Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-3	N.Brown	1.1	6	---	---	Is imported water sent to the Earl Schmitt Filtration Plant and Buena Vista Water Treatment Plant via a diversion on Castaic Creek or via a pipeline or canal directly from Castaic Lake?	Via a pipeline.	More Information Needed
S-4	N.Brown	1.2.1	8	---	---	Should remediation pumping and the routing of that extracted GW be depicted in the "Imported Water in Water Balance" graphic or is the magnitude of pumping small enough that it doesn't need representation on the graphic?	Remediation pumping is small. It's a term that is incorporated into a more detailed new diagram that will appear in Section 2. In that figure, we identify that groundwater pumping goes both (1) directly to water users and (2) to permitted discharges to the river in the case of this remediation system.	Needs Clarification
S-5	N.Brown	1.2.1	8	---	---	Will there be any difference in the physics of how future releases from Castaic Lake is routed to downstream parties or will the water be conveyed via Castaic Creek as it has been?	It is our understanding that the releases will continue to be from the lake to the lagoon, and then from the lagoon into the creek.	Needs Clarification
S-6	N.Brown	1.2.2	9	1-4	---	Figure 1-4 indicates years as wet, dry, or average. The GSP Regs indicate water year types are to be subdivided into five categories ranging from wet, above normal, below normal, dry, and critically dry. The report only lists wet, normal, and dry without any description of how they were established for historical and future water years. As such, the water budget information provided might not be fully compliant with the GSP Regs.	We respectfully disagree. See response to comment G-2.	Defensibility
S-7	N.Brown	1.2.2	9	1-6	---	Are the green and orange phreatophyte locations in Figure 1-6 synonymous with GDE locations?	The habitat that is shown in green on the map (riparian mixed hardwood) occurs along river corridors and is a mixture of species that are known to have the potential to withdraw groundwater. The habitat shown in orange on the map is a type of	Needs Clarification

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
							woodland that is commonly located in upland areas and does not depend on perennial flowing surface water (perennial streamflow) or a regional aquifer system for its water. The orange species take up water primarily in the cooler months, with low ET demands during the dry/warm/hot seasons (unlike the green habitat, which has peak ET demands during the summer). These details are discussed in Section 2.4.8.	
S-8	N.Brown	1.4.2	16	1-7	---	The model calibration period is 1980 through 2019 (39 years), but the historical water budget is shown from 1925 through 2019 (94 years). Was the model used for estimates prior to 1980 or was some other method used?	Yes, the model was used for the period prior to 1980, along with information on agricultural land locations (see Appendix A), the dates various wells were drilled, and historical archive records that discuss the early land uses and the timing of the transitions of certain lands from ag to urban during the 1960s and 1970s. See Section 2.2.1 for the reasons we extend the model this far back in time.	Needs Clarification

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-9	N.Brown	1.5	19	---	---	The approach used to establish the current water budget could possibly be interpreted as inconsistent with what is stated in the GSP Regs. For reference, § 354.18(c,1) of the GSP Regs indicates that the current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information. I think what has been done in the report is useful technical information, but ultimately DWR will decide if this approach meets the intent of the current water budget. This approach does include recent hydrology through 2019, so perhaps this is fine.	GSI and SCV Water contemplated this very question/comment at great length during the project. As explained in the report, we did not want to limit the current water budget to recent years (particularly post-2014 years) because groundwater pumping was much lower than normal because of local conservation efforts and SCV's decision to purchase more imported water than normal after 2016 to speed up groundwater level recovery. We made sure to include the local hydrology for 2015-2019 in the current water budget analysis to address the DWR requirement to use recent years in the current water budget.	Defensibility
S-10	N.Brown	1.6.1	21	---	---	It would be good to include maps of historical and full buildout conditions used in the historical and future simulations.	Separate maps are being added to the report for both the historical and future projected full build-out land use conditions.	More Information Needed
S-11	N.Brown	1.6.2	21-22	---	---	Did any water year type under climate-change conditions change or did you leave them unchanged from historical water year types?	The year types did not change under climate-change conditions; applying DWR's climate-change factors does not change the timing of inflections in the rainfall cumulative departure curves compared with the curve for the historical data set.	More Information Needed
S-12	N.Brown	1.7	26	---	---	The second paragraph defines safe yield in various ways, but SGMA does not require defining a safe yield, but rather a sustainable yield (as pointed out later in the section). What is the value in describing and presenting safe yield at all? Will this just add confusion when eventually describing sustainable yield to	We see the safe yield discussion as feeding into two of the SGMA sustainability criteria: (1) chronic lowering of groundwater levels and (2) reductions in groundwater in storage. Note that we will be changing the term "safe yield" to be "basin yield" to be consistent	Needs Clarification

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						support decisions regarding sustainable management criteria?	with past planning documents in this basin (and because safe yield is not a term used in the GSP regs, as noted by the comment).	
S-13	J.Rumbaugh	1.7	26	---	---	More discussion is needed on how the model and water budgets do not indicate chronic declines in GW levels. For example, describe the yellow line (cumulative change) in Figure 1-7.	Comment noted. We explain this a bit in Section 1.4.2 and are reviewing the text to ensure we provide a succinct explanation. PS: This does not seem like a defensibility issue; it seems like this falls in the "more information needed" category.	Defensibility
S-14	N.Brown	2.1	30	---	---	The bullets at the top of the page indicate pumping at municipal, agricultural, and private wells. What about industrial, commercial, and remediation GW pumping?	Commercial and industrial water uses are met by SCV Water; there is no separate groundwater pumping for those purposes that we know of in this basin. The pumping for the remediation at Whittaker Bermite is meant to be included in the bullet that mentions groundwater treatment systems; we will mention it specifically in that sentence.	Needs Clarification
S-15	N.Brown	2.2.1	31	---	---	The last sentence in the last paragraph of this section discusses past and future water year types, but it is not clear how the water year types are defined or if they are consistent with DWR's expectations.	The last sentence is actually talking about the classification scheme for the 95-year historical record, not the future rainfall. The last sentence is making the point that the multi-year trends and the prior year's rainfall are more important than focusing on just the amount of rainfall occurring in an individual year when deciding how to classify that individual year.	More Information Needed
S-16	N.Brown	2.2.3	32	---	---	I can't tell if projection simulations include full buildout land use throughout the entire simulation or just starting in 2042. GSP Regs indicate using the most recent land use, but also indicate future scenarios	We use full build-out throughout the simulation. We will review the text of Section 2.2.3 again to make sure this is clearly stated.	More Information Needed

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						of water demand uncertainty associated with projected changes in local land use, population growth, and climate.		
S-17	J.Sun	---	33	---	2-4	Line 3 from INFLOWS: The subsurface inflow beneath SCR is computed by GHB. Please clarify. I thought GHB was used for tributaries entering the model boundary and the recharge along SCR is based on the SCV recharge compiler.	As shown in Table 2-4, the SCV Recharge Compiler handles surface water flows crossing into the groundwater basin. The GHB handles subsurface flow crossing into the groundwater basin (beneath tributaries). These details are also discussed in the model development report.	Needs Clarification
S-18	N.Brown	2.3	33	---	---	It is stated that "Numerical groundwater models provide the most robust state-of-the-art method for quantifying these terms, especially when the model has been calibrated to historically measured groundwater levels and streamflows, as has occurred for this model." If the SCV Recharge Compiler is retained, then it would be important to see how its computed streamflows compare to available stream gage data at Mint Canyon (F328-R) and Bouquet Canyon (F377-R). Without such comparisons, it is not clear whether the GW/SW interaction process has been adequately characterized.	Comment noted. We have obtained and reviewed the data for those two stream gages and evaluated the model's streamflow simulations against those data; this is discussed with new text and graphics that have been added to the model development report. The model shows good calibration at these two gages, which was expected because of the generally good calibration to water levels in the alluvium at most locations.	Defensibility
S-19	N.Brown	2.4	34	---	---	Wouldn't assignment of subsurface inflow from the SCV Recharge Compiler double count the subsurface inflows provided by the GHBs described in Section 3.3.2 in the modeling report?	No. Subsurface inflow is not included in the SCV Recharge Compiler. We will review the text to make sure we are not suggesting this term is in the SCV Recharge Compiler.	Needs Clarification

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-20	N.Brown	2.4.1	34	---	---	Equation 2-1 is inconsistent with Equation B-2 in Appendix B of the model report, in that Equation 2-1 leaves out runoff. Further the term "annual" should be included in the equations in front of each term and indicate that the units must be in inches.	Comment noted. We will examine and correct any inconsistencies in how the two equations are shown and explained in these two documents.	Needs Clarification
S-21	N.Brown	2.4.3	36	---	---	Wouldn't assignment of subsurface inflow from the SCV Recharge Compiler double count the subsurface inflows provided by the GHBs described in Section 3.3.2 in the modeling report?	Subsurface inflow is not included in the SCV Recharge Compiler. We will review the text to make sure we are not suggesting this is in the SCV Recharge Compiler.	Needs Clarification
S-22	N.Brown	2.4.7	38	---	---	It is mentioned that further discharges from wells SCWD-Saugus 1, SCWD-Saugus 2, and VWD-201 are either unlikely or expected to end soon. Why? It would be good to provide some context when making such statements.	The discharges to the river are expected to eventually end, but the wells will continue operating because they will provide municipal water supply. We will review the language to make sure this detail is clearly stated.	More Information Needed
S-23	N.Brown	2.4.8	39	---	---	So peak ET demands for the coast live oak are higher in the wetter months than in the drier months (see second paragraph of Section 2.4.8)?	Yes, that is correct.	Needs Clarification
S-24	N.Brown	3.1	41	---	3-1	Table 3-1 lists sources of supply and demand from a water retailer perspective, as opposed to the GW system perspective or the SW system perspective. I would suggest changing the "Demand" header in Table 3-1 to "Retail Water Demand" or something similar, because there are other beneficial users of water that have water demands (consumptive use), which would be met in part by precipitation and GW uptake.	Comment noted. We will change the wording of the table title to reflect that the information show is for municipal and non-municipal water demands and supplies.	Needs Clarification
S-25	N.Brown	3.1	42	---	3-2	GSP Regs define water use sectors as follows. "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial,	We can clarify in the table that (1) the municipal uses include all urban and industrial uses in the basin and (2) the table is for the human water demands (municipal	Defensibility

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						agricultural, managed wetlands, managed recharge, and native vegetation. Some of the water use sectors provided in Table 3-2 are not consistent with those defined in the GSP Regs. Ultimately, DWR will decide whether entries in Table 3-2 are adequate. I am simply noting some differences with the GSP Regs.	and non-municipal). FYI, there are no managed wetlands or managed recharge projects at this time in the basin.	
S-26	N.Brown	3.2	42	---	---	It is stated that two type of SW sources are relevant to the East Subbasin, including local imported supplies from Castaic Lake and local streams. Shouldn't there be three categories, including SWP (from Castaic Lake as indicated in Section 3.2.1), local imported water (from other imported sources not including SWP), and local supplies?	Yes, there should be three categories. This will be fixed in the report. Note that the SWP and local imported supplies are discussed in Section 3.2.1, while the local supplies are discussed in Section 3.2.2.	Needs Clarification
S-27	N.Brown	3.2.1	42	---	---	It is mentioned that the operating plan, which includes drawing upon GW storage reserves (primarily in the Saugus Formation) to augment imported supplies during drought years in the SWP, then reducing pumping at other times to facilitate the natural replenishment of those reserves. This GW operating plan is integral to the water resources plan for SCV. How reliable will those imported sources of water be in the future? There is no discussion of uncertainty associated with imported water and I think this will be very important to characterize/evaluate as part of the GSP.	In 2017, CLWA (SCVWA's predecessor agency) prepared a Water Supply Reliability Report Update that demonstrated the ability of Imported Supplies to fully and reliably meet supplemental water demands within its service area. The approach incorporated the groundwater operating plan and analyzed the Agency's imported water portfolio through 2050 buildout utilizing historic hydrologic traces. The report demonstrated full reliability under 2015 UWMP assumptions. It also concluded that even with a significant reduction in SWP reliability, the Agency can meet full demands without exceeding the groundwater operating plan. Later, in support of the 2020 UWMP, a draft update to the	Defensibility

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
							reliability report was prepared. This draft update report demonstrated full reliability under 2020 UWMP assumptions and concluded that even with a significant reduction in SWP reliability, the Agency could meet its full demands without exceeding the annual production volumes specified in the groundwater operating plan. The 2020 UWMP indicates that demands with active conservation can be fully met as long as the remaining supply capacities in the Saugus Formation and water banks are fully developed.	
S-28	J.Sun	3.2.2 & App B	43	---	3-3, B-1 & 3-3, B-2	Table 3-3 seems to be mostly based on Table B-1. The average values of some individual terms were calculated from different years in Table 3-3. But the total in Table 3-3 is the same as Table B-1. This is confusing. Why some terms were based on different years? The same question applies to Table 3-4 and B-2.	This is a reasonable question that we too contemplated during report preparation. We decided that it is important to show the range and average for each term, and to do so independently of the other terms … which is why those statistics are for different years as we go from one term to the next. We also want to show the range and average for total inflow, and similarly for total outflow. We suspect that many non-technical readers will not try adding them up; but we've provided explanatory footnotes for those who do.	Needs Clarification

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-29	N.Brown	3.2.3	44	---	3-4	How is SW ET calculated separately from GW ET, given that SW ET would be an outflow component from the SW system, whereas GW ET would be an outflow component from the GW system?	SW ET and stormwater outflow are lumped together, because together they constitute the difference that arises from summing all other surface water terms. This is calculated separately from GW ET, which is calculated using the model.	Needs Clarification
S-30	N.Brown	3.2.3	44	---	3-4	How do values in Table 3-4 compare with measured streamflows near the county line, which are likely used as SW inflows in UWCD's model?	This is discussed in the model development report, which compares simulated and historically observed non-storm flows at the western (downgradient) end of the basin (at the basin boundary).	More Information Needed
S-31	J.Sun	---	---	---	3-5	If the minimum precip and storm flow are from the same year, it is counter-intuitive that the generated stormflow is close to the precip during dry years. I like to see the ratio of generated storm flow to precip.	We assume this was a comment about Table 3-3 (showing precip and stormwater generation), not Table 3-5. The stormwater term is the amount generated that is unavailable for recharge to groundwater. This gets reduced further by ET processes in the surface water budget, to simplify the accounting. The commenter is correct to note that a portion of that water actually could be lost to ET before it becomes stormwater; we include that loss term in the "ET and Stormwater Outflow" term that shows up in Table 3-4 for the surface water budget.	Needs Clarification
S-32	N.Brown	3.5	47	---	---	It is stated, "In the judgment of the GSP development team, the model and its underlying data render the model to be a viable and reliable tool for the SCV-GSA and SCV Water to use for development, implementation, and monitoring of the GSP for the East Subbasin, and for other groundwater resource planning and	We agree with this comment and will add a small amount of text to point out that the past 20 years of model development and application have helped the model and the understanding of the basin to both evolve over time.	Defensibility

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						management programs". To bolster this statement, you might consider including an additional "proof statement", which could indicate that this model has evolved and been used in the basin for nearly 20 years and there has been no evidence that it would indicate that the model has misguided the management of the local water purveyors' water portfolio…or something similar (if my suggestion is true).		
S-33	N.Brown	4.1	49	---	4-1	Table 4-1 lists sources of supply and demand from a water retailer perspective, as opposed to the GW system perspective or the SW system perspective. I would suggest changing the "Demand" header in Table 4-1 to "Retail Water Demand" or something similar, because there are other beneficial users of water that have water demands (consumptive use), which would be met in part by precipitation and GW uptake.	This is the same comment as Comment G-3. See the response to that comment.	Needs Clarification
S-34	N.Brown	5.1	53	---	---	It is stated, "The definition of normal versus dry years is governed by local hydrologic (precipitation) conditions in the case of the Alluvial Aquifer and by the allocation amounts of imported water supplies in the case of the Saugus Formation". The report needs to more clearly define how water year types are developed and there needs to be a clearer linkage between historical and projected water year types relative to the operating plan.	Section 5.1 is being revised to provide clearer explanations of the reasons for variations in normal-year and dry-year pumping for each of the two principal aquifers. This includes tables showing the development of the water year types and their relationship to the operating plan.	Needs Clarification
S-35	N.Brown	5.6	61	---	---	Imported water represents a significant portion of the supply. It is not entirely clear from the report how reliable the imported supplies will be. This is especially true during consecutive dry years when purveyors all over the state will be	See the response to comment S-27.	Defensibility

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						competing for water. Are there additional qualifying statements that could be included as examples that would provide more insight into imported water reliability in the future?		
S-36	J.Sun	Apps B & C	---	---	B-1, B-2 & C-1, C-2	Comparing Tables B-1 and B-2, the total SW inflow in Table B-1 is less than the Recharge from Stream in Table B-2 in Years 1928, 1948, 1951, 1961, and other years. The same for Tables C-1 and C-2 in Years 1925, 1948-1951. Why is the annual recharge from streams higher than the total SW flow?	This apparent (but not actual) discrepancy occurred because Tables B-1 and C-1 showed the net GW/SW exchange from the SFR package, whereas Tables B-2 and C-2 showed the SFR inflows separately from the SFR outflows. We will revise Tables B-1 and C-1 to show the SFR terms separately, which will raise the total surface water inflow terms and fix this apparent discrepancy. This is a display/presentation issue with Tables B-1 and C-1, and not a problem with the water budget calculations themselves.	Needs Clarification
Editorial Comments								
E-1	N.Brown	1	1-25	---	---	SW budgets are missing from Section 1. Only GW budgets are presented.	The SW budgets are presented later in the document. We want Section 1 to be a narrative-style executive-summary focused on the main topic … the groundwater budget.	Miscellaneous
E-2	N.Brown	1.2.2	14	---	---	It is stated, "…the net impact of stored groundwater on the water budget and the balancing of the water budget terms is shown in black for the first year and in tan for the second year". This is not apparent in the graphic. GW storage appears to me as hues of brown in both years.	Comment noted. Text will be corrected.	Miscellaneous
E-3	N.Brown J.Rumbaugh J.Sun	1.4.2	16	43837	---	The blue chart background makes it a little difficult to discern some colors on the individual bars. Consider changing the background color to white or gray to avoid	Per our responses to other comments, we intend to continue the use of the wet, normal, and dry year types. We do not plan to	Miscellaneous

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						competing with the colored bars to improve clarity. Also, see previous comments on potentially needing more water year types than just the three shown.	change the colors, as we received positive feedback on the color schemes during prior review steps and during presentations to the public.	
E-4	N.Brown	2	29	---	2-1 & 2-2	The colors in Tables 2-1 and 2-2 are distracting. I would suggest eliminating the colors and adding another column indicating the flow process.	We were trying to avoid adding columns, for table readability purposes. Also, we feel the color choices help the reader distinguish groundwater/surface water interactions separately from other processes and from changes in storage.	Miscellaneous
E-5	N.Brown	2.2.3	32	---	---	It is indicated that "...precipitation and ET factors have been provided by DWR on a monthly basis for the period from January 1915 through December 2011". When describing ET in this context throughout the report, it is important to note in the text that it is the reference ET. (global comment on all related reports)	Comment noted. The text will be corrected.	Miscellaneous
E-6	N.Brown	2.3	33	---	---	It is stated that "The numerical groundwater flow model of the East Subbasin simulates the occurrence and movement of groundwater flow in the two primary aquifer systems…". I would suggest using "principal" when describing the aquifers included in the water budgets to be more consistent with GSP Reg terminology. (global comment)	Comment noted. The text will be corrected.	Miscellaneous
E-7	N.Brown J.Rumbaugh J.Sun	2.3	33	---	---	It is indicated that "The model is called the Santa Clarita Valley Groundwater Flow Model, and is referred to as the SCVGWFM or the regional model." It is not always clear which model is being referred to in the report (e.g., conceptual model, numerical model, historical model, etc.). We suggest always using the proper model name (e.g., SCVGWFM, SCV Recharge	Comment noted. The text will be corrected.	Miscellaneous

Table B-1. ERP Member Comments and GSI Responses on the Water Budget Report (GSI 2020b).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						Compiler model, etc.) in an effort to limit reviewer confusion.		
E-8	N.Brown	2.3	33	---	2-3 & 2-4	The colors in Tables 2-3 and 2-4 are distracting. I would suggest eliminating the colors and adding another column indicating the flow process.	We were trying to avoid adding columns, for table readability purposes. Also, we feel the color choices help the reader distinguish groundwater/surface water interactions separately from other processes and from changes in storage.	Miscellaneous
E-9	N.Brown	3.2.4	44	---	3-4	Net inflow from GW represents the third largest SW inflow component, rather than the 2nd largest, as stated in the fourth bullet.	Comment noted. The text will be corrected.	Miscellaneous

See the **Acronyms** section for a complete listing of acronyms used in this table.

Attachment C
Comments and Responses on the SMC Section

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
General Comments								
G-1	N.Brown	---	---	---	---	It was assumed that the Executive Summary of Section 8 will be removed from Section 8 and rewritten for the entire GSP. Therefore, the ERP did not provide comments on the Section 8 Executive Summary, even though our comments on the main text of Section 8 would potentially require revisions to its Executive Summary.	No action needed	Miscellaneous
G-2	N.Brown	---	---	---	---	It would be a good idea to search for "in the year 2042" in the document to confirm whether the statement should instead indicate that the simulation is based on the 2042 water budget projection, rather than specifically "in the year 2042". This is a global comment, because the statement is made several times throughout the document and on some figures as well.	Agree. Changes have been made throughout the document.	Miscellaneous
G-3	N.Brown J.Rumbaugh	---	---	---	---	There are different datasets and models spanning different periods, so rather than using subjective terms like "long-term average" and "during peak months", it would be better to state the actual date range of the averaging period and explain how the average is computed and state the actual peak months or explain how peak months would be determined each year. This is a global comment.	Much of this comment is now moot, because we are no longer using averages or peak months to assess compliance with MTs and MOs. Text in various places in the document has been revised substantially to make it clear that we are using either the 95-year model simulation of future conditions or the recently (since 1980) measured GW levels to set the MTs and MOs.	Miscellaneous

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
G-4	N.Brown	---	---	---	---	It would appear that the GSA has avoided establishing SMCs for depletion of interconnected SW. Instead self-imposed "trigger levels" are set for managing GW effects to local GDEs. The importance of managing potential GW effects to GDEs in the Subbasin is understood; however, neglecting to establish SMCs for any of the six sustainability indicators puts the GSA at risk for submitting to DWR a noncompliant GSP. The SGMA Regulations only describe GDEs in §354.16(g) (Groundwater Conditions). Discussion of potential effects of the proposed SMCs for depletion of interconnected SW on beneficial uses in adjacent basins is also a GSP requirement (see SGMA Regulations §354.26[b][3] and §354.28[b][3]), but no such discussion is provided. Blurring the line between the depletion of interconnected SW sustainability indicator and GDE health seems potentially problematic. I recommend you discuss your approach with your DWR representative to make sure what you have done complies with the SGMA regulations.	Discussions have been added that go beyond just GDEs and address depletion of interconnected SW directly. MTs and MOs are now included, which are groundwater levels that serve as proxies for streamflows and streamflow depletion.	Miscellaneous
G-5	N.Brown J.Rumbaugh	---	---	---	---	In some cases it is difficult to opine on the SMCs without reviewing Section 7 Monitoring Networks, which presumably would describe the frequency of data collection. For example, if several GW-level values are available in a given year at a	The text has been revised to clarify that GW levels need to be below the MT throughout a 3-year period. As discussed in Section 7, two readings will be used each year: a reading in the spring (typically the seasonal high GW level) and a reading in the	Miscellaneous

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						given RMS well and only one of those values drops below its MT during the year, then would that entire year count toward the consecutive years of violating the MT or are you only planning on using a single spring or fall measurement or an average of the seasonal values or other? It would have been helpful to have reviewed Section 7, because the intended use of the monitoring data would likely influence our assessment of how the SMCs are set and how they will be assessed during implementation. Uncertainty in future conditions is inevitable, but uncertainty in how the GSA will determine whether an undesirable result has occurred must be avoided.	late summer (typically the seasonal low GW level).	
G-6	N.Brown	---	---	---	---	SGMA Regulations (e.g., §350.40[f] & §354.30[e]) seem to imply needing to develop SMCs over a 50-year planning period, but the hydrographs associated with this section of the GSP only span 40 years. It may be worth checking with your DWR representative on this to make sure your analysis is compliant with the regulations.	The SMCs are now calculated from the 95-year model simulations used in the water budget analysis for Year 2042 conditions, rather than looking at just the last 40 years of that model simulation. This does not affect the minimum threshold values, which mostly occur in historical years 2015 and 2016. But this change has small effects on the computations of measurable objectives.	Miscellaneous
G-7	N.Brown J.Rumbaugh	---	---	---	---	As requested, our review only focused on chronic lowering of GW levels, reduction of GW storage, and depletion of interconnected SW. We did not review content associated with degraded water quality, land subsidence, or seawater intrusion.	No action needed	Miscellaneous

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
Specific Comments								
S-1	N.Brown	8.2.2	4	---	---	A bullet statement should be added that addresses downstream beneficial uses in the adjacent basin under "Avoid Depletion of Interconnected Surface Water".	Section 8.3.3.5 of the Admin Draft GSP now includes a discussion of this topic, including additional graphics. The discussion describes that future changes in the total flow volume leaving the Basin will be de minimis in magnitude.	Defensibility
S-2	N.Brown	8.3.2	5	---	---	The 3rd bullet should be modified to address downstream beneficial uses in the adjacent basin.	See the response to comment S-1	Defensibility
S-3	N.Brown	8.3.3.5	7	---	---	A statement should be added to address flows to downstream beneficial users in the adjacent basin.	See the response to comment S-1	Defensibility
S-4	N.Brown	8.5	9	---	---	A nice addition right before Section 8.5 would be a subsection titled "Overview of Sustainable Management Criteria" or something similar. This subsection could provide a table that summarizes the SMCs and metrics for how undesirable results will be determined for each sustainability indicator. Then the subsequent subsections could provide the details for how you arrived at the proposed metrics for assessing whether undesirable results will have occurred during GSP implementation. Example table headings could include the following: Sustainability Indicator, Definition of Undesirable Result, Identification of Undesirable Results, Measurable Objective, and Minimum Threshold" or something similar.	We have added a new section 8.5 with a new Table 8-1. For each sustainability indicator, the table describes/identifies what constitutes an undesirable result, then describes the minimum thresholds and measurable objectives in a qualitative sense.	Miscellaneous

