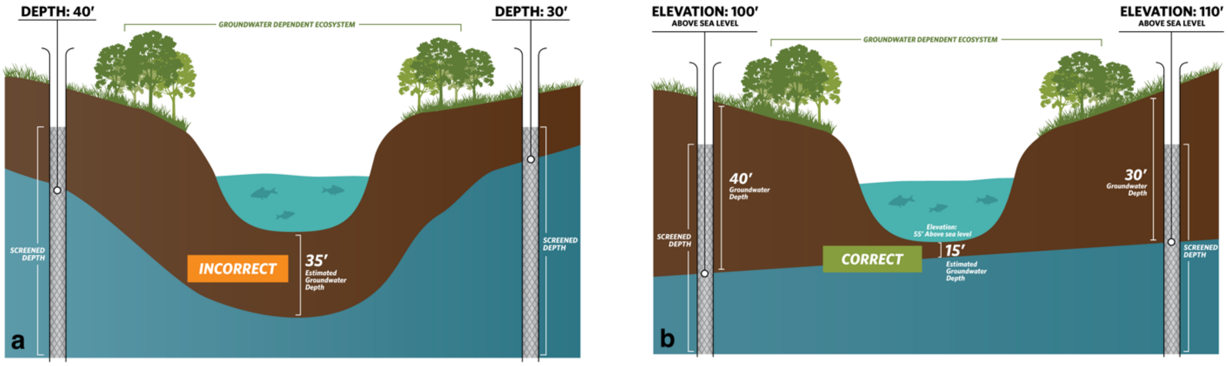

Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

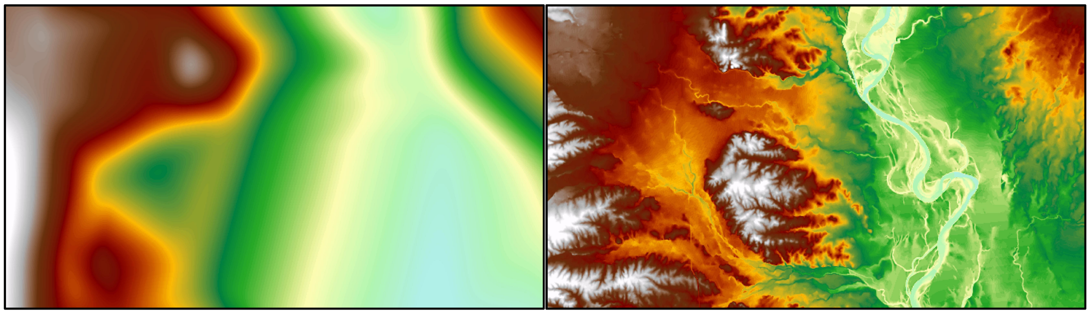

Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation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

SMGWA Online Comment

Name: John Ricker

Address: Soquel

Comment:
The Santa Margarita GSP is a well written and thorough document that makes good use of available data and recognizes additional data needs. Implementation of the GSP should be expected to ensure long term sustainability. I have specific comments attached.

Santa Margarita GSP Comments – John Ricker

The Santa Margarita GSP is a well written and thorough document that makes good use of available data and recognizes additional data needs. Implementation of the GSP should be expected to ensure long term sustainability. I have the following comments:

p. ES-3. Period of rapid growth in basin began in 1970-1980, particularly in unincorporated areas, see Fig 2-34

p. ES-5. The County's LAMP for septic systems is correctly titled the Local Area Management Program (not Plan)

p. ES-8 states: "Groundwater levels in both aquifers started to decline as early as the 1970s…", while ES-9 states: "Lowered groundwater levels in certain parts of the Basin have caused a corresponding reduction in groundwater stored in the Basin. Since the 1980s, and even possibly starting in the 1960s,..." These should be reworded for consistency. Maybe best to say: "Since the 1970s and possibly even starting in the 1960s"

p. ES-10 Typo at end of last paragraph: "…losses from the adjacent Mount Hermon / South Scotts Valley area ~~implementation~~."

p. ES-13: Are SLVWD's surface water sources for conjunctive use considered to be within the Basin? That is a bit of a stretch. Maybe better to say within the basin watershed. In that case, the San Lorenzo River would also be considered an in-basin source.

p. 2-107: Last paragraph: Suggest adding a sentence about the City's Tait Street Diversion on the San Lorenzo River derives a significant amount of its flow from the Basin. This is consistent with including it in Table 2-17, which I appreciate.

p.3-72-73: The discussion of groundwater quality should be more explicit on one point, specifically related to nitrate. Recharge with treated wastewater has the potential to increase nitrate levels in groundwater, resulting in an increase in nitrate in surface water. This can cause biostimulation in the aquatic ecosystem, depressing dissolved oxygen levels and adversely impacting aquatic biota, and it can result in increased production of organic compounds that can cause taste and odor problems and disinfection byproducts adversely affecting municipal water supply and costs for surface water treatment.