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-5	N.Brown	8.5.1 8.6.1 8.10.1	9 15 31	---	---	Should an additional example be included regarding imported water? Perhaps something like an unforeseen lack of access to imported water, thereby needing to rely more heavily on local GW?	We have added a bullet titled "Emergency interruption of imported supplies" to each of these three sections (which are now Sections 8.6.1, 8.7.1, and 8.11.1, respectively).	Needs Clarification
S-6	J.Rumbaugh	8.5.1 8.5.2.7 8.5.4	9 13 15	---	---	Define "peak pumping months". Is this always the same each year? Are water levels averaged for all wells over this period and compared to the threshold?	This question is now moot, based on revisions to the Saugus monitoring well network and program discussed during ERP Workshop 2. Specifically, the GSP no longer presents the idea of using only the water level data during the peak-pumping months to evaluate future conditions against the SMCs; instead, water level data collected in both the spring and the late summer or early fall will be evaluated.	Needs Clarification
S-7	N.Brown J.Rumbaugh	8.5.1	9	---	---	The description for how the Saugus GW levels will be evaluated against the MTs for chronic lowering of GW levels is confusing. The metric for the MT for this sustainability indicator needs to be an elevation. If you take the average of the difference between measured GW level and the MT, then you no longer have an elevation. The calculation methodology for determining whether an undesirable result has occurred needs to be clear in the GSP. Consider adding some example statements or calculations to help clarify what would or would not constitute an undesirable result. Be specific.	Agree. We agreed during ERP Workshop 2 to take the approach recommended in this comment (using a GW level rather than a difference).	Needs Clarification

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-8	N.Brown	8.5.1	9	---	---	The 2nd to the last bullet introduces a secondary indicator for rates of water level decline and it's not clear how this fits into the bigger picture of undesirable results. Would it be possible for a primary indicator to be triggered while a secondary is not or vice versa, and if so, then what would be the determination for undesirable result? The calculation methodology must be clear in the GSP.	We have removed the discussion of drawdown rate as a secondary indicator. As suggested by the comment, there could be situations where a drawdown rate could be a false signal of an unsustainable condition. For example, if a certain group of wells in one part of the basin need to be pumped differently for operational reasons, then it is possible for the drawdown to be more than was modeled, even if the total volume of pumping from those wells (combined) and basin-wide is unchanged. We feel groundwater elevations are a better indicator than drawdown for that reason. Additionally, DWR's BMP documents contemplate the use of groundwater elevations (rather than drawdowns) as sustainability indicators.	Needs Clarification
S-9	J.Rumbaugh	8.5.1	9	---	---	Alluvial GW levels drop below MTs - Does this mean at any one measurement time or is this an average over the year?	We no longer use an average. We will instead evaluate whether the exceedance has occurred throughout a 3-year period. This is discussed in Section 8.6.2.7 (formerly Section 8.5.2.7).	Needs Clarification
S-10	J.Rumbaugh	8.5.1	9	---	---	Same question for Saugus wells. Is the average over the peak pumping months or does it just have to go below the MT in one measurement?	We no longer use an average. We will instead evaluate whether the exceedance has occurred throughout a 3-year period. This is discussed in Section 8.6.2.7 (formerly Section 8.5.2.7).	Needs Clarification
S-11	N.Brown	8.5.2	10	---	8.1	It would be helpful to include two additional columns in Table 8.1 that indicate the basis for the MO and MT	Table 8-1 is now Table 8-2. A column has been added on the right side of the table identifying whether the future model or the historical data form the basis for the MT and MO	More Information Needed

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						(e.g., average or lowest predicted or measured value).	values. As discussed in the text, the lowest elevation is used for the MT and the average elevation is used for the MO.	
S-12	N.Brown	8.5.2 Appendix C	10	---	8.1	According to the most recent monitoring data available at the time of this review, alluvial monitoring well AL-12A has been as “dry” between 2013 and 2019. The measured groundwater elevation data shown on the hydrograph in Appendix C for this well during this time period is not representative of groundwater level fluctuations in the Alluvial Aquifer. It is recommended to identify a different alluvial monitoring well to act as a representative well for monitoring purposes.	Agree. We had already decided to drop this well from the representative monitoring network for other reasons. (Specifically, it’s very shallow depth in the alluvium means that it can’t be used to measure groundwater levels during dry periods as has been the case in recent years.) Note that there are no other nearby alluvial monitoring wells in this part of the basin.	Defensibility
S-13	N.Brown	8.5.2.1 Appendix C	11	---	---	The first sentence states, "The minimum thresholds for the Alluvial Aquifer are based on the lowest predicted GW level estimated to occur at each representative monitoring site (see Table 8-1)." However, the 2nd bullet on that same page contradicts this statement. The 2nd bullet is also too vague when indicating "In the eastern portion of the Subbasin..." historical lows are instead used. It would be better to list the specific well names, so the reviewer does not have to guess which RMS wells are being discussed. Hydrographs in Appendix C do not always seem consistent with this description. For example, the MTs for SCWD-Sand Canyon (PDF	We have addressed each of these points through corrections and clarifications to the text of Section 8.6.2.1 (formerly Section 8.5.2.1), the additions to Table 8-2 (formerly Table 8-1), and the plots that appear in Appendix C.	Needs Clarification

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						page 73) and NWD-Pinetree 5 (PDF page 74) do not seem to correspond with either the predicted or measured value, but something in between.		
S-14	N.Brown	8.5.2.3	11	---	---	It is stated "Pumping at, or less than, the sustainable yield will maintain average GW levels in the Subbasin." Not sure what this statement means. Clearly two different pumping conditions cannot both result in maintaining average GW levels. What are you trying to say here?	Revisions have been made to the wording in this section (which is now Section 8.6.2.3).	Needs Clarification
S-15	N.Brown	8.5.2.3	11			2nd to last bullet on page. If you're intending to use GW levels as a proxy for reduction of GW storage, then it would seem that this would be the subsection to begin that discussion. If you're using GW levels as a proxy for reduction of GW storage, then you're essentially saying that avoidance of undesirable results for chronic lowering of GW levels would be also result in avoidance of undesirable results for reduction of GW storage.	We have added a statement about this at the end of that bullet.	Needs Clarification
S-16	N.Brown	8.5.2.3	12	---	---	2nd to last bullet on page. If you're intending to use GW levels as a proxy for depletion of interconnected SW, then it would seem that this would be the subsection to begin that discussion. I would think this subsection also should state how the MTs for chronic lowering of GW levels would be protective of beneficial uses (including downstream users). In other words, if you're using GW levels as a proxy for depletion of interconnected SW, then you're	As discussed in the response to Comments S-1 through S-3, Section 8.3.3.5 of the GSP now discusses how future changes in the total flow volume leaving the Basin will be de minimis in magnitude. Former Section 8.5.2.3 (which is now Section 8.6.2.3) is mostly discussing relationships between indicators, and not other topics such as whether GW levels can be used as a proxy. We introduce and address the topics in	Defensibility

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						essentially saying that avoidance of undesirable results for chronic lowering of GW levels would be also result in avoidance of undesirable results for depletion of interconnected SW.	this comment later in multiple places in Section 8.	
S-17	N.Brown	8.5.2.4 8.5.2.5 8.6.2.2	13 13 17	---	---	The discussion focuses on the GW outflow to the downstream basins and effects on local GDEs, but there is no mention of whether depletions of SW in the SCR (also an important source of recharge for Piru) are anticipated to be significant and unreasonable from a downstream, beneficial-use perspective. The metric for depletion of interconnected SW is a rate or volume, but you have not provided any estimates for the rate or volume of SCR streamflow leaving the Subbasin. It would seem that you would need to convince DWR that any additional depletion of interconnected SW that occurs from 2015 (i.e., SGMA effective date) and forward in time would represent a small enough percentage of reduction that it would not be significant and unreasonable. It may be worth checking with your DWR representative on this to make sure your analysis is compliant with the regulations.	We have added text to former Section 8.5.2.4 (now Section 8.6.2.4) and former Section 8.6.2.2 (now Section 8.7.2.2) that identifies and acknowledges these items as a set of topics pertinent to the "depletion of surface water" sustainability indicator. This includes adding text about streamflows. Note that Section 8.3.3.5 presents the technical analyses that are needed to address the SGMA requirement to estimate the rate/volume of streamflow leaving the East Subbasin under the modeled future scenario.	Defensibility
S-18	N.Brown J.Rumbaugh	8.5.2.7 8.6.2.5	13 18	---	---	If several GW-level values are available in a given year at a given RMS well and only one of those values drops below its MT during the year, then would that entire year	The text has been revised to clarify that the exceedance needs to occur throughout a 3-year period. As discussed in Section 7, two readings will be used each year: a reading in	Needs Clarification

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						count toward the consecutive years of violating the MT or are you only planning on using a single spring or fall measurement or an average of the seasonal values or other? This section needs greater specificity to really understand how undesirable results would be assessed. We would suggest including example calculations to help clarify the methodology and avoid vague terms like "peak pumping months" and "net exceedance". If such terms will be retained, then please define what they mean and how they are computed.	the spring (typically the seasonal high GW level) and a reading in the late summer (typically the seasonal low GW level).	
S-19	N.Brown	8.5.3.2	14	---	---	The 2nd bullet is too vague when indicating "In the eastern portion of the Subbasin…". It would be better to list the specific well names, so the reviewer does not have to guess. The basis for the MO should be included in Table 8.1.	This has been removed. The right-most column in new Table 8-2 contains the information about which wells use the historical data versus the model of projected future conditions.	Needs Clarification
S-20	J.Rumbaugh	8.5.3.2 8.5.3.3	14 14	---	---	MOs for Alluvial and Saugus water levels - please define "long-term average". How is this computed?	The text has been revised to describe that we compute this from model output for the 95-year simulation period of the 2042 water budget projection model.	Needs Clarification
S-21	N.Brown	8.5.4 8.6.3	15 18	---	---	It would be good to provide a more overarching statement (provided you can demonstrate that it's true) that implementation of the GSP is likely to maintain sustainable GW management over the planning and implementation horizon per §354.30(e), rather than just "…from current conditions…" as stated in the text.	We have added the statement described in this comment to Sections 8.6.4 and 8.7.4 (which were formerly Section 8.5.4 and 8.6.4). (We assume this comment referred to former Section 8.6.4 rather than 8.6.3.)	Needs Clarification

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
S-22	J.Rumbaugh N.Brown	8.6.2	16	---	---	Please describe where the 52,200 AFY value came from. This specific value is not provided in the water budget report either.	The text already does refer to the source of this information, which is Section 6 of the GSP.	Needs Clarification
S-23	N.Brown J.Rumbaugh	8.6.2	16	---	---	2nd to last paragraph of subsection. What will be the frequency of data collection during a typical year during GSP implementation and which data will ultimately be used to assess SMC (e.g., only Oct data or all monthly data, etc.)? If multiple data points are used in a given year, then would one single violation mean that that year would be included as one of the possible "consecutive years" or would there be an additional constraint for some percentage of values or percentage of time during a given year that MTs must be exceeded to count toward the consecutive years?	As discussed in the response to Comments S-18 (and as described in new Section 8.6.2.7), the exceedance needs to occur throughout a 3-year period. As discussed in Section 7, two readings will be used each year: a reading in the spring (typically the seasonal high GW level) and a reading in the late summer (typically the seasonal low GW level).	More Information Needed
S-24	N.Brown	8.6.2.1	17	---	---	2nd to last bullet of section needs to be expanded to address depletion of interconnected SW in terms of flow rate or volume as it relates to downstream beneficial users.	This topic is now covered in Section 8.3.3.5, as discussed in our responses to comments S-1 through S-3.	Defensibility
S-25	N.Brown	8.10	31 thru 37	---	---	Consideration should be given to rewriting this entire subsection. It does not discuss depletion of interconnected SW in terms of stream flow rates or volumes or impacts to beneficial users other than local GDEs. It is understood that the GDEs will be an important element to manage and address during implementation, but the regulated sustainability indicator is for depletion of interconnected SW,	This topic is now covered in Section 8.11.2 (formerly Section 8.10.2).	Defensibility

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						not GDEs. It may be worth checking with your DWR representative on this to make sure your analysis is compliant with the regulations.		
S-26	N.Brown	8.10.1 8.10.2	31 32	---	---	Downstream users in the Piru and lower basins benefit from SCR streamflows entering Ventura County from LA County. As such, the proposed approach might be perceived by DWR as being noncompliant, because it does not consider the magnitude of streamflow leaving the Subbasin for downstream beneficial uses and does not establish SMCs the depletion of interconnected SW sustainability indicator (see §354.26[b][3] and §354.28[b][3]). It may be worth checking with your DWR representative on this to make sure your analysis is compliant with the regulations.	This topic is now covered in Section 8.11.2 (formerly Section 8.10.2) and Section 8.3.3.5.	Defensibility
S-27	N.Brown	8.10.2	32	---	---	This subsection is titled "Minimum Thresholds", but only trigger levels for GDEs are discussed. This subsection needs to discuss MTs for depletion of interconnected SW. The metric for this should be a rate or volume of SW depletions caused by GW use (see §354.28[c][6]).	Minimum thresholds are now discussed in the 3rd and 4th paragraphs of Section 8.11.2 (formerly Section 8.10.2), followed by paragraphs that discuss the trigger levels.	Defensibility
S-28	N.Brown	8.10.2	32	---	---	GW levels are being proposed for three sustainability indicators including chronic lowering of GW levels, reduction of GW storage, and depletion of interconnected SW, but the MTs are not the same head values at each RMS? If GW levels are going to be used as a proxy, then it	These three sustainability indicators now all use the same methods to compute MTs (lowest historical or future water level) and MOs (average historical or future water level).	Needs Clarification

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
						would seem that whichever sustainability indicator is the most restrictive should be used for all sustainability indicators for which GW levels will be used as a proxy, because sustainability would only be achieved by avoidance of undesirable results for any of the six sustainability indicators.		
S-29	N.Brown	8.10.3	35	---	---	The MO should relate to a flow rate or volume.	Because groundwater levels are being used as a proxy, the MO is the average groundwater level (from the model simulation of year 2042 future full build-out conditions, with 2030 climate change).	Defensibility
S-30	J.Rumbaugh	Appendix C	---	NWD-12	---	I would set the initial MT by taking the max difference between the historic and future model curves and subtract from lowest point from field data (blue dots). This would put the red line about 20 ft higher	We have eliminated this well from the representative monitoring network, based on discussions with the expert panel during ERP Workshop 2.	Defensibility
S-31	J.Rumbaugh	Appendix C	---	VWD-160	---	Same as NWD-12	We found that the calculation method described by the reviewer in comment S-30 did not produce reasonable results when tested. We think this is because the max difference between the historic and future model curves does not always coincide with the periods when groundwater levels are lowest in the aquifer. In particular, the max differences may arise from historical seasonal or annual variations in pumping that differ from future seasonal or annual variations in pumping. We also concluded that such a calculation would be difficult to show and explain to a non-	Defensibility

Table C-1. ERP Member Comments and GSI Responses on the SMC Section (GSI 2021).

Comment Number	Reviewer	Section	Page	Figure	Table	ERP Comment	GSI Response	Theme
							technical audience. We have elected to simply use the future-conditions model output (GW elevations) since the calibration to historical data looks reasonable at this well.	
S-32	J.Rumbaugh	Appendix C	---	VWD-206	---	Same as NWD-12 - that would put red line about 50 ft higher than shown in the existing figure	See response to comment S-30.	Defensibility
Editorial Comments								
E-1	N.Brown	All	All	---	---	All page headers starting on the Abbreviations and Acronyms page have "Sustainable" misspelled in the header.	This has been corrected.	Miscellaneous
E-2	N.Brown	All	All	---	---	Consider searching and replacing "undesirable effects" with "undesirable results" to be consistent with SGMA terminology.	We have made this revision in a few selected places in the text, but not universally. The original text had intentionally used the term "effects" in certain places to distinguish them from "undesirable results." This was based on the wording that appears in Section 354.26(a) and (b), which use both terms and describe how they relate to one another. Also, in several places we quote portions of the SGMA rules that use the words "effect" or "effects."	Miscellaneous
E-3	N.Brown	All	All	---	---	Consider searching and replacing "surrogate" with "proxy" to be more consistent with SGMA terminology.	This has been corrected.	Miscellaneous

See the **Acronyms** section for a complete listing of acronyms used in this table.

APPENDIX I

Appendices to Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

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Locations of Agricultural Lands and Irrigation Supply Wells in 1947

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PREPARED IN COOPERATION WITH THE NEWHALL COUNTY WATER DISTRICT

LOCATION OF MODEL PUMPING NODES AND IRRIGATED AREAS

WATER—LEVEL CONTOURS FOR 1945 FOR THE ALLUVIAL AQUIFER

LOCATION OF MODEL PUMPING NODES AND IRRIGATED AREAS AND WATER-LEVEL CONTOURS FOR 1945 FOR THE ALLUVIAL AQUIFER IN THE SAUGUS-NEWHALL AREA, CALIFORNIA

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Annual Water Budget Tables: Historical Conditions

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Table I-1
Annual Surface Water Budget for Historical Conditions (Water Years 1925 through 2019)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1925	33,042	33,042	1,418	1,471	0	0	0	0	0	134,241	170,172	53,620	0	83,091	33,460	170,172
1926	133,419	88,224	10,985	59,265	0	56,544	0	0	0	176,218	436,431	69,515	45,195	141,306	180,415	436,431
1927	100,190	70,932	3,573	14,351	0	31,678	0	0	0	189,397	339,189	72,697	29,258	143,526	93,708	339,189
1928	30,776	25,093	1,015	622	0	6,083	0	0	0	155,712	194,207	61,590	5,683	100,464	26,470	194,207
1929	73,314	73,314	602	523	0	0	0	0	0	132,811	207,250	52,576	0	80,887	73,787	207,250
1930	57,272	57,272	1,140	523	0	0	0	0	0	125,765	184,699	47,622	0	79,383	57,695	184,699
1931	95,197	72,289	4,027	13,673	0	26,054	0	0	0	151,559	290,510	54,223	22,908	123,131	90,248	290,510
1932	109,562	93,435	2,215	5,759	0	16,355	0	0	0	156,520	290,412	58,952	16,127	115,176	100,157	290,412
1933	78,871	61,171	1,742	7,264	0	15,050	0	0	0	148,683	251,610	56,930	17,700	105,324	71,656	251,610
1934	68,848	55,259	3,857	9,167	102	9,294	0	0	0	152,566	243,833	56,425	13,589	110,525	63,294	243,833
1935	98,241	90,203	407	1,465	111	4,366	0	0	0	138,518	243,108	51,876	8,038	92,028	91,167	243,108
1936	52,873	42,370	246	9,238	111	8,920	0	0	0	135,148	206,536	49,316	10,503	95,493	51,225	206,536
1937	126,250	101,192	3,857	9,167	111	17,379	0	0	0	148,783	305,547	50,109	25,058	118,218	112,163	305,547
1938	126,334	77,746	407	86,803	111	64,532	0	0	0	168,926	447,113	58,664	48,588	142,282	197,579	447,113
1939	101,596	79,664	11,336	7,899	111	30,288	0	0	0	176,742	327,972	58,572	21,932	144,867	102,600	327,972
1940	61,008	47,136	711	9,249	111	12,963	0	0	0	137,604	221,645	45,029	13,872	106,394	56,351	221,645
1941	219,669	122,351	37,844	101,811	111	138,049	0	0	0	268,487	765,971	86,927	97,318	250,196	331,530	765,971
1942	63,314	44,404	1,916	8,766	111	28,197	0	0	0	182,907	285,211	56,881	18,910	148,946	60,475	285,211
1943	149,184	84,937	33,737	99,911	111	92,611	0	0	0	253,282	628,836	86,636	64,247	234,926	243,027	628,836
1944	134,174	85,957	818	16,158	111	61,091	0	0	0	198,918	411,270	59,283	48,217	170,321	133,448	411,270
1945	61,176	49,947	1,449	5,759	111	10,791	0	0	0	134,749	214,035	38,907	11,229	107,809	56,089	214,035
1946	78,409	65,880	1,775	20,338	111	9,884	0	0	0	115,720	226,237	29,418	12,529	98,246	86,043	226,237
1947	80,966	63,195	1,130	488	111	17,113	0	0	0	111,475	211,283	28,156	17,771	95,787	69,569	211,283
1948	37,275	37,275	350	517	111	0	0	0	0	85,706	123,958	20,530	0	65,319	38,110	123,958
1949	46,752	46,752	281	523	111	0	0	0	0	73,495	121,162	16,956	0	57,084	47,122	121,162
1950	45,871	45,871	940	194	111	0	0	0	0	66,250	113,365	14,642	0	52,393	46,331	113,365
1951	34,298	34,298	775	1,333	111	0	0	0	0	62,592	99,109	13,270	0	51,175	34,664	99,109
1952	160,212	104,720	21,239	86,267	111	77,917	0	0	0	115,045	460,791	22,584	55,492	144,066	238,649	460,791
1953	54,382	36,903	2,250	1,554	111	24,542	0	0	0	116,688	199,528	26,367	17,479	107,990	47,692	199,528
1954	71,616	64,951	1,997	8,165	111	1,470	0	0	0	89,479	172,838	19,793	6,665	75,312	71,068	172,838
1955	70,149	66,388	1,268	5,793	111	582	0	0	0	76,202	154,105	16,993	3,761	64,617	68,734	154,105
1956	83,104	79,154	1,098	6,016	111	398	0	0	0	68,876	159,603	15,229	3,950	58,952	81,472	159,603
1957	66,039	47,704	906	20,338	111	19,156	0	0	0	79,782	186,331	15,381	18,335	83,406	69,209	186,331
1958	154,928	110,691	7,344	20,276	111	46,906	0	0	0	124,236	353,802	22,874	44,237	144,165	142,526	353,802
1959	47,882	45,980	1,777	817	111	2,027	0	0	0	90,792	143,407	19,922	1,902	75,049	46,533	143,407
1960	43,230	43,230	807	523	111	0	0	0	0	73,451	118,122	16,247	0	58,358	43,517	118,122
1961	34,677	34,677	979	523	111	0	0	0	0	62,643	98,933	11,311	0	51,967	35,655	98,933
1962	134,007	107,986	4,195	6,908	111	23,990	0	0	0	93,253	262,463	16,766	26,021	97,957	121,719	262,463
1963	51,406	51,354	1,159	967	111	48	187	0	0	87,955	141,833	18,073	52	72,272	51,436	141,833
1964	42,768	42,768	696	2,853	111	0	437	0	0	86,363	133,228	18,694	0	70,128	44,406	133,228
1965	71,153	49,441	433	86,180	111	29,809	687	0	0	109,378	297,751	27,246	21,712	115,320	133,473	297,751
1966	121,007	75,997	9,236	7,020	111	60,619	937	0	0	138,474	337,404	38,837	45,010	134,095	119,462	337,404

Table I-1
Annual Surface Water Budget for Historical Conditions (Water Years 1925 through 2019)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1967	125,494	102,129	8,260	20,338	111	21,515	1,187	90	0	152,489	329,484	44,721	23,365	149,062	112,337	329,484
1968	71,531	58,292	2,008	488	111	14,180	1,437	281	0	134,492	224,528	41,201	13,239	108,310	61,778	224,528
1969	157,907	95,701	23,229	86,174	111	85,563	1,687	496	0	188,639	543,807	65,330	62,206	176,558	239,713	543,807
1970	59,833	41,323	4,404	21,342	111	21,060	1,937	711	0	165,781	275,179	57,387	18,510	146,034	53,249	275,179
1971	83,858	64,746	4,486	3,780	111	19,853	2,187	926	0	146,987	262,188	47,782	19,112	124,284	71,010	262,188
1972	49,267	47,794	1,564	811	111	140	2,437	1,141	0	117,651	173,122	37,950	1,473	85,995	47,705	173,122
1973	103,985	85,471	3,693	6,902	111	14,411	2,687	1,356	0	123,171	256,317	37,738	18,514	104,438	95,628	256,317
1974	75,432	61,739	1,674	10,206	111	8,061	2,937	1,571	0	120,622	220,614	36,871	13,693	103,940	66,111	220,614
1975	77,485	72,973	814	3,764	111	2,441	3,187	1,786	0	108,032	197,620	32,827	4,512	86,156	74,125	197,620
1976	57,654	55,351	259	0	111	229	3,437	2,001	0	98,088	161,778	29,228	2,303	75,055	55,193	161,778
1977	80,504	63,684	147	0	111	14,538	3,687	2,216	0	105,704	206,907	29,327	16,820	93,627	67,134	206,907
1978	224,449	121,463	21,288	22,293	111	148,404	3,937	2,431	0	169,172	592,085	56,595	102,986	175,575	256,929	592,085
1979	109,604	79,475	6,314	27,403	111	31,125	4,187	2,646	0	174,304	355,694	60,295	30,129	154,521	110,749	355,694
1980	136,984	89,796	11,607	14,786	111	58,191	4,511	2,808	0	173,820	402,818	79,622	47,188	157,305	118,704	402,818
1981	57,610	52,814	1,836	4,541	124	2,798	4,730	2,903	0	129,765	204,306	53,258	4,796	101,841	44,412	204,306
1982	86,792	68,847	3,802	6,471	109	15,625	5,200	3,238	0	138,766	260,003	51,670	17,945	123,715	66,673	260,003
1983	188,515	104,388	27,927	63,058	110	119,739	5,800	3,395	0	232,521	641,065	82,097	84,127	225,915	248,927	641,065
1984	51,574	26,971	1,372	8,992	109	36,494	5,823	3,625	0	209,806	317,795	78,622	24,603	172,235	42,335	317,795
1985	65,286	65,286	3,010	1,635	108	0	5,642	3,903	0	131,143	210,727	51,485	0	96,877	62,365	210,727
1986	112,958	94,399	4,169	5,624	108	14,139	5,868	4,554	0	140,935	288,355	50,888	18,559	124,552	94,355	288,355
1987	29,853	26,606	2,022	1,005	112	1,800	5,606	6,029	0	126,970	173,397	46,940	3,247	98,937	24,273	173,397
1988	101,049	90,978	4,031	4,544	111	3,435	5,171	7,119	0	130,057	255,516	45,878	10,071	110,398	89,170	255,516
1989	64,154	59,171	1,449	932	110	2,127	5,440	7,877	0	118,945	201,034	43,218	4,983	95,108	57,725	201,034
1990	41,636	41,636	217	532	113	0	5,594	8,278	0	108,649	165,019	38,807	0	86,071	40,141	165,019
1991	78,828	60,208	3,705	1,655	111	16,748	5,911	8,104	0	119,802	234,864	39,073	18,620	113,798	63,374	234,864
1992	154,677	93,651	3,510	18,681	108	81,720	5,903	9,556	0	178,551	452,706	57,019	61,026	187,498	147,163	452,706
1993	178,451	106,498	24,328	22,246	108	97,420	6,796	10,022	0	252,351	591,721	99,983	71,953	239,298	180,487	591,721
1994	45,536	41,672	19,954	6,255	107	5,189	7,556	9,460	0	148,353	242,410	54,608	3,864	128,810	55,129	242,410
1995	156,731	99,912	634	7,062	110	76,517	7,841	9,970	0	167,403	426,268	65,474	56,819	157,807	146,168	426,268
1996	62,558	46,697	3,026	6,957	108	15,028	6,417	10,526	0	146,884	251,504	53,756	15,861	129,114	52,773	251,504
1997	77,738	64,428	2,072	10,647	105	8,936	6,052	9,932	0	127,758	243,239	43,419	13,310	112,821	73,689	243,239
1998	201,137	128,358	35,204	47,365	100	97,591	6,186	11,096	0	240,294	638,974	83,307	72,779	252,996	229,892	638,974
1999	54,843	49,190	2,087	8,994	117	7,971	6,317	11,458	0	147,869	239,656	56,354	5,653	125,028	52,621	239,656
2000	68,135	63,321	2,204	7,563	108	501	6,019	12,492	0	119,098	216,120	43,951	4,814	100,733	66,622	216,120
2001	99,226	71,641	3,880	2,695	108	29,199	6,373	12,468	0	136,167	290,116	46,782	27,585	133,379	82,371	290,116
2002	30,776	25,093	1,015	0	106	6,083	6,279	13,566	0	119,183	177,008	40,785	5,683	105,281	25,258	177,008
2003	102,056	92,930	1,088	3,019	108	3,626	5,266	15,167	0	112,402	242,731	40,106	9,126	99,308	94,191	242,731
2004	56,982	45,918	30	1,063	107	7,671	4,364	15,941	0	114,876	201,034	40,410	11,064	102,493	47,067	201,034
2005	219,962	135,800	37,844	91,241	47	111,067	4,624	18,137	0	193,668	676,590	76,616	84,162	202,498	313,313	676,590
2006	86,291	71,887	4,712	17,844	53	10,033	5,211	17,839	0	150,450	292,433	58,978	14,404	133,741	85,310	292,433
2007	27,422	26,733	645	0	55	225	5,661	17,153	0	115,320	166,481	45,589	689	93,881	26,322	166,481
2008	96,940	76,786	1,286	10,579	62	18,080	5,544	17,633	0	120,289	270,413	46,360	20,154	112,982	90,917	270,413

Table I-1

Annual Surface Water Budget for Historical Conditions (Water Years 1925 through 2019)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
2009	57,192	49,796	159	2,552	119	4,727	5,679	16,974	0	108,143	195,545	38,677	7,396	99,283	50,189	195,545
2010	107,549	79,348	1,059	10,185	127	32,972	5,461	16,849	1,099	126,076	301,377	43,688	28,201	130,330	99,158	301,377
2011	131,113	95,681	4,465	22,247	131	36,536	5,593	16,401	693	145,174	362,353	50,871	35,432	147,414	128,635	362,353
2012	67,381	62,933	1,094	709	73	2,719	5,662	16,228	0	114,242	208,109	40,615	4,448	100,576	62,471	208,109
2013	34,716	34,716	0	0	43	0	5,701	16,081	0	100,346	156,887	34,529	0	88,053	34,305	156,887
2014	38,701	38,701	215	0	33	0	6,033	15,232	0	92,198	152,411	30,172	0	83,859	38,380	152,411
2015	53,962	53,962	65	0	36	0	5,862	14,586	0	88,726	163,236	27,800	0	82,021	53,416	163,236
2016	45,578	45,481	22	0	34	5	5,600	14,225	0	90,038	155,502	26,685	97	83,779	44,942	155,502
2017	107,046	94,125	10,551	19,581	48	5,751	5,703	14,564	4	110,175	273,424	35,708	12,921	114,857	109,937	273,424
2018	46,753	45,103	0	0	62	176	5,485	14,577	2,532	106,313	175,897	36,453	1,650	93,370	44,424	175,897
2019	116,061	84,034	3,102	19,231	60	37,583	5,195	14,931	3,700	139,943	339,806	52,878	32,027	143,411	111,490	339,806
Min	**27,422**	**25,093**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**62,592**	**98,933**	**11,311**	**0**	**51,175**	**24,273**	**98,933**
Max	**224,449**	**135,800**	**37,844**	**101,811**	**131**	**148,404**	**7,841**	**18,137**	**3,700**	**268,487**	**765,971**	**99,983**	**102,986**	**252,996**	**331,530**	**765,971**
Average	**87,602**	**67,019**	**5,173**	**14,741**	**93**	**24,154**	**2,809**	**4,974**	**85**	**134,463**	**274,095**	**44,905**	**20,583**	**117,293**	**91,312**	**274,095**
Percent of Total	**32%**		**2%**	**5%**	**0.03%**	**9%**	**1%**	**2%**	**0.03%**	**49%**	**100%**	**16%**	**8%**	**43%**	**33%**	**100%**

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: WRP = water reclamation plant ET = evapotranspiration

Note: Blue font means inflow to surface water, purple font means internal surface flow process, and red font means surface water outflow.

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: For WRPs, the statistics are for all years, including years before they were present.

Note: All values are from historical data, except the following:

The internal flow term *Stormwater Generated from In-Basin Precipitation* is the difference between the basin-wide rainfall volume and the volume of streamflow percolation to groundwater from ephemeral streams.

The inflow term *Groundwater Discharge to Streams* is the basin-wide SFR-Out term computed by the SFR package in MODFLOW-USG.

The outflow term *Santa Clara River Non-Storm Outflow at Western Basin Boundary* is calculated by the SFR and CHD packages in MODFLOW-USG and includes subsurface outflows.

The outflow term *Groundwater Recharge from Precipitation* is calculated by the SCV Recharge Compiler and is provided as input to the RCH package in MODFLOW-USG.

The outflow term *Groundwater Recharge from Streams* is the sum of (1) recharge in ephemeral streams (from the SCV Recharge Compiler and the RCH package) and (2) the basin-wide SFR-In term computed by the SFR package in MODFLOW-USG.

The outflow term *ET and Stormwater Outflow* is calculated from the balance of all other terms in this surface water budget.

Table I-2

Annual Groundwater Budget for Historical Conditions (Water Years 1925 through 2019)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1925	0	83,091	1,676	29,334	0	0	114,101	0	7,266	134,241	141,506	-27,406	-27,406
1926	45,195	141,306	1,676	28,643	0	0	216,820	0	7,666	176,218	183,884	32,936	5,531
1927	29,258	143,526	1,676	28,589	0	0	203,050	0	7,812	189,397	197,209	5,841	11,372
1928	5,683	100,465	1,680	29,113	0	0	136,941	0	7,557	155,712	163,268	-26,327	-14,955
1929	0	80,887	1,676	29,410	0	0	111,972	0	7,268	132,811	140,078	-28,106	-43,061
1930	0	79,382	1,676	29,460	0	0	110,518	0	7,111	125,765	132,876	-22,358	-65,419
1931	22,908	123,131	1,676	28,955	0	0	176,670	0	7,357	151,559	158,916	17,754	-47,666
1932	16,127	115,176	1,680	28,995	0	0	161,979	0	7,515	156,520	164,036	-2,057	-49,723
1933	17,700	105,324	1,676	29,027	0	0	153,727	0	7,443	148,683	156,126	-2,400	-52,122
1934	13,589	110,525	1,676	29,069	0	0	154,859	0	7,485	152,566	160,050	-5,191	-57,313
1935	8,038	92,028	1,676	29,261	0	0	131,002	0	7,338	138,518	145,856	-14,854	-72,167
1936	10,503	95,494	1,680	29,384	0	799	137,860	4,129	7,223	135,148	146,500	-8,640	-80,807
1937	25,058	118,218	1,676	28,998	0	1,750	175,699	9,061	7,310	148,783	165,154	10,545	-70,262
1938	48,588	142,282	1,676	28,674	0	2,702	223,922	13,994	7,528	168,926	190,448	33,474	-36,788
1939	21,932	144,867	1,676	28,873	0	3,655	201,002	18,926	7,429	176,742	203,097	-2,094	-38,882
1940	13,872	106,394	1,680	29,112	0	4,616	155,674	23,859	7,091	137,604	168,554	-12,880	-51,762
1941	97,318	250,196	1,676	28,007	0	5,559	382,755	28,791	7,852	268,487	305,130	77,625	25,863
1942	18,910	148,946	1,676	28,627	0	6,512	204,670	33,724	7,388	182,907	224,018	-19,349	6,515
1943	64,247	234,926	1,676	28,274	0	7,464	336,586	38,656	7,636	253,282	299,574	37,012	43,527
1944	48,217	170,321	1,680	28,393	0	8,432	257,043	43,589	7,414	198,918	249,920	7,123	50,650
1945	11,229	107,810	1,676	28,974	0	9,369	159,057	48,521	6,759	134,749	190,029	-30,971	19,679
1946	12,529	98,246	1,676	29,083	0	9,524	151,058	49,325	6,389	115,720	171,434	-20,376	-697
1947	17,771	95,787	1,676	29,054	0	9,524	153,812	49,325	6,139	111,475	166,939	-13,127	-13,823
1948	0	65,319	1,680	29,522	0	9,541	106,063	49,325	5,560	85,706	140,591	-34,528	-48,351
1949	0	57,084	1,676	29,538	0	9,524	97,821	49,188	5,027	73,495	127,709	-29,888	-78,240
1950	0	52,392	1,676	29,559	0	9,524	93,151	49,269	4,506	66,250	120,025	-26,874	-105,114
1951	0	51,175	1,676	29,561	0	9,524	91,935	49,033	4,083	62,592	115,709	-23,774	-128,888
1952	55,492	144,065	1,680	28,795	0	9,541	239,573	49,425	5,654	115,045	170,124	69,449	-59,438
1953	17,479	107,991	1,676	28,847	0	9,524	165,516	49,604	5,952	116,688	172,244	-6,728	-66,166
1954	6,665	75,312	1,676	29,264	0	9,524	122,441	49,484	5,556	89,479	144,519	-22,078	-88,245
1955	3,761	64,616	1,676	29,401	0	9,524	108,977	49,333	5,126	76,202	130,661	-21,684	-109,928
1956	3,950	58,953	1,680	29,555	0	9,541	103,679	49,154	4,686	68,876	122,716	-19,037	-128,965
1957	18,335	83,406	1,676	29,110	0	9,524	142,051	49,366	4,760	79,782	133,909	8,142	-120,823
1958	44,237	144,166	1,676	28,529	0	9,524	228,131	49,813	5,843	124,236	179,892	48,239	-72,584
1959	1,902	75,050	1,676	29,162	0	9,524	117,313	49,807	5,579	90,792	146,179	-28,866	-101,451
1960	0	58,358	1,680	29,547	0	9,541	99,126	49,987	5,005	73,451	128,443	-29,317	-130,767
1961	0	51,967	1,676	29,534	59	7,123	90,358	48,410	4,447	62,643	115,500	-25,141	-155,909
1962	26,021	97,958	1,676	29,121	78	5,544	160,398	43,405	4,455	93,253	141,113	19,285	-136,624
1963	52	72,272	1,676	29,413	239	4,332	107,984	39,221	4,444	87,955	131,621	-23,637	-160,260

Table I-2

Annual Groundwater Budget for Historical Conditions (Water Years 1925 through 2019)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1964	0	70,128	1,680	29,605	404	3,088	104,905	35,473	4,446	86,363	126,282	-21,377	-181,637
1965	21,712	115,319	1,676	29,193	639	3,073	171,612	31,654	5,034	109,378	146,066	25,546	-156,092
1966	45,010	134,095	1,676	28,679	815	2,601	212,878	33,060	5,316	138,474	176,849	36,028	-120,063
1967	23,365	149,063	1,676	28,737	905	2,589	206,334	29,600	5,651	152,489	187,740	18,594	-101,469
1968	13,239	108,310	1,680	29,036	948	2,626	155,839	29,236	5,507	134,492	169,235	-13,397	-114,866
1969	62,206	176,558	1,676	28,506	974	2,645	272,565	29,711	5,828	188,639	224,179	48,387	-66,479
1970	18,510	146,034	1,676	28,782	1,004	2,668	198,673	30,176	5,888	165,781	201,845	-3,172	-69,651
1971	19,112	124,284	1,676	28,860	1,033	2,690	177,656	30,691	5,718	146,987	183,396	-5,740	-75,392
1972	1,473	85,995	1,680	29,438	1,066	2,717	122,369	31,166	5,447	117,651	154,265	-31,896	-107,287
1973	18,514	104,438	1,676	29,199	1,092	2,736	157,654	31,632	5,421	123,171	160,224	-2,570	-109,857
1974	13,693	103,940	1,676	29,241	1,122	2,759	152,430	32,147	5,469	120,622	158,237	-5,808	-115,665
1975	4,512	86,155	1,676	29,455	1,151	2,781	125,731	32,622	5,251	108,032	145,906	-20,175	-135,840
1976	2,303	75,054	1,680	29,675	1,184	2,808	112,704	33,087	5,002	98,088	136,176	-23,472	-159,312
1977	16,820	93,627	1,676	29,370	1,210	2,827	145,529	33,602	4,986	105,704	144,292	1,237	-158,075
1978	102,986	175,575	1,676	28,207	1,240	2,850	312,534	34,078	5,766	169,172	209,016	103,518	-54,557
1979	30,129	154,521	1,676	28,491	1,274	2,876	218,967	34,542	5,966	174,304	214,812	4,156	-50,401
1980	47,188	157,305	1,680	28,599	1,452	2,928	239,151	35,813	8,446	173,820	218,079	21,071	-29,330
1981	4,796	101,841	1,676	29,226	1,680	3,235	142,453	35,929	8,431	129,765	174,125	-31,672	-61,002
1982	17,945	123,715	1,676	29,073	1,389	2,825	176,623	27,900	8,498	138,766	175,164	1,459	-59,542
1983	84,127	225,915	1,676	28,048	1,226	2,431	343,423	24,441	9,240	232,521	266,202	77,221	17,678
1984	24,603	172,234	1,680	28,608	1,749	3,155	232,030	30,282	9,135	209,806	249,223	-17,193	485
1985	0	96,877	1,676	29,286	2,013	3,162	133,015	30,329	8,456	131,143	169,928	-36,913	-36,428
1986	18,559	124,552	1,676	29,072	2,175	3,186	179,219	29,714	8,568	140,935	179,216	3	-36,425
1987	3,247	98,937	1,676	29,301	2,373	3,185	138,719	28,428	8,418	126,970	163,816	-25,097	-61,522
1988	10,071	110,399	1,680	29,318	2,437	3,376	157,280	28,465	8,396	130,057	166,917	-9,637	-71,159
1989	4,983	95,108	1,676	29,390	2,432	3,747	137,335	30,863	8,179	118,945	157,987	-20,652	-91,811
1990	0	86,071	1,676	29,553	2,432	3,954	123,687	32,571	7,808	108,649	149,028	-25,341	-117,152
1991	18,620	113,798	1,676	29,203	2,432	3,623	169,352	39,996	7,830	119,802	167,627	1,725	-115,427
1992	61,026	187,498	1,680	28,475	2,439	3,700	284,819	39,338	8,641	178,551	226,530	58,289	-57,138
1993	71,953	239,298	1,676	28,124	2,432	3,695	347,178	40,177	9,244	252,351	301,772	45,406	-11,732
1994	3,864	128,811	1,676	28,968	2,432	4,115	169,865	44,219	8,806	148,353	201,378	-31,513	-43,245
1995	56,819	157,807	1,676	28,595	2,432	4,156	251,485	43,497	8,976	167,403	219,876	31,609	-11,636
1996	15,861	129,114	1,680	29,056	2,439	4,773	182,924	45,896	8,652	146,884	201,432	-18,508	-30,144
1997	13,310	112,821	1,676	29,177	2,432	5,217	164,632	47,243	8,312	127,758	183,312	-18,680	-48,824
1998	72,779	252,996	1,676	28,284	2,432	4,616	362,782	43,183	9,156	240,294	292,633	70,149	21,325
1999	5,653	125,028	1,676	28,982	2,432	5,184	168,955	46,248	8,794	147,869	202,911	-33,956	-12,631
2000	4,814	100,733	1,680	29,452	2,439	5,561	144,678	44,621	8,322	119,098	172,040	-27,362	-39,993
2001	27,585	133,379	1,676	28,989	2,432	5,609	199,669	42,269	8,387	136,167	186,822	12,847	-27,146
2002	5,683	105,282	1,676	29,262	2,432	6,159	150,493	43,096	8,216	119,183	170,495	-20,002	-47,149

Table I-2

Annual Groundwater Budget for Historical Conditions (Water Years 1925 through 2019)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
2003	9,126	99,308	1,676	29,409	2,432	5,989	147,939	38,884	8,112	112,402	159,397	-11,458	-58,607
2004	11,064	102,493	1,680	29,424	2,439	6,305	153,404	39,741	8,036	114,876	162,653	-9,248	-67,855
2005	84,162	202,498	1,676	28,207	2,432	5,835	324,811	42,536	8,927	193,668	245,131	79,680	11,825
2006	14,404	133,741	1,676	28,851	2,432	6,274	187,379	50,504	8,705	150,450	209,659	-22,280	-10,456
2007	689	93,881	1,676	29,431	2,432	6,557	134,667	47,704	8,085	115,320	171,108	-36,441	-46,897
2008	20,154	112,982	1,680	29,330	2,439	6,363	172,949	47,692	8,131	120,289	176,113	-3,164	-50,061
2009	7,396	99,284	1,676	29,411	2,432	6,041	146,239	48,561	7,866	108,143	164,571	-18,332	-68,393
2010	28,201	130,330	1,676	29,068	2,432	5,529	197,236	50,423	8,076	126,076	184,574	12,662	-55,731
2011	35,432	147,415	1,676	28,775	2,432	5,490	221,220	49,076	8,444	145,174	202,694	18,525	-37,205
2012	4,448	100,577	1,680	29,407	2,439	5,932	144,483	50,205	8,076	114,242	172,523	-28,040	-65,245
2013	0	88,053	1,676	29,571	2,432	6,387	128,119	46,607	7,658	100,346	154,612	-26,493	-91,738
2014	0	83,858	1,676	29,605	2,432	5,865	123,436	46,966	7,192	92,198	146,355	-22,920	-114,658
2015	0	82,021	1,676	29,613	2,432	4,726	120,468	41,677	7,062	88,726	137,465	-16,997	-131,655
2016	97	83,779	1,680	29,703	2,439	5,018	122,716	42,151	7,079	90,038	139,269	-16,553	-148,208
2017	12,921	114,857	1,676	29,298	2,432	5,434	166,618	30,499	7,781	110,175	148,455	18,163	-130,045
2018	1,650	93,370	1,676	29,470	2,432	5,638	134,236	36,472	7,644	106,313	150,429	-16,193	-146,238
2019	32,027	143,411	1,676	28,957	2,432	5,250	213,753	33,053	8,286	139,943	181,281	32,471	-113,767
Min	**0**	**51,175**	**1,676**	**28,007**	**0**	**0**	**90,358**	**0**	**4,083**	**62,592**	**115,500**	**-36,913**	
Max	**102,986**	**252,996**	**1,680**	**29,703**	**2,439**	**9,541**	**382,755**	**50,504**	**9,244**	**268,487**	**305,130**	**103,518**	
Average	**20,583**	**117,293**	**1,677**	**29,072**	**1,141**	**4,688**	**174,454**	**34,163**	**7,026**	**134,463**	**175,651**	**-1,198**	
Percent of Total	**11.8%**	**67.2%**	**1.0%**	**16.7%**	**0.7%**	**2.7%**	**100%**	**19.4%**	**4.0%**	**76.6%**	**100%**		

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: ET = evapotranspiration GW = groundwater SNMP = Salt Nutrient Management Plan (GSSI, 2016)

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: Subsurface outflow at the western basin boundary is included in the surface water budget as surface water outflow (Table I-1) rather than in this groundwater budget.

Notes:
- (a) Computed by the SCV Recharge Compiler
- (b) Computed by the SCV Recharge Compiler and the SFR package in MODFLOW-USG
- (c) Estimated and provided as input to the WEL package in MODFLOW-USG
- (d) Computed by the GHB package in MODFLOW-USG
- (e) Computed by the SCV Recharge Compiler, based on estimates from the SNMP
- (f) Computed by the SCV Recharge Compiler, based on acreages and plant water demands
- (g) Total of items (a) through (f)
- (h) From data (1980-2019) or estimated (1922-1979)
- (i) Computed by the EVT package in MODFLOW-USG
- (j) Computed by the SFR package in MODFLOW-USG
- (k) Total of items (h) through (j)
- (l) Total inflow minus total outflow
- (m) Rolling sum of annual changes in groundwater storage

Annual Water Budget Tables: Current Conditions

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Table I-3
Annual Surface Water Budget for Current Conditions (Under the 2014 Level of Development)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1925	33,042	33,042	1,418	1,471	111	0	5,004	16,813	500	109,581	167,940	42,581	0	93,222	32,137	167,940
1926	133,419	88,224	10,985	59,265	111	56,544	5,004	16,813	500	141,138	423,779	52,821	45,195	145,756	180,007	423,779
1927	100,190	70,932	3,573	14,351	111	31,678	5,004	16,813	500	147,260	319,480	55,257	29,258	140,064	94,901	319,480
1928	30,776	25,093	1,015	622	111	6,083	5,018	16,860	501	125,223	186,209	47,366	5,683	105,731	27,429	186,209
1929	73,314	73,314	602	523	111	0	5,004	16,813	500	105,791	202,658	39,598	0	90,284	72,776	202,658
1930	57,272	57,272	1,140	523	111	0	5,004	16,813	500	97,638	179,001	34,470	0	88,434	56,097	179,001
1931	95,197	72,289	4,027	13,673	111	26,054	5,004	16,813	500	120,654	282,032	37,965	22,908	131,752	89,408	282,032
1932	109,562	93,435	2,215	5,759	111	16,355	5,018	16,860	501	122,278	278,660	42,268	16,127	120,935	99,330	278,660
1933	78,871	61,171	1,742	7,264	111	15,050	5,004	16,813	500	117,173	242,528	40,804	17,700	112,902	71,122	242,528
1934	68,848	55,259	3,857	9,167	111	9,294	5,004	16,813	500	117,636	231,229	39,899	13,589	114,993	62,748	231,229
1935	98,241	90,203	407	1,465	111	4,366	5,004	16,813	500	105,946	232,854	36,512	8,038	97,744	90,561	232,854
1936	52,873	42,370	246	9,238	111	8,920	5,018	16,860	501	106,111	199,878	36,074	10,503	102,741	50,560	199,878
1937	126,250	101,192	3,857	9,167	111	17,379	5,004	16,813	500	121,963	301,044	38,761	25,058	124,105	113,121	301,044
1938	126,334	77,746	407	86,803	111	64,532	5,004	16,813	500	137,056	437,559	47,717	48,588	141,764	199,489	437,559
1939	101,596	79,664	11,336	7,899	111	30,288	5,004	16,813	500	139,234	312,780	52,003	21,932	136,180	102,665	312,780
1940	61,008	47,136	711	9,249	111	12,963	5,018	16,860	501	122,974	229,395	45,813	13,872	114,844	54,866	229,395
1941	219,669	122,351	37,844	101,811	111	138,049	5,004	16,813	500	236,467	756,268	83,210	97,318	243,019	332,721	756,268
1942	63,314	44,404	1,916	8,766	111	28,197	5,004	16,813	500	162,496	287,117	62,634	18,910	144,916	60,658	287,117
1943	149,184	84,937	33,737	99,911	111	92,611	5,004	16,813	500	241,848	639,719	91,286	64,247	238,814	245,372	639,719
1944	134,174	85,957	818	16,158	111	61,091	5,018	16,860	501	195,491	430,222	73,142	48,217	175,269	133,594	430,222
1945	61,176	49,947	1,449	5,759	111	10,791	5,004	16,813	500	139,506	241,109	56,562	11,229	117,051	56,267	241,109
1946	78,409	65,880	1,775	20,338	111	9,884	5,004	16,813	500	129,404	262,237	48,895	12,529	114,566	86,247	262,237
1947	80,966	63,195	1,130	488	111	17,113	5,004	16,813	500	127,694	249,819	47,667	17,771	114,752	69,629	249,819
1948	37,275	37,275	350	517	111	0	5,018	16,860	501	104,637	165,269	39,295	0	89,820	36,154	165,269
1949	46,752	46,752	281	523	111	0	5,004	16,813	500	96,919	166,903	34,602	0	87,049	45,252	166,903
1950	45,871	45,871	940	194	111	0	5,004	16,813	500	93,077	162,510	31,347	0	86,242	44,922	162,510
1951	34,298	34,298	775	1,333	111	0	5,004	16,813	500	89,735	148,569	29,086	0	85,841	33,642	148,569
1952	160,212	104,720	21,239	86,267	111	77,917	5,018	16,860	501	148,267	516,391	50,150	55,492	172,569	238,180	516,391
1953	54,382	36,903	2,250	1,554	111	24,542	5,004	16,813	500	137,944	243,101	47,787	17,479	129,482	48,353	243,101
1954	71,616	64,951	1,997	8,165	111	1,470	5,004	16,813	500	111,876	217,552	39,580	6,665	101,170	70,137	217,552
1955	70,149	66,388	1,268	5,793	111	582	5,004	16,813	500	101,833	202,053	35,633	3,761	95,275	67,385	202,053
1956	83,104	79,154	1,098	6,016	111	398	5,018	16,860	501	97,432	210,538	32,997	3,950	93,233	80,358	210,538
1957	66,039	47,704	906	20,338	111	19,156	5,004	16,813	500	111,671	240,537	35,539	18,335	118,505	68,158	240,537
1958	154,928	110,691	7,344	20,276	111	46,906	5,004	16,813	500	151,509	403,391	47,727	44,237	169,694	141,733	403,391
1959	47,882	45,980	1,777	817	111	2,027	5,004	16,813	500	117,480	192,411	40,659	1,902	102,800	47,051	192,411
1960	43,230	43,230	807	523	111	0	5,018	16,860	501	101,628	168,678	35,039	0	90,469	43,169	168,678
1961	34,677	34,677	979	523	111	0	5,004	16,813	500	93,179	151,785	30,733	0	87,351	33,701	151,785
1962	134,007	107,986	4,195	6,908	111	23,990	5,004	16,813	500	111,523	303,051	35,406	26,021	119,947	121,677	303,051
1963	51,406	51,354	1,159	967	111	48	5,004	16,813	500	96,118	172,126	31,675	52	89,634	50,764	172,126
1964	42,768	42,768	696	2,853	111	0	5,018	16,860	501	92,125	160,932	29,618	0	87,591	43,723	160,932
1965	71,153	49,441	433	86,180	111	29,809	5,004	16,813	500	114,298	324,301	37,284	21,712	131,781	133,524	324,301
1966	121,007	75,997	9,236	7,020	111	60,619	5,004	16,813	500	141,730	362,040	47,269	45,010	148,830	120,931	362,040