5 mg-N/L may still be too high as a minimum threshold for nitrate to prevent undesirable results in surface water. If extensive areas of the Basin were allowed to reach a nitrate concentration of 5 mg-N/L, it is very likely the target of 0.33 mg-N/L would be significantly exceeded in the San Lorenzo River. Ongoing monitoring should include monitoring for nitrate in the River as well as groundwater, with consideration to reducing the minimum threshold in the future as needed. Achieving the nitrate TMDL target for the River will require reducing current nitrate inputs to the Basin, which will result in lower nitrate concentrations in groundwater than presently exist as shown in Table 3-21.

P 3-82: I concur with the estimates of streamflow depletion from groundwater extraction estimated for the Basin and for Bean Creek. Those figures are consistent with my analysis of streamflow records going back to the early 1970's. It will be good to further address this critical issue through the installation of additional shallow monitoring wells and stream gages and further evaluate that data in future GSP updates. Hopefully this will help establish measurable objectives that will help restore some of the depleted flows.

Fig. 3-23: This figure illustrates some concerns I have with the minimum threshold and objectives for SV4-MW. The minimum threshold seems too low, particularly if levels can be allowed to fall below the minimum threshold for up to two years or during a drought period. Drought periods are the time when baseflow contributions to the streams are the most critical for maintaining minimum flows in streams and the River. During droughts there is almost no surface contribution from the areas of the watershed north of the Zayante fault and the contribution from the Santa Margarita basin is critically important. Perhaps some sort of minimum threshold during drought periods should be considered. If groundwater levels are low, there is a need to reduce groundwater extractions during drought periods, rather than just allowing groundwater levels to fall below minimum thresholds. I am also concerned about setting the measurable objective at levels observed in 2004 in SV4-MW. Figure 3-23 shows that the levels in 2004 were uncharacteristically low, even though it was preceded by ”normal” rainfall years. For that location I might suggest a minimum threshold during drought periods of 381 ft, a minimum threshold during non-drought of 387 ft and a measurable objective of 397 ft.

p. 3-95: In discussing the effect on the mid-county basin, Carbonera Creek does not flow into the mid-county basin but Branciforte Cr. (Blackburn Gulch) does. Depletion of groundwater contribution to portions of Branciforte in the Santa Margarita Basin could have a significant affect on flow downstream in the mid-county basin.

Sections 4 and 5: It is encouraging to see potential projects under consideration and real possibilities to meet measurable objectives of the GSP; and to see the budget and implementation program going forward.

From: Philip McReynolds
To: Nick Wallace
Subject: Santa Margarita Aquifer
Date: Sunday, September 19, 2021 8:51:10 PM

Hi, I'm asking for the plan to be amended to cover sustainability of the Santa Margarita aquifer, specifically plans around recharge of this aquifer.

With Respect

Philip McReynolds

SMGWA Online Comment

Name: Becky Steinbruner

Address: Aptos

Comment:

4.5.1.3 Purified Wastewater Augmentation at Loch Lomond (page 4-36) There is no information included regarding how the State Required holding times for indirect potable re-use would be monitored and met. There is no information regarding the inherent potential health problems with unregulated contaminants, hormones, and radioactive constituents associated with chemotherapy drugs in the waste water train. "Advanced treatment would occur via an AWTF located at or near City of Santa Cruz WWTF employing full advanced treatment technology that meets regulatory requirements and industry best practices." It is unclear whether new a Advanced Treatment Facility would be associated with the Soquel Creek Water District's Modified PureWater Soquel Project. There is no space available at the Santa Cruz Wastewater Treatment Plant for an Advanced Water Treatment Facility, which is why Soquel Creek Water District is only constructing a tertiary treatment plant and an nBAF treatment plant there. The Advanced Treatment Facility is proposed to be in Live Oak. This should be made clear, as it would influence the route of the conveyance system, and place dependence on Soquel Creek Water District's facilities. Page 4-36: "Reservoir augmentation would take place about half of each year and be sized to produce 3.2 MGD of advanced treated water when the reservoir is being drawn down to meet demands." Why pump the recycled water into Loch Lomond instead of using it for irrigation in the summer months? This would greatly reduce the potential ill health effects of the treated wastewater, which likely would contain unregulated pharmaceuticals, hormones, CEC's and radiologic contaminants, as well as the DEET, Sucralose caffeine, ibuprofen and other compounds that cannot be fully eliminated in the treatment process. It would also reduce use of the potable water from Loch Lomond and maintain it as a relatively clean potable water source. Please include using recycled water only for irrigation, and model that scenario relative to reduced draw-down from Loch Lomond inherent as opposed to pumping the recycled water into Loch Lomond. Please include the public process for notification of all CEQA hearings relative to the addition of recycled water to Loch Lomond, a practice that is not currently allowed by the State. 4.5.4 Permitting and Regulatory Process (page 4-38) Please include requirement for a Final Anti-Degradation Analysis for Loch Lomond if the recycled water were to be added and mixed, to comply with Resolution 68-16. Please include a discussion regarding how the Agency would collaborate with California Dept. of Fish and Wildlife to develop meaningful and enforceable mitigation measures to protect the receptive sensors. 4.5.6 Expected Benefits "While basin groundwater levels have stabilized in the last few decades, supplemental sources of water from outside the Basin may be needed to increase Lompico aquifer groundwater levels and meet Basin sustainability objectives. After recharging enough purified wastewater to increase groundwater levels to measurable objectives, any additional water stored in the aquifer may be used to augment groundwater or surface water providing a drought resilient supply that will increase the cooperating agencies’ water supply resiliency." Does this mean that the Agency plans to inject recycled water into the aquifer as well as into

Loch Lomond? Where would the injection wells be located? What would the energy demand be, and how would there be redundancy built in to accommodate PSPS events in the summer fire season when water use is higher? Page 4-39 Expected Benefits "Compared to 540 AFY conjunctive use (Section 4.3.6, Table 4-1), the amount of groundwater discharge to creeks from 710 AFY purified wastewater recharge (Table 4-5) is very similar, but there is 75% more groundwater in storage because of direct injection into the Lompico aquifer." How would private well owners be impacted by the injection of potentially-contaminated recycled water if there are system malfunctions? How would the six-month holding times required by the State be met and monitored, as they affect nearby private well potable sources? 4.5.7 Legal Authority (page 4-42) "California state law gives water districts the authority to take actions necessary to supply sufficient water for present or future beneficial use. Land use jurisdictions have police powers to develop similar programs. The Sustainable Groundwater Management Act of 2014 grants SMGWA legal authority to pass regulations necessary to achieve sustainability. Water use efficiency projects make use of preserving existing sources already within each member agency’s specific system to which each agency already has rights." Please include discussion of Anti-Degradation Analysis requirements to comply with State Water Board Resolution 68-16 to protect high quality waters from contamination / degradation. Please include discussion of necessary collaboration with California Dept. of Fish and Wildlife to develop meaningful and enforceable mitigations, especially for stream crossings and stream inflow contamination monitoring from injected effluent. 4.5.8 Estimated Costs and Funding Plan (page 4-43) "Projects included in this subsection require new infrastructure such as pipelines, interties, pump stations, injection wells, and new treatment facilities. Costs associated with the new infrastructure would be funded through a combination of increased operating revenue and outside funding sources." This would be a very expensive supplemental source, funded by raising rates, when there are less expensive options available. Table 4-7 on page 4-44 shows projected annually operating costs to be $2.6 million to $7.5 million. How can the area's low-income residents and struggling businesses ever hope to afford this water? Page 4-48: "Part of this study will be to review other reuse and system expansion opportunities for adjacent water agencies." Please identify those water agencies...is it the City of Santa Cruz, or Soquel Creek Water District? This matters because of the implications inherent with necessary infrastructure and conveyance systems.

I commend the Agency for keeping management costs to a minimum, with the proposed annual budget of $393,580 for the next five years. (page 5-2) This is in stark contrast to the bloated MidCounty Groundwater Agency annual budget of $810,975 and a $1.4 million cash reserve. Page 5-6:"The SMGWA has no current plans to regulate or to charge a fee on either de minimis or non-de minimis private users. The SMGWA may evaluate these options as funding mechanisms in the future, with any fees that may be proposed being commensurate to the benefit received by de minimis and non-de minimis private users. Private users shall be engaged in this process." I commend the Agency not assessing the non-diminimus and diminimus private pumpers, and to involve all such pumpers in any future actions to consider such. Would there be an engineer's report conducted to establish the benefit level of any possible future fees? Please discuss this, with any possible timeline associated.