Table I-3

Annual Surface Water Budget for Current Conditions (Under the 2014 Level of Development)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1967	125,494	102,129	8,260	20,338	111	21,515	5,004	16,813	500	155,100	353,135	53,011	23,365	164,288	112,471	353,135
1968	71,531	58,292	2,008	488	111	14,180	5,018	16,860	501	132,158	242,855	45,668	13,239	121,871	62,077	242,855
1969	157,907	95,701	23,229	86,174	111	85,563	5,004	16,813	500	183,592	558,894	68,206	62,206	187,782	240,700	558,894
1970	59,833	41,323	4,404	21,342	111	21,060	5,004	16,813	500	164,488	293,555	60,462	18,510	158,735	55,849	293,555
1971	83,858	64,746	4,486	3,780	111	19,853	5,004	16,813	500	142,655	277,061	51,122	19,112	134,479	72,347	277,061
1972	49,267	47,794	1,564	811	111	140	5,018	16,860	501	111,896	186,169	41,373	1,473	96,356	46,966	186,169
1973	103,985	85,471	3,693	6,902	111	14,411	5,004	16,813	500	117,975	269,394	41,226	18,514	115,078	94,577	269,394
1974	75,432	61,739	1,674	9,167	111	8,061	5,004	16,813	500	114,908	231,670	39,793	13,693	111,086	67,099	231,670
1975	77,485	72,973	814	7,162	111	2,441	5,004	16,813	500	104,698	215,028	36,388	4,512	98,185	75,943	215,028
1976	57,654	55,351	259	1,732	111	229	5,018	16,860	501	97,136	179,500	32,826	2,303	89,397	54,974	179,500
1977	80,504	63,684	147	1,236	111	14,538	5,004	16,813	500	105,779	224,632	33,337	16,820	107,369	67,107	224,632
1978	224,449	121,463	21,288	100,395	111	148,404	5,004	16,813	500	185,029	701,993	60,558	102,986	202,109	336,340	701,993
1979	109,604	79,475	6,314	34,822	111	31,125	5,004	16,813	500	191,272	395,565	64,709	30,129	181,018	119,709	395,565
1980	136,984	89,796	11,607	60,076	111	58,191	5,018	16,860	501	179,602	468,950	66,675	47,188	173,472	181,616	468,950
1981	57,610	52,814	1,836	6,338	111	2,798	5,004	16,813	500	128,388	219,398	49,781	4,796	110,657	54,163	219,398
1982	86,792	68,847	3,802	9,548	111	15,625	5,004	16,813	500	129,165	267,360	46,598	17,945	127,675	75,142	267,360
1983	188,515	104,388	27,927	90,597	111	119,739	5,004	16,813	500	226,206	675,412	75,819	84,127	238,067	277,399	675,412
1984	51,574	26,971	1,372	10,417	111	36,494	5,018	16,860	501	195,315	317,662	71,656	24,603	172,528	48,874	317,662
1985	65,286	65,286	3,010	3,214	111	0	5,004	16,813	500	117,791	211,729	46,132	0	100,580	65,017	211,729
1986	112,958	94,399	4,169	20,700	111	14,139	5,004	16,813	500	129,708	304,101	47,480	18,559	128,664	109,398	304,101
1987	29,853	26,606	2,022	1,004	111	1,800	5,004	16,813	500	109,157	166,264	39,123	3,247	97,976	25,918	166,264
1988	101,049	90,978	4,031	4,544	111	3,435	5,018	16,860	501	112,664	248,212	37,682	10,071	109,449	91,011	248,212
1989	64,154	59,171	1,449	932	111	2,127	5,004	16,813	500	100,850	191,940	34,547	4,983	93,286	59,125	191,940
1990	41,636	41,636	217	532	111	0	5,004	16,813	500	92,736	157,549	31,403	0	84,931	41,215	157,549
1991	78,828	60,208	3,705	6,908	111	16,748	5,004	16,813	500	106,851	235,468	33,512	18,620	112,950	70,386	235,468
1992	154,677	93,651	3,510	30,381	111	81,720	5,018	16,860	501	178,382	471,160	52,125	61,026	195,833	162,176	471,160
1993	178,451	106,498	24,328	87,136	111	97,420	5,004	16,813	500	248,287	658,050	89,465	71,953	243,315	253,317	658,050
1994	45,536	41,672	19,954	6,467	111	5,189	5,004	16,813	500	140,102	239,677	51,814	3,864	128,365	55,634	239,677
1995	156,731	99,912	634	64,358	111	76,517	5,004	16,813	500	165,997	486,665	63,467	56,819	162,897	203,481	486,665
1996	62,558	46,697	3,026	6,585	111	15,028	5,018	16,860	501	142,903	252,590	53,733	15,861	128,596	54,400	252,590
1997	77,738	64,428	2,072	10,600	111	8,936	5,004	16,813	500	127,477	249,251	47,329	13,310	114,039	74,573	249,251
1998	201,137	128,358	35,204	96,386	111	97,591	5,004	16,813	500	260,439	713,185	89,004	72,779	271,185	280,218	713,185
1999	54,843	49,190	2,087	8,478	111	7,971	5,004	16,813	500	148,213	244,021	56,836	5,653	128,001	53,531	244,021
2000	68,135	63,321	2,204	8,329	111	501	5,018	16,860	501	114,470	216,129	43,872	4,814	99,065	68,378	216,129
2001	99,226	71,641	3,880	13,806	111	29,199	5,004	16,813	500	130,185	298,724	46,824	27,585	131,267	93,048	298,724
2002	30,776	25,093	1,015	720	111	6,083	5,004	16,813	500	113,325	174,347	41,483	5,683	101,899	25,282	174,347
2003	102,056	92,930	1,088	4,304	111	3,626	5,004	16,813	500	106,376	239,877	38,232	9,126	98,458	94,062	239,877
2004	56,982	45,918	30	1,938	111	7,671	5,018	16,860	501	105,528	194,639	36,227	11,064	99,281	48,066	194,639
2005	219,962	135,800	37,844	197,521	111	111,067	5,004	16,813	500	204,955	793,777	66,962	84,162	220,971	421,682	793,777
2006	86,291	71,887	4,712	17,768	111	10,033	5,004	16,813	500	150,605	291,838	54,235	14,404	137,316	85,882	291,838
2007	27,422	26,733	645	1,049	111	225	5,004	16,813	500	108,650	160,420	42,068	689	91,580	26,083	160,420
2008	96,940	76,786	1,286	13,179	111	18,080	5,018	16,860	501	115,113	267,088	42,191	20,154	109,498	95,245	267,088

Table I-3

Annual Surface Water Budget for Current Conditions (Under the 2014 Level of Development)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
2009	57,192	49,796	159	3,651	111	4,727	5,004	16,813	500	105,398	193,555	37,734	7,396	97,426	50,999	193,555
2010	107,549	79,348	1,059	11,126	111	32,972	5,004	16,813	500	123,295	298,429	42,449	28,201	127,805	99,974	298,429
2011	131,113	95,681	4,465	25,027	111	36,536	5,004	16,813	500	142,281	361,850	48,471	35,432	144,109	133,837	361,850
2012	67,381	62,933	1,094	1,586	111	2,719	5,018	16,860	501	113,296	208,566	40,461	4,448	99,486	64,172	208,566
2013	34,716	34,716	0	281	111	0	5,004	16,813	500	97,565	154,990	34,972	0	85,993	34,025	154,990
2014	38,701	38,701	215	836	111	0	5,004	16,813	500	90,123	152,302	30,974	0	84,067	37,261	152,302
2015	53,962	53,962	65	2,510	111	0	5,004	16,813	500	86,425	165,390	28,575	0	82,907	53,908	165,390
2016	45,578	45,481	22	818	111	5	5,018	16,860	501	83,199	152,112	26,235	97	81,001	44,780	152,112
2017	107,046	94,125	10,551	12,244	111	5,751	5,004	16,813	500	93,158	251,178	27,918	12,921	104,800	105,538	251,178
2018	46,753	45,103	0	1,324	111	176	5,004	16,813	500	86,532	157,213	27,371	1,650	83,605	44,587	157,213
2019	116,061	84,034	3,102	21,189	111	37,583	5,004	16,813	500	116,568	316,931	35,919	32,027	134,049	114,936	316,931
Min	**27,422**	**25,093**	**0**	**194**	**111**	**0**	**5,004**	**16,813**	**500**	**83,199**	**148,569**	**26,235**	**0**	**81,001**	**25,282**	**148,569**
Max	**224,449**	**135,800**	**37,844**	**197,521**	**111**	**148,404**	**5,018**	**16,860**	**501**	**260,439**	**793,777**	**91,286**	**102,986**	**271,185**	**421,682**	**793,777**
Average	**87,602**	**67,019**	**5,173**	**20,055**	**111**	**24,154**	**5,007**	**16,824**	**500**	**130,711**	**290,138**	**46,008**	**20,583**	**126,336**	**97,211**	**290,138**
Percent of Total	**30%**		**2%**	**7%**	**0.04%**	**8%**	**2%**	**6%**	**0.2%**	**45%**	**100%**	**16%**	**7%**	**43.5%**	**33.5%**	**100%**

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: WRP = water reclamation plant ET = evapotranspiration

Note: Blue font means inflow to surface water, purple font means internal surface flow process, and red font means surface water outflow.

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: For WRPs, the statistics are for all years, including years before they were present.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for the 2014 level of development. All values are from historical data, except the following:

The internal flow term *Stormwater Generated from In-Basin Precipitation* is the difference between the basin-wide rainfall volume and the volume of streamflow percolation to groundwater from ephemeral streams.

The inflow term *Groundwater Discharge to Streams* is the basin-wide SFR-Out term computed by the SFR package in MODFLOW-USG.

The outflow term *Santa Clara River Non-Storm Outflow at Western Basin Boundary* is calculated by the SFR and CHD packages in MODFLOW-USG and includes subsurface outflows.

The outflow term *Groundwater Recharge from Precipitation* is calculated by the SCV Recharge Compiler and is provided as input to the RCH package in MODFLOW-USG.

The outflow term *Groundwater Recharge from Streams* is the sum of (1) recharge in ephemeral streams (from the SCV Recharge Compiler and the RCH package) and (2) the basin-wide SFR-In term computed by the SFR package in MODFLOW-USG.

The outflow term *ET and Stormwater Outflow* is calculated from the balance of all other terms in this surface water budget.

Table I-4

Annual Groundwater Budget for Current Conditions (Under the 2014 Level of Development)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1925	0	93,222	1,676	29,329	2,432	5,749	132,408	49,231	6,620	109,581	165,431	-33,023	-33,023
1926	45,195	145,756	1,676	28,651	2,432	5,749	229,458	49,231	6,956	141,138	197,324	32,134	-890
1927	29,258	140,064	1,676	28,619	2,432	5,749	207,798	49,231	7,070	147,260	203,561	4,237	3,347
1928	5,683	105,731	1,680	29,159	2,439	5,757	150,450	49,338	6,825	125,223	181,386	-30,937	-27,590
1929	0	90,284	1,676	29,438	2,432	5,749	129,579	49,231	6,448	105,791	161,470	-31,891	-59,480
1930	0	88,434	1,676	29,460	2,432	5,749	127,751	49,231	6,207	97,638	153,077	-25,326	-84,806
1931	22,908	131,751	1,676	28,962	2,432	5,749	193,478	49,231	6,464	120,654	176,348	17,130	-67,677
1932	16,127	120,935	1,680	29,010	2,439	5,757	175,948	49,338	6,622	122,278	178,238	-2,290	-69,966
1933	17,700	112,902	1,676	29,042	2,432	5,749	169,500	49,231	6,556	117,173	172,961	-3,460	-73,426
1934	13,589	114,992	1,676	29,091	2,432	5,749	167,529	49,231	6,568	117,636	173,435	-5,906	-79,332
1935	8,038	97,744	1,676	29,279	2,432	5,749	144,918	49,231	6,363	105,946	161,540	-16,623	-95,955
1936	10,503	102,742	1,680	29,395	2,439	5,757	152,517	49,338	6,353	106,111	161,801	-9,285	-105,239
1937	25,058	124,104	1,676	29,024	2,432	5,749	188,043	49,231	6,576	121,963	177,770	10,273	-94,966
1938	48,588	141,764	1,676	28,742	2,432	5,749	228,952	49,231	6,895	137,056	193,181	35,771	-59,196
1939	21,932	136,180	1,676	28,950	2,432	5,749	196,919	49,231	6,957	139,234	195,422	1,497	-57,699
1940	13,872	114,843	1,680	29,162	2,439	5,757	167,753	49,338	6,744	122,974	179,056	-11,302	-69,001
1941	97,318	243,019	1,676	28,034	2,432	5,749	378,227	49,231	7,620	236,467	293,318	84,910	15,908
1942	18,910	144,916	1,676	28,677	2,432	5,749	202,360	49,231	7,341	162,496	219,068	-16,709	-800
1943	64,247	238,814	1,676	28,304	2,432	5,749	341,222	49,231	7,635	241,848	298,714	42,508	41,707
1944	48,217	175,269	1,680	28,416	2,439	5,757	261,778	49,338	7,618	195,491	252,447	9,332	51,039
1945	11,229	117,051	1,676	29,019	2,432	5,749	167,156	49,231	7,187	139,506	195,924	-28,768	22,271
1946	12,529	114,566	1,676	29,127	2,432	5,749	166,080	49,231	6,958	129,404	185,593	-19,513	2,758
1947	17,771	114,752	1,676	29,103	2,432	5,749	171,483	49,231	6,847	127,694	183,772	-12,289	-9,531
1948	0	89,820	1,680	29,547	2,439	5,757	129,243	49,338	6,455	104,637	160,430	-31,187	-40,717
1949	0	87,049	1,676	29,533	2,432	5,749	126,438	49,231	6,204	96,919	152,354	-25,916	-66,634
1950	0	86,242	1,676	29,543	2,432	5,749	125,641	49,231	6,040	93,077	148,349	-22,707	-89,341
1951	0	85,841	1,676	29,541	2,432	5,749	125,238	49,231	5,910	89,735	144,876	-19,638	-108,979
1952	55,492	172,569	1,680	28,779	2,439	5,757	266,716	49,338	6,812	148,267	204,417	62,299	-46,679
1953	17,479	129,482	1,676	28,854	2,432	5,749	185,671	49,231	6,813	137,944	193,988	-8,317	-54,996
1954	6,665	101,170	1,676	29,281	2,432	5,749	146,973	49,231	6,523	111,876	167,631	-20,658	-75,654
1955	3,761	95,275	1,676	29,393	2,432	5,749	138,285	49,231	6,337	101,833	157,401	-19,116	-94,770
1956	3,950	93,234	1,680	29,537	2,439	5,757	136,598	49,338	6,213	97,432	152,983	-16,385	-111,155
1957	18,335	118,505	1,676	29,093	2,432	5,749	175,790	49,231	6,361	111,671	167,263	8,527	-102,627
1958	44,237	169,694	1,676	28,516	2,432	5,749	252,304	49,231	6,834	151,509	207,574	44,729	-57,898
1959	1,902	102,801	1,676	29,160	2,432	5,749	143,720	49,231	6,658	117,480	173,369	-29,650	-87,548
1960	0	90,469	1,680	29,555	2,439	5,757	129,900	49,338	6,276	101,628	157,242	-27,342	-114,889
1961	0	87,351	1,676	29,522	2,432	5,749	126,730	49,231	6,008	93,179	148,418	-21,688	-136,577
1962	26,021	119,948	1,676	29,121	2,432	5,749	184,947	49,231	5,460	111,523	166,214	18,733	-117,844
1963	52	89,634	1,676	29,422	2,432	5,749	128,965	49,231	5,107	96,118	150,456	-21,491	-139,335

Table I-4

Annual Groundwater Budget for Current Conditions (Under the 2014 Level of Development)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1964	0	87,591	1,680	29,602	2,439	5,757	127,069	49,338	4,968	92,125	146,431	-19,362	-158,697
1965	21,712	131,781	1,676	29,184	2,432	5,749	192,533	49,231	5,492	114,298	169,022	23,512	-135,185
1966	45,010	148,829	1,676	28,678	2,432	5,749	232,374	49,231	5,697	141,730	196,658	35,716	-99,469
1967	23,365	164,288	1,676	28,741	2,432	5,749	226,251	49,231	5,788	155,100	210,119	16,132	-83,337
1968	13,239	121,871	1,680	29,015	2,439	5,757	174,001	49,338	5,688	132,158	187,184	-13,183	-96,520
1969	62,206	187,782	1,676	28,488	2,432	5,749	288,333	49,231	5,926	183,592	238,749	49,584	-46,936
1970	18,510	158,736	1,676	28,747	2,432	5,749	215,849	49,231	5,956	164,488	219,676	-3,826	-50,762
1971	19,112	134,479	1,676	28,844	2,432	5,749	192,292	49,231	5,816	142,655	197,702	-5,410	-56,172
1972	1,473	96,357	1,680	29,410	2,439	5,757	137,116	49,338	5,541	111,896	166,775	-29,660	-85,832
1973	18,514	115,078	1,676	29,139	2,432	5,749	172,587	49,231	5,524	117,975	172,730	-143	-85,974
1974	13,693	111,087	1,676	29,164	2,432	5,749	163,800	49,231	5,505	114,908	169,644	-5,845	-91,819
1975	4,512	98,185	1,676	29,375	2,432	5,749	141,929	49,231	5,399	104,698	159,328	-17,399	-109,218
1976	2,303	89,397	1,680	29,598	2,439	5,757	131,174	49,338	5,202	97,136	151,676	-20,502	-129,720
1977	16,820	107,369	1,676	29,293	2,432	5,749	163,338	49,231	5,218	105,779	160,228	3,110	-126,610
1978	102,986	202,109	1,676	28,107	2,432	5,749	343,059	49,231	5,882	185,029	240,142	102,917	-23,693
1979	30,129	181,018	1,676	28,397	2,432	5,749	249,401	49,231	6,034	191,272	246,537	2,863	-20,830
1980	47,188	173,472	1,680	28,533	2,439	5,757	259,069	49,338	8,502	179,602	237,442	21,627	797
1981	4,796	110,658	1,676	29,170	2,432	5,749	154,481	49,231	8,453	128,388	186,072	-31,591	-30,794
1982	17,945	127,675	1,676	29,019	2,432	5,749	184,497	49,231	8,249	129,165	186,645	-2,149	-32,942
1983	84,127	238,067	1,676	28,008	2,432	5,749	360,059	49,231	9,157	226,206	284,593	75,465	42,523
1984	24,603	172,528	1,680	28,602	2,439	5,757	235,610	49,338	9,016	195,315	253,669	-18,059	24,464
1985	0	100,580	1,676	29,257	2,432	5,749	139,694	49,231	8,230	117,791	175,252	-35,557	-11,093
1986	18,559	128,664	1,676	29,011	2,432	5,749	186,091	49,231	8,208	129,708	187,147	-1,056	-12,149
1987	3,247	97,976	1,676	29,239	2,432	5,749	140,319	49,231	7,925	109,157	166,312	-25,994	-38,142
1988	10,071	109,449	1,680	29,260	2,439	5,757	158,656	49,338	7,881	112,664	169,882	-11,226	-49,368
1989	4,983	93,287	1,676	29,337	2,432	5,749	137,463	49,231	7,639	100,850	157,720	-20,257	-69,625
1990	0	84,931	1,676	29,508	2,432	5,749	124,295	49,231	7,370	92,736	149,336	-25,041	-94,666
1991	18,620	112,951	1,676	29,167	2,432	5,749	170,594	49,231	7,549	106,851	163,631	6,963	-87,703
1992	61,026	195,832	1,680	28,434	2,439	5,757	295,169	49,338	8,329	178,382	236,049	59,120	-28,584
1993	71,953	243,315	1,676	28,074	2,432	5,749	353,200	49,231	9,034	248,287	306,552	46,648	18,064
1994	3,864	128,364	1,676	28,909	2,432	5,749	170,994	49,231	8,589	140,102	197,923	-26,929	-8,865
1995	56,819	162,897	1,676	28,499	2,432	5,749	258,072	49,231	8,803	165,997	224,030	34,042	25,177
1996	15,861	128,596	1,680	28,956	2,439	5,757	183,290	49,338	8,650	142,903	200,890	-17,600	7,577
1997	13,310	114,038	1,676	29,100	2,432	5,749	166,305	49,231	8,380	127,477	185,088	-18,783	-11,206
1998	72,779	271,185	1,676	28,218	2,432	5,749	382,039	49,231	9,135	260,439	318,805	63,234	52,028
1999	5,653	128,001	1,676	28,900	2,432	5,749	172,411	49,231	8,764	148,213	206,208	-33,797	18,231
2000	4,814	99,065	1,680	29,373	2,439	5,757	143,127	49,338	8,156	114,470	171,963	-28,836	-10,605
2001	27,585	131,267	1,676	28,873	2,432	5,749	197,582	49,231	8,194	130,185	187,610	9,972	-633
2002	5,683	101,899	1,676	29,151	2,432	5,749	146,590	49,231	7,952	113,325	170,508	-23,918	-24,551

Table I-4

Annual Groundwater Budget for Current Conditions (Under the 2014 Level of Development)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
2003	9,126	98,458	1,676	29,344	2,432	5,749	146,785	49,231	7,841	106,376	163,448	-16,663	-41,213
2004	11,064	99,282	1,680	29,384	2,439	5,757	149,606	49,338	7,670	105,528	162,536	-12,929	-54,143
2005	84,162	220,971	1,676	28,156	2,432	5,749	343,146	49,231	8,856	204,955	263,042	80,104	25,961
2006	14,404	137,316	1,676	28,767	2,432	5,749	190,345	49,231	8,724	150,605	208,560	-18,216	7,746
2007	689	91,580	1,676	29,339	2,432	5,749	131,465	49,231	8,012	108,650	165,893	-34,428	-26,682
2008	20,154	109,498	1,680	29,243	2,439	5,757	168,771	49,338	7,945	115,113	172,396	-3,625	-30,307
2009	7,396	97,426	1,676	29,335	2,432	5,749	144,014	49,231	7,728	105,398	162,357	-18,343	-48,650
2010	28,201	127,806	1,676	28,998	2,432	5,749	194,861	49,231	7,983	123,295	180,509	14,352	-34,298
2011	35,432	144,108	1,676	28,688	2,432	5,749	218,085	49,231	8,391	142,281	199,903	18,182	-16,116
2012	4,448	99,487	1,680	29,331	2,439	5,757	143,142	49,338	8,072	113,296	170,706	-27,564	-43,680
2013	0	85,993	1,676	29,525	2,432	5,749	125,375	49,231	7,545	97,565	154,341	-28,966	-72,646
2014	0	84,067	1,676	29,581	2,432	5,749	123,505	49,231	7,253	90,123	146,607	-23,102	-95,748
2015	0	82,907	1,676	29,606	2,432	5,749	122,370	49,231	7,104	86,425	142,760	-20,391	-116,139
2016	97	81,001	1,680	29,704	2,439	5,757	120,677	49,338	6,918	83,199	139,455	-18,777	-134,916
2017	12,921	104,800	1,676	29,319	2,432	5,749	156,897	49,231	7,161	93,158	149,550	7,348	-127,568
2018	1,650	83,605	1,676	29,508	2,432	5,749	124,620	49,231	7,047	86,532	142,810	-18,190	-145,758
2019	32,027	134,049	1,676	28,996	2,432	5,749	204,929	49,231	7,632	116,568	173,431	31,498	-114,260
Min	**0**	**81,001**	**1,676**	**28,008**	**2,432**	**5,749**	**120,677**	**49,231**	**4,968**	**83,199**	**139,455**	**-35,557**	
Max	**102,986**	**271,185**	**1,680**	**29,704**	**2,439**	**5,757**	**382,039**	**49,338**	**9,157**	**260,439**	**318,805**	**102,917**	
Average	**20,583**	**126,336**	**1,677**	**29,048**	**2,434**	**5,751**	**185,829**	**49,257**	**7,064**	**130,711**	**187,032**	**-1,203**	
Percent of Total	**11%**	**68%**	**1%**	**16%**	**1%**	**3%**	**100%**	**26%**	**4%**	**70%**	**100%**		

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: ET = evapotranspiration GW = groundwater SNMP = Salt Nutrient Management Plan (GSSI, 2016)

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for the 2014 level of development.

Note: Subsurface outflow at the western basin boundary is included in the surface water budget as surface water outflow (Table I-3) rather than in this groundwater budget.

Notes:
(a) Computed by the SCV Recharge Compiler
(b) Computed by the SCV Recharge Compiler and the SFR package in MODFLOW-USG
(c) Estimated and provided as input to the WEL package in MODFLOW-USG
(d) Computed by the GHB package in MODFLOW-USG
(e) Computed by the SCV Recharge Compiler, based on estimates from the SNMP
(f) Computed by the SCV Recharge Compiler, based on acreages and plant water demands
(g) Total of items (a) through (f)
(h) From 2014 groundwater usage data
(i) Computed by the EVT package in MODFLOW-USG
(j) Computed by the SFR package in MODFLOW-USG
(k) Total of items (h) through (j)
(l) Total inflow minus total outflow
(m) Rolling sum of annual changes in groundwater storage

Annual Water Budget Tables: Projected Conditions without Climate Change

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Table I-5
Annual Projected Surface Water Budget for Full Build-Out Conditions Without Climate Change
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1925	33,042	33,042	1,418	1,471	111	0	5,004	15,994	500	109,775	167,315	42,106	0	93,582	31,627	167,315
1926	133,419	88,224	10,985	59,265	111	56,544	5,004	15,994	500	138,571	420,393	48,363	45,195	147,161	179,675	420,393
1927	100,190	70,932	3,573	14,351	111	31,678	5,004	15,994	500	141,828	313,229	47,485	29,258	142,368	94,118	313,229
1928	30,776	25,093	1,015	622	111	6,083	5,018	16,052	501	121,239	181,416	43,212	5,683	105,639	26,882	181,416
1929	73,314	73,314	602	523	111	0	5,004	15,994	500	103,785	199,833	37,569	0	89,710	72,553	199,833
1930	57,272	57,272	1,140	523	111	0	5,004	15,994	500	96,076	176,619	32,875	0	88,067	55,678	176,619
1931	95,197	72,289	4,027	13,673	111	26,054	5,004	15,994	500	117,574	278,134	34,106	22,908	132,086	89,034	278,134
1932	109,562	93,435	2,215	5,759	111	16,355	5,018	16,052	501	117,125	272,698	35,938	16,127	121,625	99,008	272,698
1933	78,871	61,171	1,742	7,264	111	15,050	5,004	15,994	500	110,693	235,230	33,422	17,700	113,321	70,786	235,230
1934	68,848	55,259	3,857	9,167	111	9,294	5,004	15,994	500	109,870	222,645	31,648	13,589	114,990	62,418	222,645
1935	98,241	90,203	407	1,465	111	4,366	5,004	15,994	500	95,638	221,727	27,671	8,038	96,095	89,923	221,727
1936	52,873	42,370	246	9,238	111	8,920	5,018	16,052	501	98,227	191,186	29,915	10,503	100,673	50,095	191,186
1937	126,250	101,192	3,857	9,167	111	17,379	5,004	15,994	500	116,191	294,453	33,855	25,058	122,942	112,598	294,453
1938	126,334	77,746	407	86,803	111	64,532	5,004	15,994	500	133,662	433,347	43,187	48,588	142,243	199,328	433,347
1939	101,596	79,664	11,336	7,899	111	30,288	5,004	15,994	500	137,453	310,181	48,716	21,932	137,105	102,428	310,181
1940	61,008	47,136	711	9,249	111	12,963	5,018	16,052	501	120,758	226,371	43,303	13,872	114,515	54,681	226,371
1941	219,669	122,351	37,844	101,811	111	138,049	5,004	15,994	500	236,711	755,693	80,710	97,318	244,666	333,000	755,693
1942	63,314	44,404	1,916	8,766	111	28,197	5,004	15,994	500	162,267	286,069	60,640	18,910	146,052	60,467	286,069
1943	149,184	84,937	33,737	99,911	111	92,611	5,004	15,994	500	242,329	639,382	89,403	64,247	240,165	245,566	639,382
1944	134,174	85,957	818	16,158	111	61,091	5,018	16,052	501	196,537	430,460	71,548	48,217	177,175	133,520	430,460
1945	61,176	49,947	1,449	5,759	111	10,791	5,004	15,994	500	139,239	240,023	55,243	11,229	117,545	56,006	240,023
1946	78,409	65,880	1,775	20,338	111	9,884	5,004	15,994	500	129,143	261,158	48,024	12,529	114,607	85,998	261,158
1947	80,966	63,195	1,130	488	111	17,113	5,004	15,994	500	127,719	249,025	47,189	17,771	114,680	69,385	249,025
1948	37,275	37,275	350	517	111	0	5,018	16,052	501	104,245	164,068	39,271	0	88,940	35,858	164,068
1949	46,752	46,752	281	523	111	0	5,004	15,994	500	97,551	166,716	35,011	0	86,707	44,998	166,716
1950	45,871	45,871	940	194	111	0	5,004	15,994	500	91,936	160,549	30,724	0	85,497	44,329	160,549
1951	34,298	34,298	775	1,333	111	0	5,004	15,994	500	88,210	146,225	28,529	0	84,442	33,254	146,225
1952	160,212	104,720	21,239	86,267	111	77,917	5,018	16,052	501	149,243	516,560	49,349	55,492	173,574	238,145	516,560
1953	54,382	36,903	2,250	1,554	111	24,542	5,004	15,994	500	138,612	242,950	47,559	17,479	129,809	48,103	242,950
1954	71,616	64,951	1,997	8,165	111	1,470	5,004	15,994	500	111,834	216,691	39,666	6,665	100,491	69,869	216,691
1955	70,149	66,388	1,268	5,793	111	582	5,004	15,994	500	102,907	202,308	36,181	3,761	95,156	67,211	202,308
1956	83,104	79,154	1,098	6,016	111	398	5,018	16,052	501	96,695	208,993	32,524	3,950	92,726	79,792	208,993
1957	66,039	47,704	906	20,338	111	19,156	5,004	15,994	500	110,863	238,910	34,981	18,335	117,771	67,823	238,910
1958	154,928	110,691	7,344	20,276	111	46,906	5,004	15,994	500	152,745	403,809	47,175	44,237	170,695	141,702	403,809
1959	47,882	45,980	1,777	817	111	2,027	5,004	15,994	500	118,043	192,155	40,847	1,902	102,749	46,657	192,155
1960	43,230	43,230	807	523	111	0	5,018	16,052	501	101,548	167,790	35,368	0	89,540	42,882	167,790
1961	34,677	34,677	979	523	111	0	5,004	15,994	500	94,121	151,909	31,346	0	87,035	33,528	151,909
1962	134,007	107,986	4,195	6,908	111	23,990	5,004	15,994	500	110,435	301,144	34,453	26,021	119,449	121,220	301,144
1963	51,406	51,354	1,159	967	111	48	5,004	15,994	500	93,865	169,054	30,745	52	87,870	50,387	169,054
1964	42,768	42,768	696	2,853	111	0	5,018	16,052	501	89,911	157,910	28,906	0	85,580	43,424	157,910
1965	71,153	49,441	433	86,180	111	29,809	5,004	15,994	500	113,022	322,206	36,169	21,712	130,656	133,669	322,206
1966	121,007	75,997	9,236	7,020	111	60,619	5,004	15,994	500	140,745	360,236	46,489	45,010	147,894	120,843	360,236

Table I-5

Annual Projected Surface Water Budget for Full Build-Out Conditions Without Climate Change

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1967	125,494	102,129	8,260	20,338	111	21,515	5,004	15,994	500	154,595	351,812	52,303	23,365	163,569	112,575	351,812
1968	71,531	58,292	2,008	488	111	14,180	5,018	16,052	501	131,521	241,410	45,235	13,239	121,113	61,822	241,410
1969	157,907	95,701	23,229	86,174	111	85,563	5,004	15,994	500	183,400	557,882	67,360	62,206	187,423	240,894	557,882
1970	59,833	41,323	4,404	21,342	111	21,060	5,004	15,994	500	165,388	293,636	60,283	18,510	159,152	55,691	293,636
1971	83,858	64,746	4,486	3,780	111	19,853	5,004	15,994	500	142,917	276,503	50,904	19,112	134,331	72,157	276,503
1972	49,267	47,794	1,564	811	111	140	5,018	16,052	501	111,222	184,687	41,441	1,473	95,080	46,692	184,687
1973	103,985	85,471	3,693	6,902	111	14,411	5,004	15,994	500	117,341	267,942	41,197	18,514	113,851	94,381	267,942
1974	75,432	61,739	1,674	9,167	111	8,061	5,004	15,994	500	114,350	230,293	39,871	13,693	109,814	66,915	230,293
1975	77,485	72,973	814	7,162	111	2,441	5,004	15,994	500	104,208	213,719	36,611	4,512	96,916	75,680	213,719
1976	57,654	55,351	259	1,732	111	229	5,018	16,052	501	96,371	177,927	33,171	2,303	87,784	54,670	177,927
1977	80,504	63,684	147	1,236	111	14,538	5,004	15,994	500	103,967	222,001	31,941	16,820	106,402	66,838	222,001
1978	224,449	121,463	21,288	100,395	111	148,404	5,004	15,994	500	183,775	699,920	55,072	102,986	205,809	336,053	699,920
1979	109,604	79,475	6,314	34,822	111	31,125	5,004	15,994	500	190,281	393,755	61,753	30,129	182,241	119,631	393,755
1980	136,984	89,796	11,607	60,076	111	58,191	5,018	16,052	501	182,396	470,936	65,194	47,188	177,057	181,497	470,936
1981	57,610	52,814	1,836	6,338	111	2,798	5,004	15,994	500	131,117	221,308	49,344	4,796	113,241	53,927	221,308
1982	86,792	68,847	3,802	9,548	111	15,625	5,004	15,994	500	131,657	269,033	46,457	17,945	129,593	75,038	269,033
1983	188,515	104,388	27,927	90,597	111	119,739	5,004	15,994	500	232,704	681,091	76,051	84,127	243,047	277,866	681,091
1984	51,574	26,971	1,372	10,417	111	36,494	5,018	16,052	501	200,441	321,980	72,344	24,603	176,435	48,597	321,980
1985	65,286	65,286	3,010	3,214	111	0	5,004	15,994	500	120,162	213,281	46,610	0	101,973	64,698	213,281
1986	112,958	94,399	4,169	20,700	111	14,139	5,004	15,994	500	132,829	306,403	48,072	18,559	130,521	109,251	306,403
1987	29,853	26,606	2,022	1,004	111	1,800	5,004	15,994	500	111,637	167,925	39,983	3,247	99,141	25,553	167,925
1988	101,049	90,978	4,031	4,544	111	3,435	5,018	16,052	501	116,472	251,212	38,891	10,071	111,397	90,854	251,212
1989	64,154	59,171	1,449	932	111	2,127	5,004	15,994	500	102,531	192,802	35,890	4,983	94,728	57,201	192,802
1990	41,636	41,636	217	532	111	0	5,004	15,994	500	94,312	158,306	32,817	0	86,385	39,105	158,306
1991	78,828	60,208	3,705	6,908	111	16,748	5,004	15,994	500	107,232	235,030	31,840	18,620	115,119	69,451	235,030
1992	154,677	93,651	3,510	30,381	111	81,720	5,018	16,052	501	182,877	474,847	47,799	61,026	204,162	161,860	474,847
1993	178,451	106,498	24,328	87,136	111	97,420	5,004	15,994	500	249,625	658,568	84,685	71,953	251,412	250,518	658,568
1994	45,536	41,672	19,954	6,467	111	5,189	5,004	15,994	500	137,981	236,736	48,855	3,864	132,372	51,646	236,736
1995	156,731	99,912	634	64,358	111	76,517	5,004	15,994	500	163,664	483,513	57,706	56,819	168,570	200,418	483,513
1996	62,558	46,697	3,026	6,585	111	15,028	5,018	16,052	501	142,277	251,156	49,707	15,861	132,059	53,528	251,156
1997	77,738	64,428	2,072	10,600	111	8,936	5,004	15,994	500	127,177	248,131	44,539	13,310	116,352	73,931	248,131
1998	201,137	128,358	35,204	96,386	111	97,591	5,004	15,994	500	262,862	714,789	86,616	72,779	275,108	280,287	714,789
1999	54,843	49,190	2,087	8,478	111	7,971	5,004	15,994	500	150,154	245,142	55,364	5,653	131,143	52,983	245,142
2000	68,135	63,321	2,204	8,329	111	501	5,018	16,052	501	115,268	216,119	42,903	4,814	100,449	67,953	216,119
2001	99,226	71,641	3,880	13,806	111	29,199	5,004	15,994	500	132,675	300,395	46,394	27,585	133,553	92,863	300,395
2002	30,776	25,093	1,015	720	111	6,083	5,004	15,994	500	113,853	174,056	40,152	5,683	103,720	24,501	174,056
2003	102,056	92,930	1,088	4,304	111	3,626	5,004	15,994	500	106,691	239,373	37,087	9,126	99,588	93,573	239,373
2004	56,982	45,918	30	1,938	111	7,671	5,018	16,052	501	106,110	194,413	35,619	11,064	100,135	47,595	194,413
2005	219,962	135,800	37,844	197,521	111	111,067	5,004	15,994	500	210,402	798,405	66,544	84,162	225,850	421,849	798,405
2006	86,291	71,887	4,712	17,768	111	10,033	5,004	15,994	500	153,952	294,365	53,871	14,404	140,424	85,666	294,365
2007	27,422	26,733	645	1,049	111	225	5,004	15,994	500	110,303	161,253	42,071	689	92,819	25,674	161,253
2008	96,940	76,786	1,286	13,179	111	18,080	5,018	16,052	501	118,093	269,259	42,589	20,154	111,429	95,087	269,259

Table I-5

Annual Projected Surface Water Budget for Full Build-Out Conditions Without Climate Change

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
2009	57,192	49,796	159	3,651	111	4,727	5,004	15,994	500	108,197	195,535	37,787	7,396	99,762	50,589	195,535
2010	107,549	79,348	1,059	11,126	111	32,972	5,004	15,994	500	122,793	297,108	39,413	28,201	130,246	99,248	297,108
2011	131,113	95,681	4,465	25,027	111	36,536	5,004	15,994	500	144,418	363,168	46,684	35,432	147,702	133,350	363,168
2012	67,381	62,933	1,094	1,586	111	2,719	5,018	16,052	501	114,720	209,182	39,535	4,448	101,549	63,650	209,182
2013	34,716	34,716	0	281	111	0	5,004	15,994	500	98,177	154,783	34,477	0	86,648	33,659	154,783
2014	38,701	38,701	215	836	111	0	5,004	15,994	500	91,869	153,229	30,950	0	85,285	36,994	153,229
2015	53,962	53,962	65	2,510	111	0	5,004	15,994	500	88,298	166,444	28,235	0	84,703	53,505	166,444
2016	45,578	45,481	22	818	111	5	5,018	16,052	501	81,546	149,651	23,805	97	81,339	44,411	149,651
2017	107,046	94,125	10,551	12,244	111	5,751	5,004	15,994	500	87,751	244,952	22,626	12,921	104,326	105,078	244,952
2018	46,753	45,103	0	1,324	111	176	5,004	15,994	500	83,171	153,033	24,265	1,650	82,980	44,137	153,033
2019	116,061	84,034	3,102	21,189	111	37,583	5,004	15,994	500	115,023	314,566	33,165	32,027	134,743	114,631	314,566
Min	**27,422**	**25,093**	**0**	**194**	**111**	**0**	**5,004**	**15,994**	**500**	**81,546**	**146,225**	**22,626**	**0**	**81,339**	**24,501**	**146,225**
Max	**224,449**	**135,800**	**37,844**	**197,521**	**111**	**148,404**	**5,018**	**16,052**	**501**	**262,862**	**798,405**	**89,403**	**102,986**	**275,108**	**421,849**	**798,405**
Average	**87,602**	**67,019**	**5,173**	**20,055**	**111**	**24,154**	**5,007**	**16,008**	**500**	**130,439**	**289,050**	**44,374**	**20,583**	**127,307**	**96,786**	**289,050**
Percent of Total	**30%**		**2%**	**7%**	**0.04%**	**8%**	**2%**	**6%**	**0.2%**	**45%**	**100%**	**15.5%**	**7%**	**44%**	**33.5%**	**100%**

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: WRP = water reclamation plant ET = evapotranspiration

Note: Blue font means inflow to surface water, purple font means internal surface flow process, and red font means surface water outflow.

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions.

All values are from historical data or the water uses associated with the full build-out scenario, except the following:

The internal flow term *Stormwater Generated from In-Basin Precipitation* is the difference between the basin-wide rainfall volume and the volume of streamflow percolation to groundwater from ephemeral streams.

The inflow term *Groundwater Discharge to Streams* is the basin-wide SFR-Out term computed by the SFR package in MODFLOW-USG.

The outflow term *Santa Clara River Non-Storm Outflow at Western Basin Boundary* is calculated by the SFR and CHD packages in MODFLOW-USG and includes subsurface outflows.

The outflow term *Groundwater Recharge from Precipitation* is calculated by the SCV Recharge Compiler and is provided as input to the RCH package in MODFLOW-USG.

The outflow term *Groundwater Recharge from Streams* is the sum of (1) recharge in ephemeral streams (from the SCV Recharge Compiler and the RCH package) and (2) the basin-wide SFR-In term computed by the SFR package in MODFLOW-USG.

The outflow term *ET and Stormwater Outflow* is calculated from the balance of all other terms in this surface water budget.

Table I-6

Annual Projected Groundwater Budget for Full Build-Out Conditions Without Climate Change

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1925	0	93,582	1,676	29,293	2,432	7,487	134,471	56,410	6,540	109,775	172,725	-38,254	-38,254
1926	45,195	147,161	1,676	28,614	2,432	7,487	232,565	65,320	6,803	138,571	210,694	21,871	-16,383
1927	29,258	142,368	1,676	28,588	2,432	7,487	211,809	62,585	6,875	141,828	211,287	522	-15,861
1928	5,683	105,640	1,680	29,139	2,439	7,499	152,080	48,400	6,695	121,239	176,333	-24,253	-40,115
1929	0	89,709	1,676	29,419	2,432	7,487	130,724	51,561	6,333	103,785	161,679	-30,954	-71,069
1930	0	88,067	1,676	29,438	2,432	7,487	129,099	56,410	6,060	96,076	158,546	-29,446	-100,515
1931	22,908	132,085	1,676	28,938	2,432	7,487	195,526	65,320	6,208	117,574	189,103	6,424	-94,092
1932	16,127	121,625	1,680	28,985	2,439	7,499	178,355	67,649	6,292	117,125	191,065	-12,710	-106,802
1933	17,700	113,321	1,676	29,020	2,432	7,487	171,637	67,500	6,167	110,693	184,360	-12,724	-119,525
1934	13,589	114,989	1,676	29,074	2,432	7,487	169,248	67,500	6,134	109,870	183,504	-14,257	-133,782
1935	8,038	96,095	1,676	29,267	2,432	7,487	144,995	62,585	5,847	95,638	164,071	-19,076	-152,858
1936	10,503	100,674	1,680	29,391	2,439	7,499	152,186	48,400	6,005	98,227	152,633	-447	-153,305
1937	25,058	122,942	1,676	29,023	2,432	7,487	188,618	48,293	6,334	116,191	170,818	17,800	-135,504
1938	48,588	142,243	1,676	28,744	2,432	7,487	231,171	48,293	6,792	133,662	188,747	42,423	-93,081
1939	21,932	137,104	1,676	28,952	2,432	7,487	199,584	48,293	6,881	137,453	192,627	6,957	-86,124
1940	13,872	114,515	1,680	29,162	2,439	7,499	169,167	48,400	6,658	120,758	175,816	-6,649	-92,773
1941	97,318	244,667	1,676	28,036	2,432	7,487	381,616	48,293	7,602	236,711	292,606	89,010	-3,763
1942	18,910	146,052	1,676	28,680	2,432	7,487	205,237	48,293	7,335	162,267	217,895	-12,658	-16,420
1943	64,247	240,165	1,676	28,305	2,432	7,487	344,311	48,293	7,643	242,329	298,266	46,046	29,626
1944	48,217	177,175	1,680	28,415	2,439	7,499	265,425	48,400	7,625	196,537	252,562	12,863	42,489
1945	11,229	117,545	1,676	29,013	2,432	7,487	169,383	48,293	7,189	139,239	194,721	-25,338	17,150
1946	12,529	114,608	1,676	29,117	2,432	7,487	167,849	48,293	6,956	129,143	184,393	-16,544	607
1947	17,771	114,680	1,676	29,088	2,432	7,487	173,135	48,293	6,844	127,719	182,856	-9,721	-9,115
1948	0	88,939	1,680	29,530	2,439	7,499	130,087	48,400	6,425	104,245	159,070	-28,983	-38,098
1949	0	86,707	1,676	29,512	2,432	7,487	127,815	51,561	6,186	97,551	155,298	-27,483	-65,581
1950	0	85,497	1,676	29,520	2,432	7,487	126,612	55,174	5,927	91,936	153,036	-26,424	-92,005
1951	0	84,442	1,676	29,518	2,432	7,487	125,556	48,293	5,825	88,210	142,328	-16,772	-108,777
1952	55,492	173,574	1,680	28,757	2,439	7,499	269,440	48,400	6,791	149,243	204,435	65,005	-43,772
1953	17,479	129,809	1,676	28,833	2,432	7,487	187,716	48,293	6,801	138,612	193,706	-5,990	-49,762
1954	6,665	100,490	1,676	29,260	2,432	7,487	148,010	48,293	6,504	111,834	166,632	-18,621	-68,383
1955	3,761	95,156	1,676	29,369	2,432	7,487	139,881	51,561	6,334	102,907	160,802	-20,922	-89,304
1956	3,950	92,727	1,680	29,510	2,439	7,499	137,805	55,311	6,113	96,695	158,119	-20,314	-109,619
1957	18,335	117,771	1,676	29,067	2,432	7,487	176,768	48,293	6,305	110,863	165,462	11,307	-98,312
1958	44,237	170,695	1,676	28,491	2,432	7,487	255,019	48,293	6,846	152,745	207,884	47,134	-51,178
1959	1,902	102,749	1,676	29,137	2,432	7,487	145,384	48,293	6,659	118,043	172,995	-27,611	-78,788
1960	0	89,540	1,680	29,531	2,439	7,499	130,689	48,400	6,257	101,548	156,205	-25,516	-104,305
1961	0	87,034	1,676	29,496	2,432	7,487	128,126	51,561	6,009	94,121	151,691	-23,566	-127,870
1962	26,021	119,449	1,676	29,100	2,432	7,487	186,165	55,174	6,263	110,435	171,872	14,294	-113,577
1963	52	87,869	1,676	29,409	2,432	7,487	128,926	48,293	6,046	93,865	148,204	-19,278	-132,855

Table I-6

Annual Projected Groundwater Budget for Full Build-Out Conditions Without Climate Change

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1964	0	85,580	1,680	29,591	2,439	7,499	126,790	48,400	5,873	89,911	144,185	-17,395	-150,250
1965	21,712	130,656	1,676	29,173	2,432	7,487	193,136	48,293	6,503	113,022	167,819	25,318	-124,932
1966	45,010	147,893	1,676	28,670	2,432	7,487	233,169	48,293	6,794	140,745	195,832	37,338	-87,595
1967	23,365	163,570	1,676	28,732	2,432	7,487	227,262	48,293	6,921	154,595	209,809	17,453	-70,142
1968	13,239	121,112	1,680	29,006	2,439	7,499	174,975	48,400	6,799	131,521	186,720	-11,744	-81,886
1969	62,206	187,423	1,676	28,481	2,432	7,487	289,704	48,293	7,211	183,400	238,904	50,801	-31,086
1970	18,510	159,152	1,676	28,738	2,432	7,487	217,995	48,293	7,276	165,388	220,956	-2,961	-34,047
1971	19,112	134,330	1,676	28,833	2,432	7,487	193,871	48,293	7,075	142,917	198,286	-4,415	-38,462
1972	1,473	95,080	1,680	29,397	2,439	7,499	137,568	48,400	6,609	111,222	166,232	-28,664	-67,125
1973	18,514	113,850	1,676	29,125	2,432	7,487	173,084	48,293	6,593	117,341	172,227	857	-66,268
1974	13,693	109,815	1,676	29,149	2,432	7,487	164,252	48,293	6,567	114,350	169,209	-4,957	-71,225
1975	4,512	96,916	1,676	29,359	2,432	7,487	142,383	48,293	6,416	104,208	158,918	-16,535	-87,760
1976	2,303	87,784	1,680	29,581	2,439	7,499	131,286	48,400	6,175	96,371	150,947	-19,661	-107,421
1977	16,820	106,402	1,676	29,274	2,432	7,487	164,091	63,291	6,083	103,967	173,341	-9,250	-116,671
1978	102,986	205,809	1,676	28,090	2,432	7,487	348,481	62,585	7,135	183,775	253,495	94,986	-21,685
1979	30,129	182,241	1,676	28,387	2,432	7,487	252,352	48,293	7,473	190,281	246,046	6,306	-15,379
1980	47,188	177,057	1,680	28,514	2,439	7,499	264,377	48,400	8,755	182,396	239,550	24,826	9,447
1981	4,796	113,241	1,676	29,147	2,432	7,487	158,779	48,293	8,494	131,117	187,904	-29,125	-19,678
1982	17,945	129,593	1,676	28,994	2,432	7,487	188,128	48,293	8,294	131,657	188,244	-116	-19,794
1983	84,127	243,047	1,676	27,983	2,432	7,487	366,752	48,293	9,214	232,704	290,211	76,541	56,747
1984	24,603	176,435	1,680	28,580	2,439	7,499	241,237	48,400	9,065	200,441	257,906	-16,670	40,077
1985	0	101,973	1,676	29,232	2,432	7,487	142,800	48,293	8,275	120,162	176,729	-33,929	6,148
1986	18,559	130,521	1,676	28,983	2,432	7,487	189,658	48,293	8,262	132,829	189,384	275	6,423
1987	3,247	99,141	1,676	29,210	2,432	7,487	143,193	48,293	7,973	111,637	167,903	-24,710	-18,287
1988	10,071	111,397	1,680	29,228	2,439	7,499	162,314	51,678	7,959	116,472	176,108	-13,794	-32,081
1989	4,983	94,728	1,676	29,302	2,432	7,487	140,609	55,174	7,600	102,531	165,305	-24,696	-56,777
1990	0	86,385	1,676	29,476	2,432	7,487	127,456	55,471	7,308	94,312	157,091	-29,635	-86,412
1991	18,620	115,119	1,676	29,133	2,432	7,487	174,468	65,320	7,374	107,232	179,926	-5,458	-91,870
1992	61,026	204,162	1,680	28,404	2,439	7,499	305,210	67,649	8,276	182,877	258,801	46,409	-45,461
1993	71,953	251,412	1,676	28,056	2,432	7,487	363,017	62,585	8,995	249,625	321,205	41,812	-3,648
1994	3,864	132,372	1,676	28,898	2,432	7,487	176,728	59,141	8,470	137,981	205,592	-28,863	-32,512
1995	56,819	168,570	1,676	28,492	2,432	7,487	265,477	61,428	8,709	163,664	233,802	31,675	-837
1996	15,861	132,059	1,680	28,952	2,439	7,499	188,490	48,400	8,604	142,277	199,281	-10,791	-11,627
1997	13,310	116,352	1,676	29,095	2,432	7,487	170,352	48,293	8,345	127,177	183,814	-13,462	-25,089
1998	72,779	275,108	1,676	28,216	2,432	7,487	387,699	48,293	9,156	262,862	320,311	67,388	42,299
1999	5,653	131,143	1,676	28,897	2,432	7,487	177,289	48,293	8,790	150,154	207,237	-29,948	12,351
2000	4,814	100,449	1,680	29,365	2,439	7,499	146,245	48,400	8,156	115,268	171,824	-25,578	-13,227
2001	27,585	133,554	1,676	28,861	2,432	7,487	201,594	51,561	8,257	132,675	192,492	9,102	-4,126
2002	5,683	103,720	1,676	29,133	2,432	7,487	150,132	55,174	7,921	113,853	176,948	-26,816	-30,942

Table I-6
Annual Projected Groundwater Budget for Full Build-Out Conditions Without Climate Change
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
2003	9,126	99,588	1,676	29,329	2,432	7,487	149,637	48,293	7,811	106,691	162,795	-13,158	-44,100
2004	11,064	100,135	1,680	29,369	2,439	7,499	152,186	48,400	7,648	106,110	162,158	-9,972	-54,071
2005	84,162	225,850	1,676	28,142	2,432	7,487	349,750	48,293	8,900	210,402	267,595	82,154	28,083
2006	14,404	140,424	1,676	28,754	2,432	7,487	195,178	48,293	8,771	153,952	211,016	-15,838	12,245
2007	689	92,819	1,676	29,323	2,432	7,487	134,427	48,293	8,037	110,303	166,634	-32,207	-19,962
2008	20,154	111,429	1,680	29,223	2,439	7,499	172,424	51,678	8,007	118,093	177,778	-5,354	-25,315
2009	7,396	99,762	1,676	29,311	2,432	7,487	148,065	56,410	7,754	108,197	172,361	-24,296	-49,612
2010	28,201	130,246	1,676	28,973	2,432	7,487	199,015	60,405	7,908	122,793	191,106	7,909	-41,702
2011	35,432	147,702	1,676	28,666	2,432	7,487	223,396	48,293	8,437	144,418	201,147	22,248	-19,454
2012	4,448	101,549	1,680	29,314	2,439	7,499	146,928	48,400	8,092	114,720	171,212	-24,284	-43,738
2013	0	86,648	1,676	29,509	2,432	7,487	127,752	48,293	7,520	98,177	153,990	-26,238	-69,976
2014	0	85,284	1,676	29,563	2,432	7,487	126,442	51,561	7,231	91,869	150,661	-24,218	-94,194
2015	0	84,703	1,676	29,584	2,432	7,487	125,882	56,410	7,045	88,298	151,753	-25,871	-120,066
2016	97	81,339	1,680	29,681	2,439	7,499	122,734	65,469	6,692	81,546	153,706	-30,972	-151,038
2017	12,921	104,326	1,676	29,296	2,432	7,487	158,139	62,585	6,788	87,751	157,124	1,015	-150,022
2018	1,650	82,981	1,676	29,489	2,432	7,487	125,715	48,293	6,812	83,171	138,276	-12,561	-162,583
2019	32,027	134,743	1,676	28,980	2,432	7,487	207,346	48,293	7,492	115,023	170,808	36,538	-126,046
Min	**0**	**81,339**	**1,676**	**27,983**	**2,432**	**7,487**	**122,734**	**48,293**	**5,825**	**81,546**	**138,276**	**-38,254**	
Max	**102,986**	**275,108**	**1,680**	**29,681**	**2,439**	**7,499**	**387,699**	**67,649**	**9,214**	**262,862**	**321,205**	**94,986**	
Average	**20,583**	**127,307**	**1,677**	**29,031**	**2,434**	**7,490**	**188,522**	**52,191**	**7,219**	**130,439**	**189,849**	**-1,327**	
Percent of Total	**11%**	**68%**	**1%**	**15%**	**1%**	**4%**	**100%**	**27%**	**4%**	**69%**	**100%**		

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: ET = evapotranspiration GW = groundwater SNMP = Salt Nutrient Management Plan (GSSI, 2016)

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions.

Note: Subsurface outflow at the western basin boundary is included in the surface water budget as surface water outflow (Table I-5) rather than in this groundwater budget.

Notes:
(a) Computed by the SCV Recharge Compiler
(b) Computed by the SCV Recharge Compiler and the SFR package in MODFLOW-USG
(c) Estimated and provided as input to the WEL package in MODFLOW-USG
(d) Computed by the GHB package in MODFLOW-USG
(e) Computed by the SCV Recharge Compiler, based on estimates from the SNMP
(f) Computed by the SCV Recharge Compiler, based on acreages and plant water demands
(g) Total of items (a) through (f)
(h) Groundwater usage for full buildout conditions
(i) Computed by the EVT package in MODFLOW-USG
(j) Computed by the SFR package in MODFLOW-USG
(k) Total of items (h) through (j)
(l) Total inflow minus total outflow
(m) Rolling sum of annual changes in groundwater storage

Annual Water Budget Tables: Projected Conditions with 2030 Climate Change

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Table I-7

Annual Projected Surface Water Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1925	31,091	31,091	1,337	1,388	111	0	5,004	15,994	500	108,939	164,364	41,545	0	93,166	29,653	164,364
1926	144,707	92,505	10,361	55,895	111	67,649	5,004	15,994	500	140,512	440,732	49,338	52,202	149,624	189,568	440,732
1927	104,207	73,786	3,370	13,536	111	32,927	5,004	15,994	500	144,465	320,114	48,550	30,421	144,644	96,499	320,114
1928	29,175	23,946	957	588	111	5,582	5,018	16,052	501	121,295	179,279	43,506	5,229	104,986	25,558	179,279
1929	75,258	75,258	568	494	111	0	5,004	15,994	500	104,008	201,937	37,678	0	89,758	74,501	201,937
1930	56,258	56,258	1,075	494	111	0	5,004	15,994	500	96,161	175,597	32,891	0	88,037	54,669	175,597
1931	96,685	73,059	3,798	12,896	111	26,185	5,004	15,994	500	117,242	278,414	34,085	23,626	131,486	89,217	278,414
1932	109,414	93,902	2,089	5,430	111	14,179	5,018	16,052	501	115,473	268,267	35,355	15,512	119,117	98,283	268,267
1933	78,846	61,071	1,643	6,851	111	15,014	5,004	15,994	500	109,985	233,949	33,068	17,775	112,656	70,450	233,949
1934	70,556	57,393	3,638	8,645	111	8,628	5,004	15,994	500	108,419	221,495	31,117	13,163	113,304	63,911	221,495
1935	99,570	92,543	384	1,383	111	3,227	5,004	15,994	500	93,915	220,088	26,902	7,027	94,117	92,041	220,088
1936	53,763	43,526	232	8,713	111	7,940	5,018	16,052	501	96,546	188,876	29,083	10,237	99,043	50,512	188,876
1937	122,990	100,066	3,638	8,645	111	14,546	5,004	15,994	500	112,656	284,083	32,397	22,924	119,013	109,750	284,083
1938	124,549	78,594	384	81,869	111	59,773	5,004	15,994	500	130,985	419,169	41,634	45,955	140,617	190,963	419,169
1939	106,975	85,136	10,692	7,451	111	29,678	5,004	15,994	500	133,085	309,490	46,799	21,839	133,622	107,229	309,490
1940	62,866	48,402	671	8,723	111	13,335	5,018	16,052	501	119,767	227,044	42,589	14,464	114,377	55,613	227,044
1941	210,544	121,089	35,693	96,024	111	124,435	5,004	15,994	500	229,149	717,453	77,203	89,455	239,411	311,384	717,453
1942	64,786	46,872	1,807	8,269	111	26,262	5,004	15,994	500	157,683	280,416	58,651	17,914	142,361	61,490	280,416
1943	143,398	83,974	31,819	94,232	111	84,025	5,004	15,994	500	234,594	609,678	84,739	59,424	234,916	230,599	609,678
1944	132,540	87,528	772	15,240	111	54,937	5,018	16,052	501	188,253	413,423	68,610	45,012	170,341	129,460	413,423
1945	58,848	49,943	1,367	5,430	111	8,928	5,004	15,994	500	134,909	231,091	52,876	8,905	114,270	55,041	231,091
1946	73,483	63,969	1,674	19,183	111	7,595	5,004	15,994	500	124,228	247,772	45,532	9,514	110,686	82,040	247,772
1947	82,423	65,974	1,066	461	111	14,392	5,004	15,994	500	122,680	242,632	44,348	16,449	110,865	70,970	242,632
1948	36,078	36,078	330	489	111	0	5,018	16,052	501	101,694	160,272	37,452	0	88,134	34,687	160,272
1949	49,487	49,487	265	494	111	0	5,004	15,994	500	95,364	167,219	33,569	0	85,923	47,728	167,219
1950	47,460	47,460	886	184	111	0	5,004	15,994	500	90,205	160,344	29,598	0	84,827	45,919	160,344
1951	34,877	34,877	731	1,258	111	0	5,004	15,994	500	86,643	145,118	27,527	0	83,752	33,839	145,118
1952	151,981	102,311	20,031	81,364	111	67,797	5,018	16,052	501	143,675	486,530	46,694	49,670	169,346	220,821	486,530
1953	53,741	37,490	2,122	1,467	111	22,181	5,004	15,994	500	133,733	234,853	45,265	16,251	126,139	47,198	234,853
1954	69,281	64,808	1,884	7,701	111	474	5,004	15,994	500	107,988	208,936	37,798	4,473	97,358	69,308	208,936
1955	69,020	66,995	1,196	5,462	111	193	5,004	15,994	500	99,332	196,811	34,294	2,025	92,933	67,559	196,811
1956	80,958	79,139	1,035	5,672	111	163	5,018	16,052	501	93,245	202,755	30,670	1,819	90,747	79,518	202,755
1957	66,395	48,592	854	19,183	111	17,918	5,004	15,994	500	106,782	232,741	32,856	17,803	114,760	67,322	232,741
1958	149,010	111,048	6,927	19,124	111	35,810	5,004	15,994	500	137,679	370,159	42,503	37,962	154,543	135,151	370,159
1959	48,395	47,226	1,676	771	111	1,065	5,004	15,994	500	109,784	183,301	36,885	1,169	97,401	47,845	183,301
1960	44,366	44,366	761	494	111	0	5,018	16,052	501	97,994	165,297	32,938	0	88,280	44,079	165,297
1961	35,053	35,053	923	494	111	0	5,004	15,994	500	91,131	149,210	29,463	0	85,842	33,905	149,210
1962	135,292	107,618	3,957	6,515	111	26,136	5,004	15,994	500	108,970	302,479	33,278	27,674	119,925	121,602	302,479
1963	52,137	52,102	1,093	913	111	33	5,004	15,994	500	92,184	167,969	29,623	35	87,190	51,120	167,969
1964	42,559	42,559	656	2,692	111	0	5,018	16,052	501	88,380	155,969	27,852	0	85,032	43,085	155,969
1965	69,427	48,643	409	81,281	111	28,102	5,004	15,994	500	110,948	311,775	34,757	20,784	130,079	126,155	311,775
1966	121,559	78,280	8,711	6,619	111	57,661	5,004	15,994	500	137,709	353,868	44,651	43,279	145,912	120,027	353,868

Table I-7
Annual Projected Surface Water Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1967	122,629	102,232	7,790	19,183	111	18,096	5,004	15,994	500	147,019	336,326	49,347	20,397	155,590	110,992	336,326
1968	71,997	60,083	1,894	461	111	11,832	5,018	16,052	501	123,851	231,717	42,083	11,914	114,958	62,762	231,717
1969	154,954	96,025	21,909	81,276	111	79,336	5,004	15,994	500	176,299	535,382	63,953	58,929	183,130	229,371	535,382
1970	54,753	39,692	4,153	20,130	111	15,448	5,004	15,994	500	154,787	270,880	56,066	15,061	148,907	50,847	270,880
1971	81,893	66,122	4,231	3,565	111	14,526	5,004	15,994	500	133,834	259,658	46,245	15,771	125,722	71,920	259,658
1972	48,269	47,759	1,475	766	111	39	5,018	16,052	501	106,565	178,797	38,589	510	93,064	46,634	178,797
1973	103,371	85,492	3,483	6,510	111	12,816	5,004	15,994	500	112,569	260,358	38,534	17,879	110,867	93,077	260,358
1974	76,278	62,197	1,579	8,645	111	8,447	5,004	15,994	500	110,856	227,414	37,767	14,081	108,275	67,291	227,414
1975	75,399	70,518	768	6,756	111	2,821	5,004	15,994	500	102,005	209,357	35,064	4,881	96,391	73,021	209,357
1976	60,610	58,482	244	1,635	111	207	5,018	16,052	501	94,419	178,797	31,870	2,128	87,079	57,721	178,797
1977	79,698	63,111	139	1,167	111	13,958	5,004	15,994	500	101,677	218,248	30,555	16,587	105,090	66,015	218,248
1978	221,621	122,929	20,078	94,690	111	140,369	5,004	15,994	500	174,322	672,689	51,840	98,692	198,610	323,547	672,689
1979	108,300	80,561	5,955	32,842	111	26,834	5,004	15,994	500	174,727	370,267	57,498	27,739	168,102	116,928	370,267
1980	136,097	90,643	10,947	56,660	111	54,881	5,018	16,052	501	172,526	452,794	61,511	45,454	169,082	176,747	452,794
1981	57,682	54,915	1,732	5,976	111	2,197	5,004	15,994	500	126,002	215,197	46,698	2,767	109,972	55,761	215,197
1982	80,878	66,383	3,586	9,005	111	10,985	5,004	15,994	500	124,467	250,530	43,268	14,495	122,172	70,594	250,530
1983	184,868	105,194	26,340	85,447	111	111,746	5,004	15,994	500	212,152	642,161	68,544	79,674	227,292	266,652	642,161
1984	51,073	27,449	1,294	9,826	111	34,676	5,018	16,052	501	191,726	310,278	68,956	23,624	170,657	47,041	310,278
1985	63,407	63,407	2,839	3,031	111	0	5,004	15,994	500	117,770	208,656	44,833	0	101,041	62,782	208,656
1986	111,502	94,287	3,932	19,524	111	11,478	5,004	15,994	500	127,264	295,309	45,404	17,215	125,423	107,268	295,309
1987	30,828	27,926	1,907	946	111	1,213	5,004	15,994	500	107,627	164,130	37,891	2,902	96,516	26,821	164,130
1988	100,444	90,654	3,802	4,287	111	2,975	5,018	16,052	501	112,956	246,146	36,880	9,790	109,146	90,330	246,146
1989	64,725	59,956	1,367	881	111	1,842	5,004	15,994	500	99,846	190,270	34,226	4,769	93,366	57,909	190,270
1990	40,067	40,067	205	503	111	0	5,004	15,994	500	92,201	154,585	31,381	0	85,662	37,542	154,585
1991	72,136	57,721	3,494	6,515	111	10,352	5,004	15,994	500	100,880	214,987	29,099	14,415	107,383	64,090	214,987
1992	150,554	95,046	3,310	28,655	111	71,698	5,018	16,052	501	160,481	436,381	40,958	55,508	184,535	155,380	436,381
1993	173,445	107,517	22,945	82,183	111	86,407	5,004	15,994	500	235,838	622,428	77,345	65,928	241,878	237,277	622,428
1994	45,418	42,313	18,820	6,099	111	4,027	5,004	15,994	500	131,151	227,124	45,605	3,105	127,181	51,233	227,124
1995	149,132	98,467	598	60,699	111	65,629	5,004	15,994	500	149,760	447,427	52,451	50,665	157,157	187,155	447,427
1996	63,283	48,540	2,854	6,212	111	12,731	5,018	16,052	501	134,207	240,969	45,887	14,743	126,264	54,075	240,969
1997	76,355	64,910	1,954	9,997	111	6,973	5,004	15,994	500	120,813	237,701	41,034	11,445	112,016	73,206	237,701
1998	203,354	130,854	33,203	90,908	111	97,770	5,004	15,994	500	253,301	700,145	81,538	72,500	269,369	276,738	700,145
1999	55,114	50,629	1,968	7,997	111	6,281	5,004	15,994	500	143,789	236,759	52,278	4,485	126,540	53,456	236,759
2000	72,262	66,227	2,079	7,855	111	714	5,018	16,052	501	112,938	217,529	41,107	6,035	99,973	70,414	217,529
2001	100,475	73,908	3,659	13,022	111	26,581	5,004	15,994	500	129,025	294,371	44,177	26,567	130,844	92,782	294,371
2002	29,780	25,158	957	681	111	4,681	5,004	15,994	500	109,814	167,522	37,929	4,622	100,776	24,195	167,522
2003	103,792	95,199	1,026	4,060	111	2,981	5,004	15,994	500	103,420	236,889	35,081	8,593	97,794	95,421	236,889
2004	58,694	47,820	28	1,829	111	7,061	5,018	16,052	501	103,073	192,368	33,779	10,874	98,400	49,315	192,368
2005	214,970	135,873	35,693	186,293	111	102,164	5,004	15,994	500	196,266	756,995	61,522	79,097	214,810	401,566	756,995
2006	82,147	71,884	4,444	16,759	111	6,789	5,004	15,994	500	141,856	273,604	49,901	10,263	128,843	84,597	273,604
2007	27,473	27,119	609	989	111	41	5,004	15,994	500	106,567	157,287	39,571	354	91,257	26,105	157,287
2008	101,332	79,939	1,213	12,431	111	19,297	5,018	16,052	501	115,376	271,331	40,654	21,393	110,760	98,524	271,331

Table I-7
Annual Projected Surface Water Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
2009	58,369	50,629	150	3,444	111	4,522	5,004	15,994	500	105,826	193,919	36,107	7,740	98,909	51,164	193,919
2010	110,766	81,089	999	10,492	111	34,331	5,004	15,994	500	121,374	299,571	38,221	29,677	130,415	101,259	299,571
2011	127,643	96,271	4,211	23,605	111	32,455	5,004	15,994	500	136,568	346,092	43,651	31,372	139,693	131,375	346,092
2012	67,659	65,085	1,032	1,497	111	808	5,018	16,052	501	108,338	201,016	36,783	2,574	95,867	65,792	201,016
2013	32,661	32,661	0	267	111	0	5,004	15,994	500	95,174	149,711	32,395	0	85,674	31,642	149,711
2014	35,672	35,672	202	790	111	0	5,004	15,994	500	89,166	147,440	29,209	0	84,272	33,959	147,440
2015	49,851	49,851	61	2,367	111	0	5,004	15,994	500	85,937	159,825	26,781	0	83,778	49,265	159,825
2016	45,326	45,326	21	771	111	0	5,018	16,052	501	79,365	147,165	22,594	0	80,284	44,287	147,165
2017	103,894	92,961	9,951	11,549	111	3,842	5,004	15,994	500	84,021	234,866	20,964	10,933	101,212	101,757	234,866
2018	45,660	45,627	0	1,249	111	12	5,004	15,994	500	79,794	148,324	22,634	33	81,019	44,637	148,324
2019	116,786	84,849	2,926	19,985	111	38,095	5,004	15,994	500	111,947	311,347	31,426	31,937	133,386	114,598	311,347
Min	**27,473**	**23,946**	**0**	**184**	**111**	**0**	**5,004**	**15,994**	**500**	**79,365**	**145,118**	**20,964**	**0**	**80,284**	**24,195**	**145,118**
Max	**221,621**	**135,873**	**35,693**	**186,293**	**111**	**140,369**	**5,018**	**16,052**	**501**	**253,301**	**756,995**	**84,739**	**98,692**	**269,369**	**401,566**	**756,995**
Average	**86,793**	**67,529**	**4,879**	**18,915**	**111**	**22,102**	**5,007**	**16,008**	**500**	**125,494**	**279,811**	**42,062**	**19,264**	**123,631**	**94,854**	**279,811**
Percent of Total	**31%**		**2%**	**7%**	**0.04%**	**8%**	**2%**	**6%**	**0.2%**	**45%**	**100%**	**15%**	**7%**	**44%**	**34%**	**100%**

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: WRP = water reclamation plant ET = evapotranspiration DWR= California Department of Water Resources

Note: Blue font means inflow to surface water, purple font means internal surface flow process, and red font means surface water outflow.

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions with 2030 climate change.

All values are from historical data, the water uses associated with the full build-out scenario, and DWR's 2030 climate change factors, except the following:

The internal flow term *Stormwater Generated from In-Basin Precipitation* is the difference between the basin-wide rainfall volume and the volume of streamflow percolation to groundwater from ephemeral streams.

The inflow term *Groundwater Discharge to Streams* is the basin-wide SFR-Out term computed by the SFR package in MODFLOW-USG.

The outflow term *Santa Clara River Non-Storm Outflow at Western Basin Boundary* is calculated by the SFR and CHD packages in MODFLOW-USG and includes subsurface outflows.

The outflow term *Groundwater Recharge from Precipitation* is calculated by the SCV Recharge Compiler and is provided as input to the RCH package in MODFLOW-USG.

The outflow term *Groundwater Recharge from Streams* is the sum of (1) recharge in ephemeral streams (from the SCV Recharge Compiler and the RCH package) and (2) the basin-wide SFR-In term computed by the SFR package in MODFLOW-USG.

The outflow term *ET and Stormwater Outflow* is calculated from the balance of all other terms in this surface water budget.

Table I-8

Annual Projected Groundwater Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1925	0	93,166	1,676	29,301	2,432	7,487	134,063	56,410	6,791	108,939	172,140	-38,077	-38,077
1926	52,202	149,625	1,676	28,557	2,432	7,487	241,979	65,320	7,106	140,512	212,937	29,042	-9,035
1927	30,421	144,644	1,676	28,557	2,432	7,487	215,217	62,585	7,202	144,465	214,253	964	-8,071
1928	5,229	104,986	1,680	29,141	2,439	7,499	150,975	48,400	6,993	121,295	176,687	-25,713	-33,784
1929	0	89,758	1,676	29,417	2,432	7,487	130,771	51,561	6,609	104,008	162,179	-31,408	-65,192
1930	0	88,037	1,676	29,438	2,432	7,487	129,070	56,410	6,320	96,161	158,891	-29,820	-95,012
1931	23,626	131,485	1,676	28,941	2,432	7,487	195,648	65,320	6,469	117,242	189,031	6,618	-88,394
1932	15,512	119,117	1,680	29,012	2,439	7,499	175,260	67,649	6,538	115,473	189,660	-14,401	-102,795
1933	17,775	112,656	1,676	29,031	2,432	7,487	171,057	67,500	6,412	109,985	183,897	-12,840	-115,636
1934	13,163	113,304	1,676	29,101	2,432	7,487	167,163	67,500	6,367	108,419	182,286	-15,123	-130,759
1935	7,027	94,117	1,676	29,304	2,432	7,487	142,044	62,585	6,049	93,915	162,549	-20,505	-151,264
1936	10,237	99,043	1,680	29,409	2,439	7,499	150,307	48,400	6,210	96,546	151,156	-849	-152,113
1937	22,924	119,013	1,676	29,073	2,432	7,487	182,605	48,293	6,530	112,656	167,479	15,126	-136,987
1938	45,955	140,618	1,676	28,784	2,432	7,487	226,952	48,293	7,005	130,985	186,284	40,668	-96,319
1939	21,839	133,623	1,676	28,969	2,432	7,487	196,027	48,293	7,108	133,085	188,487	7,540	-88,779
1940	14,464	114,377	1,680	29,163	2,439	7,499	169,622	48,400	6,903	119,767	175,071	-5,449	-94,228
1941	89,455	239,411	1,676	28,107	2,432	7,487	368,568	48,293	7,865	229,149	285,307	83,262	-10,966
1942	17,914	142,361	1,676	28,720	2,432	7,487	200,591	48,293	7,579	157,683	213,555	-12,964	-23,930
1943	59,424	234,916	1,676	28,359	2,432	7,487	334,295	48,293	7,899	234,594	290,785	43,509	19,579
1944	45,012	170,340	1,680	28,483	2,439	7,499	255,453	48,400	7,873	188,253	244,526	10,927	30,506
1945	8,905	114,270	1,676	29,072	2,432	7,487	163,842	48,293	7,414	134,909	190,616	-26,774	3,732
1946	9,514	110,687	1,676	29,187	2,432	7,487	160,983	48,293	7,155	124,228	179,675	-18,692	-14,960
1947	16,449	110,865	1,676	29,149	2,432	7,487	168,059	48,293	7,023	122,680	177,996	-9,938	-24,898
1948	0	88,133	1,680	29,551	2,439	7,499	129,303	48,400	6,605	101,694	156,698	-27,396	-52,293
1949	0	85,923	1,676	29,526	2,432	7,487	127,044	51,561	6,364	95,364	153,289	-26,245	-78,538
1950	0	84,828	1,676	29,531	2,432	7,487	125,954	55,174	6,104	90,205	151,483	-25,529	-104,067
1951	0	83,752	1,676	29,529	2,432	7,487	124,877	48,293	5,999	86,643	140,935	-16,058	-120,124
1952	49,670	169,346	1,680	28,821	2,439	7,499	259,455	48,400	6,988	143,675	199,063	60,392	-59,732
1953	16,251	126,139	1,676	28,883	2,432	7,487	182,868	48,293	7,001	133,733	189,026	-6,158	-65,890
1954	4,473	97,358	1,676	29,313	2,432	7,487	142,740	48,293	6,689	107,988	162,970	-20,231	-86,121
1955	2,025	92,933	1,676	29,415	2,432	7,487	135,967	51,561	6,493	99,332	157,386	-21,418	-107,539
1956	1,819	90,747	1,680	29,550	2,439	7,499	133,735	55,311	6,249	93,245	154,805	-21,070	-128,610
1957	17,803	114,759	1,676	29,112	2,432	7,487	173,269	48,293	6,440	106,782	161,515	11,754	-116,856
1958	37,962	154,543	1,676	28,637	2,432	7,487	232,737	48,293	6,942	137,679	192,915	39,822	-77,034
1959	1,169	97,401	1,676	29,214	2,432	7,487	139,379	48,293	6,758	109,784	164,835	-25,456	-102,490
1960	0	88,280	1,680	29,557	2,439	7,499	129,455	48,400	6,389	97,994	152,783	-23,328	-125,818
1961	0	85,842	1,676	29,515	2,432	7,487	126,952	51,561	6,145	91,131	148,838	-21,886	-147,704
1962	27,674	119,925	1,676	29,096	2,432	7,487	188,290	55,174	6,454	108,970	170,598	17,692	-130,012
1963	35	87,190	1,676	29,421	2,432	7,487	128,241	48,293	6,225	92,184	146,702	-18,461	-148,472

Table I-8
Annual Projected Groundwater Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1964	0	85,032	1,680	29,602	2,439	7,499	126,252	48,400	6,053	88,380	142,833	-16,581	-165,053
1965	20,784	130,079	1,676	29,188	2,432	7,487	191,647	48,293	6,711	110,948	165,952	25,695	-139,358
1966	43,279	145,912	1,676	28,703	2,432	7,487	229,490	48,293	7,023	137,709	193,025	36,465	-102,894
1967	20,397	155,590	1,676	28,814	2,432	7,487	216,396	48,293	7,128	147,019	202,439	13,957	-88,937
1968	11,914	114,957	1,680	29,077	2,439	7,499	167,566	48,400	6,968	123,851	179,219	-11,653	-100,590
1969	58,929	183,130	1,676	28,544	2,432	7,487	282,199	48,293	7,413	176,299	232,005	50,194	-50,396
1970	15,061	148,906	1,676	28,839	2,432	7,487	204,401	48,293	7,432	154,787	210,512	-6,111	-56,507
1971	15,771	125,722	1,676	28,951	2,432	7,487	182,040	48,293	7,198	133,834	189,325	-7,285	-63,793
1972	510	93,064	1,680	29,449	2,439	7,499	134,642	48,400	6,748	106,565	161,714	-27,072	-90,865
1973	17,879	110,866	1,676	29,168	2,432	7,487	169,509	48,293	6,741	112,569	167,602	1,907	-88,958
1974	14,081	108,275	1,676	29,170	2,432	7,487	163,121	48,293	6,736	110,856	165,885	-2,765	-91,723
1975	4,881	96,392	1,676	29,365	2,432	7,487	142,233	48,293	6,595	102,005	156,893	-14,660	-106,383
1976	2,128	87,079	1,680	29,594	2,439	7,499	130,418	48,400	6,351	94,419	149,170	-18,751	-125,134
1977	16,587	105,090	1,676	29,290	2,432	7,487	162,563	63,291	6,250	101,677	171,218	-8,655	-133,789
1978	98,692	198,610	1,676	28,143	2,432	7,487	337,039	62,585	7,290	174,322	244,197	92,842	-40,946
1979	27,739	168,103	1,676	28,458	2,432	7,487	235,895	48,293	7,663	174,727	230,683	5,211	-35,735
1980	45,454	169,082	1,680	28,570	2,439	7,499	254,724	48,400	9,005	172,526	229,932	24,792	-10,943
1981	2,767	109,971	1,676	29,194	2,432	7,487	153,527	48,293	8,741	126,002	183,036	-29,509	-40,452
1982	14,495	122,172	1,676	29,093	2,432	7,487	177,355	48,293	8,476	124,467	181,236	-3,881	-44,333
1983	79,674	227,292	1,676	28,090	2,432	7,487	346,651	48,293	9,444	212,152	269,888	76,763	32,430
1984	23,624	170,657	1,680	28,621	2,439	7,499	234,521	48,400	9,364	191,726	249,490	-14,970	17,461
1985	0	101,041	1,676	29,256	2,432	7,487	141,892	48,293	8,535	117,770	174,598	-32,706	-15,245
1986	17,215	125,423	1,676	29,043	2,432	7,487	183,275	48,293	8,492	127,264	184,050	-775	-16,020
1987	2,902	96,515	1,676	29,260	2,432	7,487	140,273	48,293	8,174	107,627	164,094	-23,821	-39,840
1988	9,790	109,145	1,680	29,263	2,439	7,499	159,816	51,678	8,162	112,956	172,795	-12,979	-52,820
1989	4,769	93,367	1,676	29,330	2,432	7,487	139,061	55,174	7,796	99,846	162,817	-23,755	-76,575
1990	0	85,662	1,676	29,492	2,432	7,487	126,749	55,471	7,512	92,201	155,184	-28,435	-105,010
1991	14,415	107,383	1,676	29,217	2,432	7,487	162,611	65,320	7,497	100,880	173,697	-11,086	-116,096
1992	55,508	184,535	1,680	28,513	2,439	7,499	280,174	67,649	8,315	160,481	236,445	43,729	-72,367
1993	65,928	241,878	1,676	28,148	2,432	7,487	347,549	62,585	9,197	235,838	307,621	39,928	-32,439
1994	3,105	127,181	1,676	28,955	2,432	7,487	170,836	59,141	8,640	131,151	198,932	-28,096	-60,535
1995	50,665	157,157	1,676	28,598	2,432	7,487	248,014	61,428	8,842	149,760	220,031	27,984	-32,552
1996	14,743	126,265	1,680	29,029	2,439	7,499	181,656	48,400	8,779	134,207	191,387	-9,731	-42,283
1997	11,445	112,016	1,676	29,166	2,432	7,487	164,223	48,293	8,498	120,813	177,604	-13,381	-55,664
1998	72,500	269,369	1,676	28,254	2,432	7,487	381,718	48,293	9,422	253,301	311,016	70,702	15,039
1999	4,485	126,540	1,676	28,953	2,432	7,487	171,572	48,293	9,037	143,789	201,119	-29,547	-14,508
2000	6,035	99,973	1,680	29,379	2,439	7,499	147,005	48,400	8,395	112,938	169,733	-22,727	-37,235
2001	26,567	130,844	1,676	28,904	2,432	7,487	197,910	51,561	8,487	129,025	189,073	8,837	-28,398
2002	4,622	100,776	1,676	29,191	2,432	7,487	146,184	55,174	8,104	109,814	173,092	-26,907	-55,305

Table I-8

Annual Projected Groundwater Budget for Year 2042 Conditions (Full Build-Out Conditions With 2030 Climate Change)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
2003	8,593	97,794	1,676	29,361	2,432	7,487	147,343	48,293	7,997	103,420	159,710	-12,367	-67,672
2004	10,874	98,400	1,680	29,399	2,439	7,499	150,291	48,400	7,823	103,073	159,297	-9,006	-76,678
2005	79,097	214,809	1,676	28,223	2,432	7,487	333,724	48,293	9,134	196,266	253,693	80,031	3,353
2006	10,263	128,843	1,676	28,867	2,432	7,487	179,569	48,293	8,922	141,856	199,071	-19,502	-16,149
2007	354	91,257	1,676	29,370	2,432	7,487	132,576	48,293	8,179	106,567	163,039	-30,462	-46,612
2008	21,393	110,760	1,680	29,237	2,439	7,499	173,008	51,678	8,188	115,376	175,242	-2,234	-48,846
2009	7,740	98,909	1,676	29,326	2,432	7,487	147,570	56,410	7,933	105,826	170,168	-22,598	-71,444
2010	29,677	130,415	1,676	28,969	2,432	7,487	200,656	60,405	8,126	121,374	189,905	10,750	-60,693
2011	31,372	139,694	1,676	28,781	2,432	7,487	211,442	48,293	8,626	136,568	193,487	17,955	-42,738
2012	2,574	95,867	1,680	29,408	2,439	7,499	139,466	48,400	8,192	108,338	164,931	-25,464	-68,202
2013	0	85,674	1,676	29,532	2,432	7,487	126,802	48,293	7,662	95,174	151,129	-24,327	-92,529
2014	0	84,272	1,676	29,577	2,432	7,487	125,444	51,561	7,396	89,166	148,123	-22,679	-115,208
2015	0	83,778	1,676	29,594	2,432	7,487	124,967	56,410	7,225	85,937	149,572	-24,604	-139,813
2016	0	80,284	1,680	29,691	2,439	7,499	121,593	65,469	6,861	79,365	151,694	-30,102	-169,914
2017	10,933	101,212	1,676	29,331	2,432	7,487	153,072	62,585	6,917	84,021	153,523	-451	-170,366
2018	33	81,019	1,676	29,519	2,432	7,487	122,167	48,293	6,959	79,794	135,046	-12,879	-183,245
2019	31,937	133,386	1,676	29,001	2,432	7,487	205,920	48,293	7,678	111,947	167,918	38,002	-145,243
Min	**0**	**80,284**	**1,676**	**28,090**	**2,432**	**7,487**	**121,593**	**48,293**	**5,999**	**79,365**	**135,046**	**-38,077**	
Max	**98,692**	**269,369**	**1,680**	**29,691**	**2,439**	**7,499**	**381,718**	**67,649**	**9,444**	**253,301**	**311,016**	**92,842**	
Average	**19,264**	**123,631**	**1,677**	**29,074**	**2,434**	**7,490**	**183,570**	**52,191**	**7,414**	**125,494**	**185,099**	**-1,529**	
Percent of Total	**10.5%**	**67.5%**	**1%**	**16%**	**1%**	**4%**	**100%**	**28%**	**4%**	**68%**	**100%**		

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: ET = evapotranspiration GW = groundwater SNMP = Salt Nutrient Management Plan (GSSI, 2016)

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions.

Note: Subsurface outflow at the western basin boundary is included in the surface water budget as surface water outflow (Table I-7) rather than in this groundwater budget.

Notes:
(a) Computed by the SCV Recharge Compiler; includes 2030 climate change
(b) Computed by the SCV Recharge Compiler and the SFR package in MODFLOW-USG
(c) Estimated and provided as input to the WEL package in MODFLOW-USG
(d) Computed by the GHB package in MODFLOW-USG
(e) Computed by the SCV Recharge Compiler, based on estimates from the SNMP
(f) Computed by the SCV Recharge Compiler, based on acreages and plant water demands
(g) Total of items (a) through (f)
(h) Groundwater usage for full buildout conditions
(i) Computed by the EVT package in MODFLOW-USG with 2030 climate change factors for ET demands
(j) Computed by the SFR package in MODFLOW-USG
(k) Total of items (h) through (j)
(l) Total inflow minus total outflow
(m) Rolling sum of annual changes in groundwater storage

Annual Water Budget Tables: Projected Conditions with 2070 Climate Change

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Table I-9

Annual Projected Surface Water Budget for Year 2072 Conditions (Full Build-Out Conditions With 2070 Climate Change)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1925	28,313	28,313	1,262	1,308	111	0	5,004	15,994	500	107,728	160,220	40,699	0	92,692	26,829	160,220
1926	145,718	94,155	9,777	52,745	111	63,777	5,004	15,994	500	137,894	431,519	48,046	51,563	146,617	185,293	431,519
1927	106,792	78,616	3,180	12,773	111	26,066	5,004	15,994	500	136,739	307,160	45,724	28,176	135,734	97,525	307,160
1928	24,383	20,675	903	556	111	3,347	5,018	16,052	501	116,104	166,975	40,844	3,708	100,663	21,761	166,975
1929	69,044	69,044	536	468	111	0	5,004	15,994	500	101,643	193,299	36,046	0	88,965	68,289	193,299
1930	54,282	54,282	1,014	468	111	0	5,004	15,994	500	94,245	171,618	31,689	0	87,251	52,677	171,618
1931	90,996	71,975	3,584	12,169	111	16,495	5,004	15,994	500	108,850	253,704	31,446	19,021	118,950	84,286	253,704
1932	107,814	97,468	1,971	5,126	111	8,313	5,018	16,052	501	104,390	249,297	30,462	10,346	108,534	99,954	249,297
1933	77,450	64,065	1,550	6,466	111	6,998	5,004	15,994	500	98,394	212,467	28,046	13,385	101,124	69,911	212,467
1934	70,591	61,375	3,433	8,159	111	3,117	5,004	15,994	500	96,486	203,395	26,012	9,216	102,047	66,120	203,395
1935	94,575	90,446	362	1,305	111	658	5,004	15,994	500	84,059	202,568	22,850	4,129	85,963	89,626	202,568
1936	53,441	45,394	219	8,222	111	3,806	5,018	16,052	501	87,365	174,736	25,002	8,047	90,852	50,835	174,736
1937	122,692	104,563	3,433	8,159	111	7,132	5,004	15,994	500	99,660	262,684	26,818	18,129	106,864	110,873	262,684
1938	130,281	82,109	362	77,255	111	61,532	5,004	15,994	500	123,296	414,334	37,039	48,172	136,700	192,423	414,334
1939	111,325	91,206	10,089	7,030	111	26,618	5,004	15,994	500	125,088	301,759	42,276	20,119	128,803	110,561	301,759
1940	64,141	51,704	633	8,231	111	8,253	5,018	16,052	501	111,135	214,075	38,425	12,437	106,088	57,125	214,075
1941	217,867	124,277	33,681	90,612	111	128,697	5,004	15,994	500	215,632	708,098	71,100	93,590	229,259	314,149	708,098
1942	58,322	41,681	1,705	7,801	111	24,182	5,004	15,994	500	152,088	265,707	55,712	16,641	138,713	54,642	265,707
1943	146,893	86,753	30,026	88,922	111	82,539	5,004	15,994	500	228,304	598,293	81,192	60,140	230,619	226,342	598,293
1944	133,590	88,944	728	14,380	111	51,971	5,018	16,052	501	182,076	404,427	66,065	44,646	165,673	128,043	404,427
1945	60,195	51,413	1,290	5,126	111	9,192	5,004	15,994	500	132,598	230,010	51,342	8,782	113,403	56,482	230,010
1946	68,715	62,017	1,580	18,102	111	3,951	5,004	15,994	500	118,488	232,444	43,113	6,698	104,983	77,649	232,444
1947	79,064	66,061	1,006	434	111	7,668	5,004	15,994	500	113,414	223,195	40,208	13,003	101,393	68,592	223,195
1948	34,003	34,003	311	462	111	0	5,018	16,052	501	98,052	154,510	34,964	0	86,850	32,696	154,510
1949	46,066	46,066	250	468	111	0	5,004	15,994	500	92,335	160,728	31,654	0	84,762	44,312	160,728
1950	44,336	44,336	836	173	111	0	5,004	15,994	500	87,959	154,914	28,145	0	83,955	42,814	154,914
1951	33,451	33,451	690	1,186	111	0	5,004	15,994	500	84,694	141,629	26,272	0	82,917	32,440	141,629
1952	150,904	102,928	18,902	76,777	111	62,052	5,018	16,052	501	137,793	468,110	43,836	47,976	164,329	211,968	468,110
1953	45,812	32,644	2,003	1,384	111	17,031	5,004	15,994	500	127,094	214,933	42,327	13,168	120,093	39,346	214,933
1954	70,975	68,289	1,777	7,267	111	265	5,004	15,994	500	104,490	206,383	35,650	2,686	95,631	72,416	206,383
1955	67,574	67,053	1,128	5,156	111	51	5,004	15,994	500	96,024	191,542	32,295	521	91,350	67,376	191,542
1956	81,087	81,087	977	5,355	111	0	5,018	16,052	501	90,027	199,127	28,844	0	89,051	81,232	199,127
1957	67,245	51,954	806	18,102	111	11,862	5,004	15,994	500	98,735	218,359	29,923	15,291	105,092	68,054	218,359
1958	149,178	114,203	6,536	18,046	111	27,816	5,004	15,994	500	125,157	348,342	37,050	34,975	141,690	134,627	348,342
1959	49,340	48,382	1,582	729	111	769	5,004	15,994	500	103,801	177,830	33,449	958	94,506	48,917	177,830
1960	45,357	45,357	718	468	111	0	5,018	16,052	501	94,333	162,558	30,516	0	86,906	45,136	162,558
1961	32,135	32,135	871	468	111	0	5,004	15,994	500	88,035	143,118	27,539	0	84,578	31,000	143,118
1962	134,641	108,165	3,734	6,149	111	21,553	5,004	15,994	500	103,767	291,452	30,680	26,476	115,178	119,118	291,452
1963	50,811	50,787	1,031	861	111	20	5,004	15,994	500	89,208	163,540	27,781	24	85,925	49,809	163,540
1964	40,038	40,038	619	2,541	111	0	5,018	16,052	501	85,986	150,866	26,303	0	84,113	40,450	150,866
1965	63,274	44,891	386	76,700	111	23,439	5,004	15,994	500	106,230	291,639	32,428	18,383	126,275	114,553	291,639
1966	120,292	80,241	8,220	6,249	111	51,068	5,004	15,994	500	132,854	340,292	41,689	40,051	142,903	115,650	340,292

Table I-9

Annual Projected Surface Water Budget for Year 2072 Conditions (Full Build-Out Conditions With 2070 Climate Change)

Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
1967	127,507	108,389	7,351	18,102	111	17,809	5,004	15,994	500	141,386	333,764	46,414	19,118	151,779	116,453	333,764
1968	70,811	58,656	1,787	434	111	11,322	5,018	16,052	501	119,336	225,373	39,824	12,155	112,159	61,235	225,373
1969	164,566	100,517	20,674	76,694	111	84,975	5,004	15,994	500	173,671	542,189	62,675	64,049	181,509	233,956	542,189
1970	53,142	39,909	3,919	18,996	111	11,575	5,004	15,994	500	148,031	257,272	53,156	13,233	141,941	48,941	257,272
1971	81,066	67,049	3,992	3,364	111	10,636	5,004	15,994	500	127,805	248,472	43,175	14,017	119,472	71,808	248,472
1972	43,165	43,165	1,392	722	111	0	5,018	16,052	501	103,381	170,342	36,554	0	91,720	42,069	170,342
1973	108,178	89,736	3,287	6,143	111	11,235	5,004	15,994	500	108,432	258,884	36,493	18,442	107,580	96,369	258,884
1974	76,492	65,487	1,490	8,159	111	4,209	5,004	15,994	500	104,963	216,922	35,167	11,005	102,460	68,291	216,922
1975	70,137	66,915	724	6,374	111	1,089	5,004	15,994	500	97,050	196,984	32,581	3,222	92,543	68,637	196,984
1976	66,950	65,809	231	1,542	111	93	5,018	16,052	501	91,111	181,608	29,939	1,141	85,520	65,009	181,608
1977	76,684	63,569	131	1,099	111	7,395	5,004	15,994	500	93,103	200,021	27,396	13,115	94,896	64,614	200,021
1978	232,979	126,908	18,946	89,352	111	150,184	5,004	15,994	500	164,051	677,121	48,035	106,071	191,224	331,791	677,121
1979	111,902	84,739	5,619	30,991	111	23,499	5,004	15,994	500	167,568	361,188	54,590	27,163	161,348	118,087	361,188
1980	138,856	93,140	10,330	53,467	111	52,667	5,018	16,052	501	166,454	443,457	58,872	45,716	163,877	174,991	443,457
1981	59,472	57,713	1,634	5,642	111	2,052	5,004	15,994	500	122,222	212,631	44,698	1,759	107,730	58,444	212,631
1982	79,722	68,452	3,384	8,497	111	5,392	5,004	15,994	500	117,039	235,643	40,489	11,270	113,543	70,340	235,643
1983	190,073	108,266	24,855	80,631	111	113,219	5,004	15,994	500	195,126	625,513	62,928	81,807	213,357	267,422	625,513
1984	44,383	23,783	1,221	9,272	111	29,741	5,018	16,052	501	180,120	286,420	65,234	20,600	160,977	39,609	286,420
1985	57,236	57,236	2,679	2,860	111	0	5,004	15,994	500	115,713	200,097	43,421	0	100,136	56,540	200,097
1986	116,671	98,530	3,710	18,424	111	10,486	5,004	15,994	500	123,787	294,688	43,656	18,141	122,499	110,392	294,688
1987	28,142	26,913	1,800	892	111	711	5,004	15,994	500	104,692	157,845	36,503	1,229	94,347	25,766	157,845
1988	93,613	90,814	3,588	4,044	111	285	5,018	16,052	501	105,666	228,878	34,334	2,799	101,414	90,331	228,878
1989	59,838	58,126	1,290	828	111	174	5,004	15,994	500	93,721	177,460	31,439	1,712	88,416	55,893	177,460
1990	37,701	37,701	193	475	111	0	5,004	15,994	500	88,438	148,416	29,087	0	84,141	35,187	148,416
1991	74,517	61,736	3,297	6,149	111	6,407	5,004	15,994	500	94,002	205,982	26,397	12,781	100,304	66,499	205,982
1992	151,406	97,076	3,124	27,040	111	67,463	5,018	16,052	501	145,683	416,399	36,581	54,330	171,471	154,016	416,399
1993	179,471	111,001	21,652	77,550	111	87,548	5,004	15,994	500	228,091	615,921	73,046	68,470	237,562	236,843	615,921
1994	43,370	40,753	17,759	5,757	111	3,329	5,004	15,994	500	126,914	218,738	43,646	2,617	123,639	48,837	218,738
1995	155,174	101,372	564	57,280	111	68,139	5,004	15,994	500	147,244	450,010	51,077	53,802	155,777	189,354	450,010
1996	64,958	52,488	2,693	5,860	111	8,405	5,018	16,052	501	127,843	231,441	43,251	12,470	119,651	56,069	231,441
1997	77,714	70,229	1,844	9,435	111	2,975	5,004	15,994	500	112,646	226,223	37,707	7,485	104,101	76,930	226,223
1998	199,453	130,094	31,332	85,784	111	92,628	5,004	15,994	500	238,302	669,107	75,044	69,359	258,802	265,902	669,107
1999	52,140	48,177	1,857	7,545	111	5,368	5,004	15,994	500	139,028	227,548	49,844	3,963	123,292	50,449	227,548
2000	73,524	70,531	1,962	7,414	111	294	5,018	16,052	501	109,594	214,470	39,153	2,993	98,022	74,302	214,470
2001	105,610	78,644	3,453	12,287	111	24,699	5,004	15,994	500	124,869	292,527	41,935	26,966	127,440	96,187	292,527
2002	27,005	23,049	903	641	111	3,642	5,004	15,994	500	105,939	159,739	35,815	3,956	98,140	21,828	159,739
2003	98,508	93,231	968	3,830	111	567	5,004	15,994	500	97,799	223,282	32,778	5,277	92,431	92,795	223,282
2004	58,587	50,726	27	1,725	111	2,903	5,018	16,052	501	95,538	180,462	30,951	7,861	90,868	50,782	180,462
2005	215,768	138,152	33,681	175,793	111	98,055	5,004	15,994	500	171,926	716,832	54,274	77,616	193,204	391,737	716,832
2006	78,861	73,845	4,194	15,814	111	5,086	5,004	15,994	500	132,335	257,899	45,886	5,016	121,654	85,343	257,899
2007	27,537	27,458	574	934	111	7	5,004	15,994	500	103,050	153,711	37,009	79	90,176	26,446	153,711
2008	101,519	82,669	1,144	11,729	111	13,018	5,018	16,052	501	108,739	257,831	37,365	18,850	105,027	96,590	257,831

Table I-9
Annual Projected Surface Water Budget for Year 2072 Conditions (Full Build-Out Conditions With 2070 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	In-Basin Precipitation	Stormwater Generated from In-Basin Precipitation	Stream Inflow (Santa Clara River)	Stream Inflow (Releases from Castaic Lake/ Lagoon)	Stream Inflow (Releases from Bouquet Reservoir)	Stream Inflow (Other Santa Clara River Tributaries)	Discharges to Santa Clara River from Saugus WRP	Discharges to Santa Clara River from Valencia WRP	Discharges to Santa Clara River from Groundwater Treatment Systems	Groundwater Discharge to Streams	TOTAL SURFACE WATER INFLOW	Santa Clara River Non-Storm Outflow at Western Basin Boundary	Groundwater Recharge from Precipitation	Groundwater Recharge from Streams	ET and Stormwater Outflow	TOTAL SURFACE WATER OUTFLOW
2009	56,392	52,785	141	3,249	111	2,491	5,004	15,994	500	99,071	182,953	32,662	3,607	93,834	52,850	182,953
2010	109,815	83,740	943	9,901	111	30,323	5,004	15,994	500	113,334	285,925	34,364	26,075	123,746	101,740	285,925
2011	119,845	97,173	3,974	22,274	111	23,262	5,004	15,994	500	123,202	314,166	38,134	22,672	127,884	125,476	314,166
2012	61,550	60,719	974	1,412	111	83	5,018	16,052	501	101,053	186,754	32,652	831	91,831	61,440	186,754
2013	28,356	28,356	0	250	111	0	5,004	15,994	500	90,396	140,611	29,247	0	83,905	27,459	140,611
2014	33,851	33,851	191	744	111	0	5,004	15,994	500	84,860	141,255	26,598	0	82,501	32,156	141,255
2015	49,593	49,593	58	2,233	111	0	5,004	15,994	500	82,108	155,600	24,635	0	82,024	48,942	155,600
2016	48,416	48,416	19	729	111	0	5,018	16,052	501	76,031	146,878	20,829	0	78,668	47,381	146,878
2017	109,998	98,018	9,390	10,897	111	3,818	5,004	15,994	500	80,561	236,274	19,288	11,980	98,851	106,155	236,274
2018	47,252	47,225	0	1,179	111	9	5,004	15,994	500	76,796	146,845	20,998	27	79,593	46,226	146,845
2019	115,780	87,287	2,761	18,859	111	29,476	5,004	15,994	500	104,742	293,227	28,340	28,493	124,846	111,548	293,227
Min	**24,383**	**20,675**	**0**	**173**	**111**	**0**	**5,004**	**15,994**	**500**	**76,031**	**140,611**	**19,288**	**0**	**78,668**	**21,761**	**140,611**
Max	**232,979**	**138,152**	**33,681**	**175,793**	**111**	**150,184**	**5,018**	**16,052**	**501**	**238,302**	**716,832**	**81,192**	**106,071**	**258,802**	**391,737**	**716,832**
Average	**86,297**	**68,342**	**4,604**	**17,849**	**111**	**19,884**	**5,007**	**16,008**	**500**	**119,124**	**269,386**	**39,133**	**17,956**	**118,440**	**93,856**	**269,386**
Percent of Total	**32%**		**2%**	**7%**	**0.04%**	**7%**	**2%**	**6%**	**0.2%**	**44%**	**100%**	**14.5%**	**6.5%**	**44%**	**35%**	**100%**

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: WRP = water reclamation plant ET = evapotranspiration DWR= California Department of Water Resources

Note: Blue font means inflow to surface water, purple font means internal surface flow process, and red font means surface water outflow.

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions with 2070 climate change.

All values are from historical data, the water uses associated with the full build-out scenario, and DWR's 2070 climate change factors, except the following:

The internal flow term *Stormwater Generated from In-Basin Precipitation* is the difference between the basin-wide rainfall volume and the volume of streamflow percolation to groundwater from ephemeral streams.

The inflow term *Groundwater Discharge to Streams* is the basin-wide SFR-Out term computed by the SFR package in MODFLOW-USG.

The outflow term *Santa Clara River Non-Storm Outflow at Western Basin Boundary* is calculated by the SFR and CHD packages in MODFLOW-USG and includes subsurface outflows.

The outflow term *Groundwater Recharge from Precipitation* is calculated by the SCV Recharge Compiler and is provided as input to the RCH package in MODFLOW-USG.

The outflow term *Groundwater Recharge from Streams* is the sum of (1) recharge in ephemeral streams (from the SCV Recharge Compiler and the RCH package) and (2) the basin-wide SFR-In term computed by the SFR package in MODFLOW-USG.

The outflow term *ET and Stormwater Outflow* is calculated from the balance of all other terms in this surface water budget.

Table I-10
Annual Projected Groundwater Budget for Year 2072 Conditions (Full Build-Out Conditions With 2070 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
1925	0	92,692	1,676	29,312	2,432	7,487	133,599	56,410	7,085	107,728	171,223	-37,624	-37,624
1926	51,563	146,617	1,676	28,583	2,432	7,487	238,358	65,320	7,406	137,894	210,620	27,739	-9,885
1927	28,176	135,734	1,676	28,644	2,432	7,487	204,150	62,585	7,448	136,739	206,773	-2,623	-12,509
1928	3,708	100,663	1,680	29,221	2,439	7,499	145,209	48,400	7,232	116,104	171,737	-26,527	-39,036
1929	0	88,964	1,676	29,435	2,432	7,487	129,995	51,561	6,852	101,643	160,056	-30,062	-69,097
1930	0	87,252	1,676	29,450	2,432	7,487	128,297	56,410	6,558	94,245	157,212	-28,915	-98,013
1931	19,021	118,950	1,676	29,055	2,432	7,487	178,621	65,320	6,629	108,850	180,800	-2,178	-100,191
1932	10,346	108,534	1,680	29,182	2,439	7,499	159,680	67,649	6,609	104,390	178,648	-18,968	-119,159
1933	13,385	101,124	1,676	29,189	2,432	7,487	155,294	67,500	6,445	98,394	172,339	-17,045	-136,203
1934	9,216	102,047	1,676	29,248	2,432	7,487	152,107	67,500	6,372	96,486	170,358	-18,252	-154,455
1935	4,129	85,963	1,676	29,407	2,432	7,487	131,094	62,585	6,047	84,059	152,692	-21,598	-176,053
1936	8,047	90,852	1,680	29,516	2,439	7,499	140,033	48,400	6,208	87,365	141,974	-1,940	-177,993
1937	18,129	106,864	1,676	29,223	2,432	7,487	165,812	48,293	6,497	99,660	154,450	11,362	-166,631
1938	48,172	136,700	1,676	28,824	2,432	7,487	225,291	48,293	7,100	123,296	178,689	46,602	-120,029
1939	20,119	128,803	1,676	29,011	2,432	7,487	189,529	48,293	7,269	125,088	180,650	8,879	-111,150
1940	12,437	106,088	1,680	29,265	2,439	7,499	159,407	48,400	7,023	111,135	166,558	-7,151	-118,300
1941	93,590	229,259	1,676	28,142	2,432	7,487	362,586	48,293	8,094	215,632	272,019	90,568	-27,733
1942	16,641	138,714	1,676	28,761	2,432	7,487	195,711	48,293	7,834	152,088	208,214	-12,504	-40,236
1943	60,140	230,619	1,676	28,379	2,432	7,487	330,733	48,293	8,196	228,304	284,793	45,940	5,704
1944	44,646	165,673	1,680	28,522	2,439	7,499	250,459	48,400	8,179	182,076	238,654	11,805	17,509
1945	8,782	113,402	1,676	29,092	2,432	7,487	162,872	48,293	7,714	132,598	188,605	-25,733	-8,224
1946	6,698	104,983	1,676	29,276	2,432	7,487	152,553	48,293	7,399	118,488	174,179	-21,626	-29,850
1947	13,003	101,393	1,676	29,273	2,432	7,487	155,264	48,293	7,192	113,414	168,899	-13,635	-43,485
1948	0	86,851	1,680	29,582	2,439	7,499	128,051	48,400	6,790	98,052	153,242	-25,191	-68,676
1949	0	84,763	1,676	29,544	2,432	7,487	125,901	51,561	6,555	92,335	150,451	-24,549	-93,225
1950	0	83,955	1,676	29,545	2,432	7,487	125,095	55,174	6,304	87,959	149,438	-24,342	-117,568
1951	0	82,917	1,676	29,542	2,432	7,487	124,055	48,298	6,196	84,694	139,188	-15,133	-132,701
1952	47,976	164,329	1,680	28,857	2,439	7,499	252,780	48,400	7,226	137,793	193,419	59,362	-73,339
1953	13,168	120,093	1,676	28,959	2,432	7,487	173,815	48,293	7,231	127,094	182,619	-8,804	-82,143
1954	2,686	95,631	1,676	29,359	2,432	7,487	139,271	48,293	6,908	104,490	159,690	-20,419	-102,562
1955	521	91,350	1,676	29,452	2,432	7,487	132,919	51,561	6,688	96,024	154,273	-21,354	-123,916
1956	0	89,050	1,680	29,587	2,439	7,499	130,255	55,311	6,427	90,027	151,764	-21,509	-145,425
1957	15,291	105,092	1,676	29,229	2,432	7,487	161,207	48,293	6,543	98,735	153,572	7,635	-137,790
1958	34,975	141,690	1,676	28,790	2,432	7,487	217,050	48,293	7,050	125,157	180,500	36,550	-101,240
1959	958	94,506	1,676	29,269	2,432	7,487	136,328	48,293	6,906	103,801	159,000	-22,672	-123,912
1960	0	86,906	1,680	29,580	2,439	7,499	128,104	48,400	6,555	94,333	149,288	-21,184	-145,097
1961	0	84,578	1,676	29,532	2,432	7,487	125,706	51,561	6,321	88,035	145,916	-20,210	-165,307
1962	26,476	115,177	1,676	29,140	2,432	7,487	182,388	55,174	6,606	103,767	165,548	16,841	-148,466
1963	24	85,924	1,676	29,443	2,432	7,487	126,986	48,293	6,400	89,208	143,901	-16,915	-165,381
1964	0	84,112	1,680	29,617	2,439	7,499	125,347	48,400	6,242	85,986	140,628	-15,281	-180,662
1965	18,383	126,275	1,676	29,238	2,432	7,487	185,491	48,293	6,913	106,230	161,436	24,055	-156,607
1966	40,051	142,903	1,676	28,768	2,432	7,487	223,317	48,293	7,264	132,854	188,412	34,905	-121,703
1967	19,118	151,779	1,676	28,871	2,432	7,487	211,364	48,293	7,382	141,386	197,061	14,303	-107,399
1968	12,155	112,158	1,680	29,111	2,439	7,499	165,042	48,400	7,214	119,336	174,951	-9,909	-117,308
1969	64,049	181,509	1,676	28,530	2,432	7,487	285,684	48,293	7,720	173,671	229,684	56,000	-61,308
1970	13,233	141,941	1,676	28,908	2,432	7,487	195,677	48,293	7,699	148,031	204,023	-8,345	-69,653
1971	14,017	119,473	1,676	29,031	2,432	7,487	174,116	48,293	7,428	127,805	183,525	-9,409	-79,062
1972	0	91,720	1,680	29,482	2,439	7,499	132,821	48,400	6,972	103,381	158,753	-25,933	-104,995
1973	18,442	107,580	1,676	29,201	2,432	7,487	166,818	48,293	6,962	108,432	163,687	3,131	-101,863
1974	11,005	102,460	1,676	29,264	2,432	7,487	154,324	48,293	6,936	104,963	160,192	-5,868	-107,731
1975	3,222	92,542	1,676	29,431	2,432	7,487	136,790	48,293	6,766	97,050	152,109	-15,319	-123,050
1976	1,141	85,520	1,680	29,622	2,439	7,499	127,900	48,400	6,527	91,111	146,038	-18,138	-141,188
1977	13,115	94,896	1,676	29,404	2,432	7,487	149,010	63,291	6,326	93,103	162,720	-13,711	-154,898
1978	106,071	191,224	1,676	28,149	2,432	7,487	337,039	62,585	7,460	164,051	234,096	102,943	-51,955
1979	27,163	161,348	1,676	28,491	2,432	7,487	228,597	48,293	7,940	167,568	223,801	4,796	-47,159
1980	45,716	163,877	1,680	28,610	2,439	7,499	249,821	48,400	9,337	166,454	224,191	25,630	-21,530
1981	1,759	107,731	1,676	29,222	2,432	7,487	150,307	48,293	9,069	122,222	179,584	-29,277	-50,806
1982	11,270	113,543	1,676	29,222	2,432	7,487	165,631	48,293	8,736	117,039	174,069	-8,438	-59,244
1983	81,807	213,358	1,676	28,174	2,432	7,487	334,934	48,293	9,738	195,126	253,157	81,776	22,532
1984	20,600	160,977	1,680	28,668	2,439	7,499	221,862	48,400	9,731	180,120	238,252	-16,390	6,143
1985	0	100,136	1,676	29,275	2,432	7,487	141,006	48,293	8,875	115,713	172,881	-31,875	-25,732
1986	18,141	122,499	1,676	29,078	2,432	7,487	181,313	48,293	8,826	123,787	180,907	406	-25,326
1987	1,229	94,348	1,676	29,302	2,432	7,487	136,474	48,293	8,477	104,692	161,461	-24,988	-50,314
1988	2,799	101,414	1,680	29,394	2,439	7,499	145,225	51,678	8,393	105,666	165,737	-20,512	-70,825
1989	1,712	88,416	1,676	29,421	2,432	7,487	131,145	55,174	7,974	93,721	156,869	-25,724	-96,549
1990	0	84,141	1,676	29,519	2,432	7,487	125,255	55,471	7,706	88,438	151,615	-26,360	-122,909
1991	12,781	100,304	1,676	29,306	2,432	7,487	153,987	65,320	7,649	94,002	166,971	-12,985	-135,893
1992	54,330	171,471	1,680	28,593	2,439	7,499	266,013	67,649	8,401	145,683	221,733	44,280	-91,613
1993	68,470	237,562	1,676	28,150	2,432	7,487	345,778	62,585	9,491	228,091	300,168	45,610	-46,003
1994	2,617	123,640	1,676	28,984	2,432	7,487	166,836	59,141	8,917	126,914	194,972	-28,136	-74,139
1995	53,802	155,777	1,676	28,592	2,432	7,487	249,767	61,428	9,171	147,244	217,843	31,924	-42,215
1996	12,470	119,651	1,680	29,126	2,439	7,499	172,866	48,400	9,071	127,843	185,313	-12,448	-54,663
1997	7,485	104,102	1,676	29,283	2,432	7,487	152,466	48,293	8,699	112,646	169,638	-17,172	-71,835
1998	69,359	258,802	1,676	28,311	2,432	7,487	368,068	48,293	9,732	238,302	296,327	71,741	-94
1999	3,963	123,292	1,676	28,990	2,432	7,487	167,840	48,293	9,369	139,028	196,690	-28,849	-28,944
2000	2,993	98,022	1,680	29,428	2,439	7,499	142,061	48,400	8,685	109,594	166,679	-24,618	-53,562
2001	26,966	127,440	1,676	28,948	2,432	7,487	194,949	51,561	8,766	124,869	185,196	9,753	-43,809
2002	3,956	98,141	1,676	29,238	2,432	7,487	142,931	55,174	8,350	105,939	169,463	-26,533	-70,342
2003	5,277	92,432	1,676	29,434	2,432	7,487	138,738	48,293	8,211	97,799	154,303	-15,565	-85,907
2004	7,861	90,868	1,680	29,516	2,439	7,499	139,863	48,400	7,986	95,538	151,924	-12,062	-97,968
2005	77,616	193,204	1,676	28,352	2,432	7,487	310,767	48,293	9,251	171,926	229,470	81,297	-16,671
2006	5,016	121,654	1,676	28,962	2,432	7,487	167,228	48,293	9,109	132,335	189,738	-22,510	-39,181
2007	79	90,176	1,676	29,410	2,432	7,487	131,260	48,293	8,387	103,050	159,729	-28,469	-67,651
2008	18,850	105,027	1,680	29,320	2,439	7,499	164,815	51,678	8,379	108,739	168,795	-3,981	-71,631
2009	3,607	93,833	1,676	29,415	2,432	7,487	138,452	56,410	8,068	99,071	163,549	-25,097	-96,728
2010	26,075	123,746	1,676	29,068	2,432	7,487	190,484	60,405	8,229	113,334	181,968	8,516	-88,212
2011	22,672	127,884	1,676	28,959	2,432	7,487	191,110	48,293	8,657	123,202	180,152	10,958	-77,254
2012	831	91,831	1,680	29,497	2,439	7,499	133,777	48,400	8,266	101,053	157,719	-23,942	-101,196
2013	0	83,905	1,676	29,562	2,432	7,487	125,062	48,293	7,788	90,396	146,478	-21,416	-122,612
2014	0	82,501	1,676	29,596	2,432	7,487	123,693	51,561	7,541	84,860	143,963	-20,270	-142,882

Table I-10
Annual Projected Groundwater Budget for Year 2072 Conditions (Full Build-Out Conditions With 2070 Climate Change)
Water Budget Development for the Santa Clara River Valley East Groundwater Subbasin

Water Year	Recharge from Precipitation (a)	Recharge from Streams (b)	Subsurface Inflow Beneath Castaic Dam (c)	Subsurface Inflow Beneath Santa Clara River and Other Tributaries (d)	Septic System Recharge (e)	Recharge of Applied Water (f)	TOTAL INFLOW TO GROUNDWATER (g)	Groundwater Pumping (h)	Riparian Evapo-transpiration (i)	Groundwater Discharge to Streams (j)	TOTAL OUTFLOW FROM GROUNDWATER (k)	Change in GW Storage (l)	Cumulative Change in GW Storage (m)
2015	0	82,024	1,676	29,609	2,432	7,487	123,229	56,410	7,387	82,108	145,905	-22,676	-165,558
2016	0	78,668	1,680	29,703	2,439	7,499	119,989	65,469	7,020	76,031	148,520	-28,531	-194,089
2017	11,980	98,851	1,676	29,338	2,432	7,487	151,764	62,585	7,055	80,561	150,201	1,563	-192,527
2018	27	79,594	1,676	29,535	2,432	7,487	120,752	48,293	7,142	76,796	132,231	-11,479	-204,006
2019	28,493	124,846	1,676	29,087	2,432	7,487	194,020	48,293	7,829	104,742	160,864	33,157	-170,849
Min	**0**	**78,668**	**1,676**	**28,142**	**2,432**	**7,487**	**119,989**	**48,293**	**6,047**	**76,031**	**132,231**	**-37,624**	
Max	**106,071**	**258,802**	**1,680**	**29,703**	**2,439**	**7,499**	**368,068**	**67,649**	**9,738**	**238,302**	**300,168**	**102,943**	
Average	**17,956**	**118,440**	**1,677**	**29,134**	**2,434**	**7,490**	**177,131**	**52,191**	**7,614**	**119,124**	**178,929**	**-1,798**	
Percent of Total	**10%**	**67%**	**1%**	**16.5%**	**1.5%**	**4%**	**100.0%**	**29%**	**4%**	**67%**	**100%**		

All yearly, minimum, maximum, and average values are in units of acre-feet per year (AFY).

Abbreviations: ET = evapotranspiration GW = groundwater SNMP = Salt Nutrient Management Plan (GSSI, 2016)

Note: The "percent of total" values are calculated from the average values of the individual and total water budget terms.

Note: This water budget is developed by projecting the historical hydrology of water years 1925 through 2019 forward in time for full build-out conditions.

Note: Subsurface outflow at the western basin boundary is included in the surface water budget as surface water outflow (Table I-9) rather than in this groundwater budget.

Notes:
(a) Computed by the SCV Recharge Compiler; includes 2070 climate change
(b) Computed by the SCV Recharge Compiler and the SFR package in MODFLOW-USG
(c) Estimated and provided as input to the WEL package in MODFLOW-USG
(d) Computed by the GHB package in MODFLOW-USG
(e) Computed by the SCV Recharge Compiler, based on estimates from the SNMP
(f) Computed by the SCV Recharge Compiler, based on acreages and plant water demands
(g) Total of items (a) through (f)
(h) Groundwater usage for full buildout conditions
(i) Computed by the EVT package in MODFLOW-USG with 2070 climate change factors for ET demands
(j) Computed by the SFR package in MODFLOW-USG
(k) Total of items (h) through (j)
(l) Total inflow minus total outflow
(m) Rolling sum of annual changes in groundwater storage

APPENDIX J

Appendix to Monitoring Program Evaluations and Summary (Santa Clara River Valley East Groundwater Subbasin), Prepared by Luhdorff & Scalmanini, Consulting Engineers

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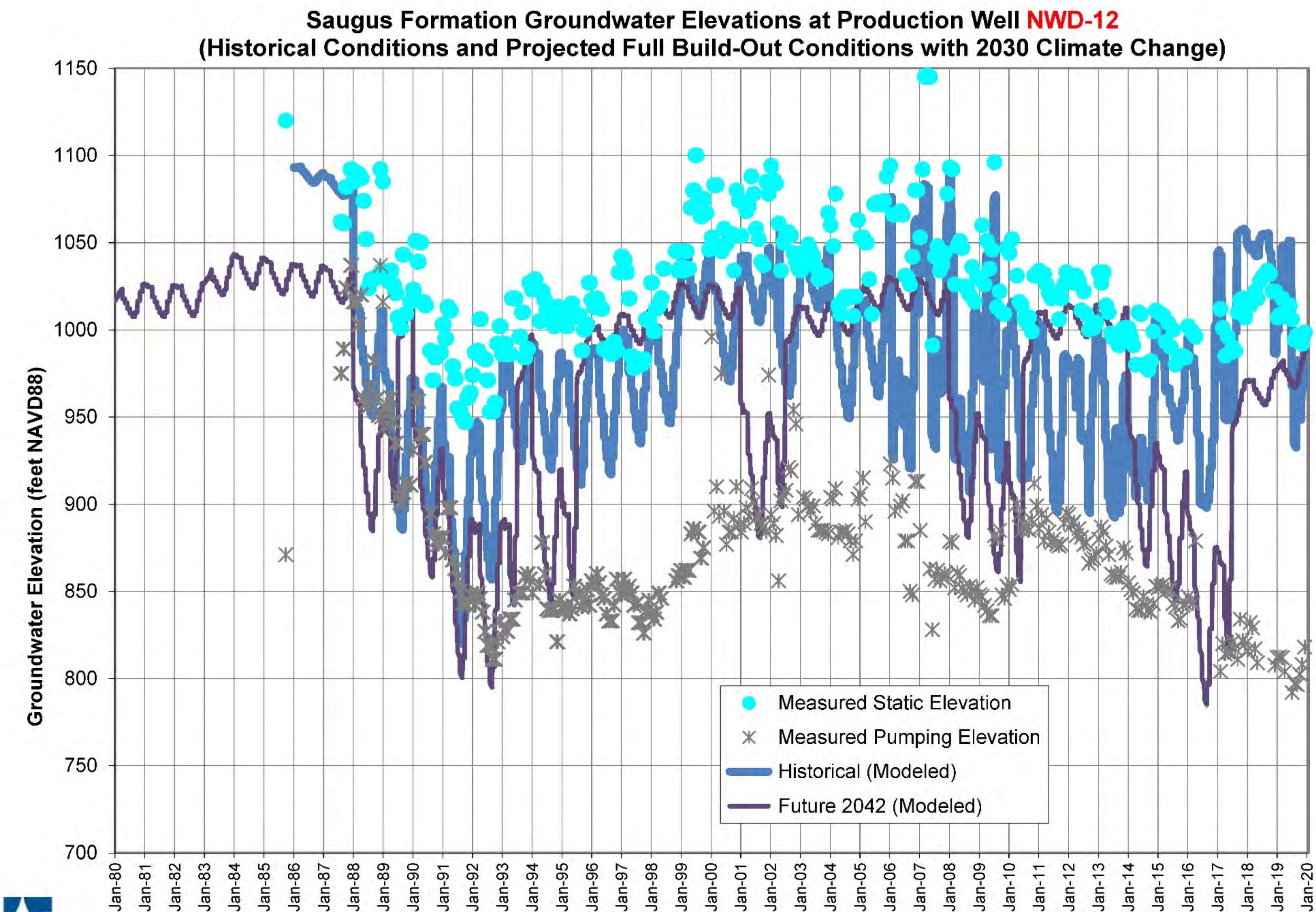

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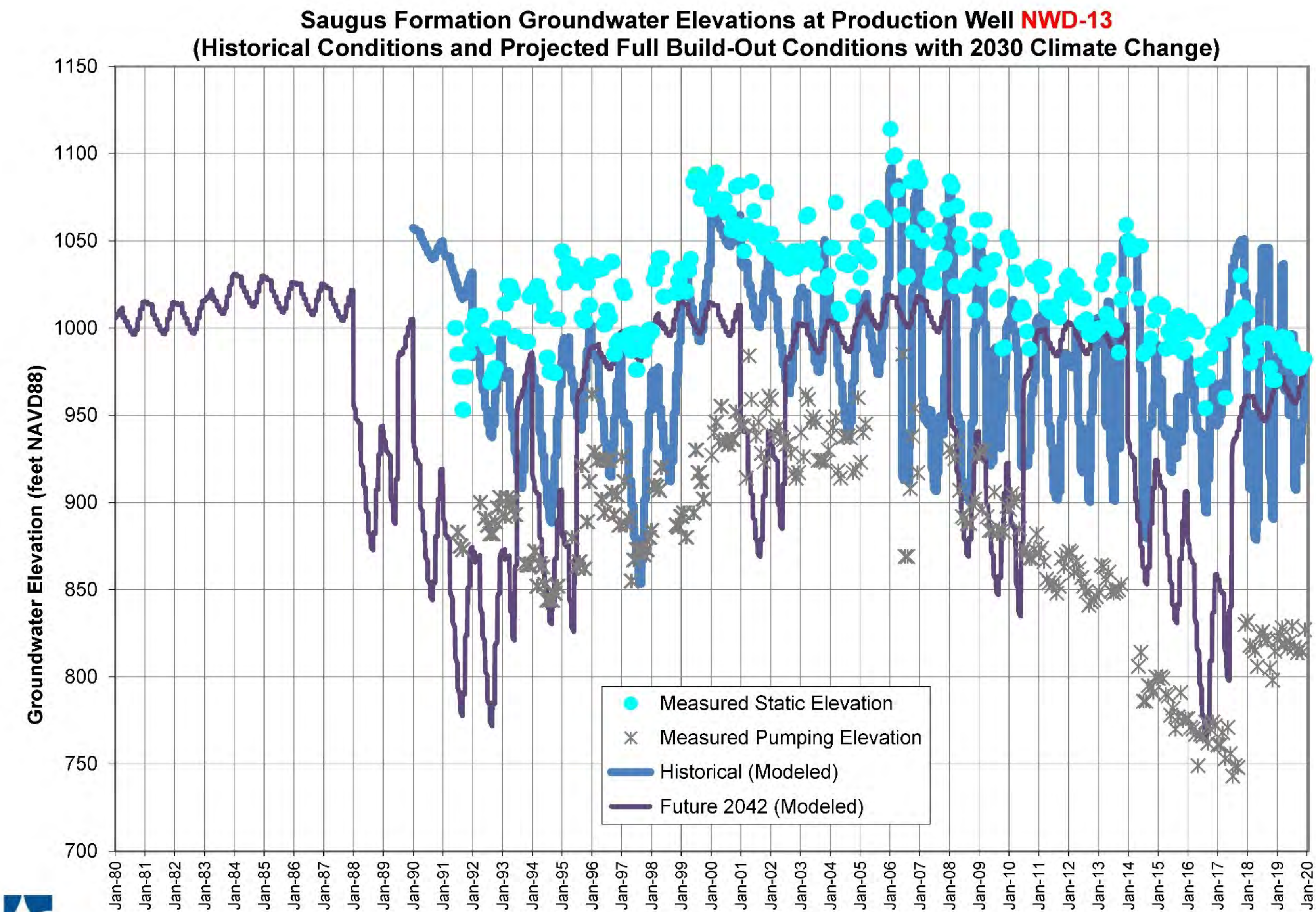
LSCE


Saugus Formation Groundwater Elevations at Production Well NWD-13
(Historical Conditions and Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet NAVD88)
1150
1100
1050
1000
950
900
850
800
750
700
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Measured Static Elevation
Measured Pumping Elevation
Historical (Modeled)
Future 2042 (Modeled)
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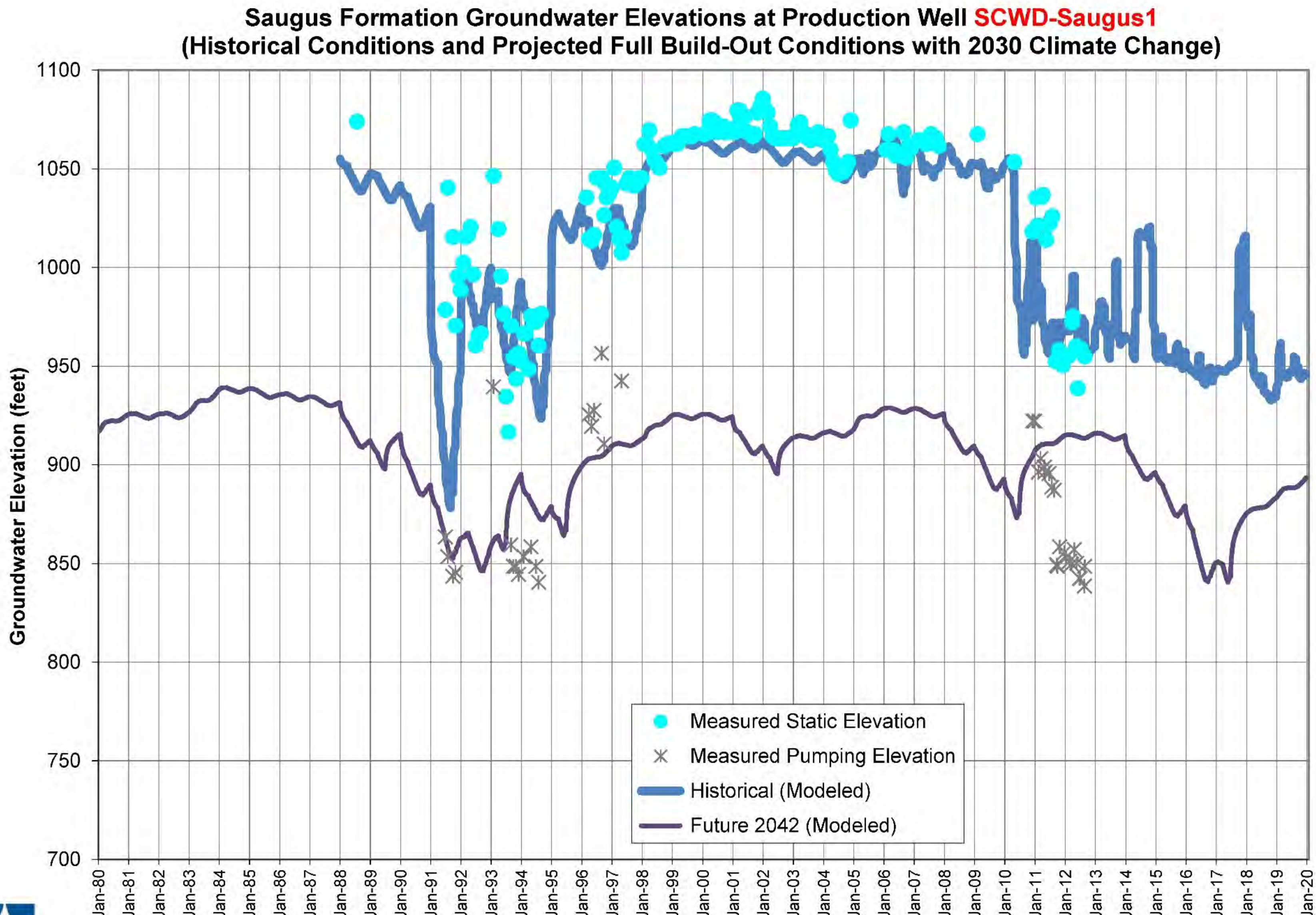

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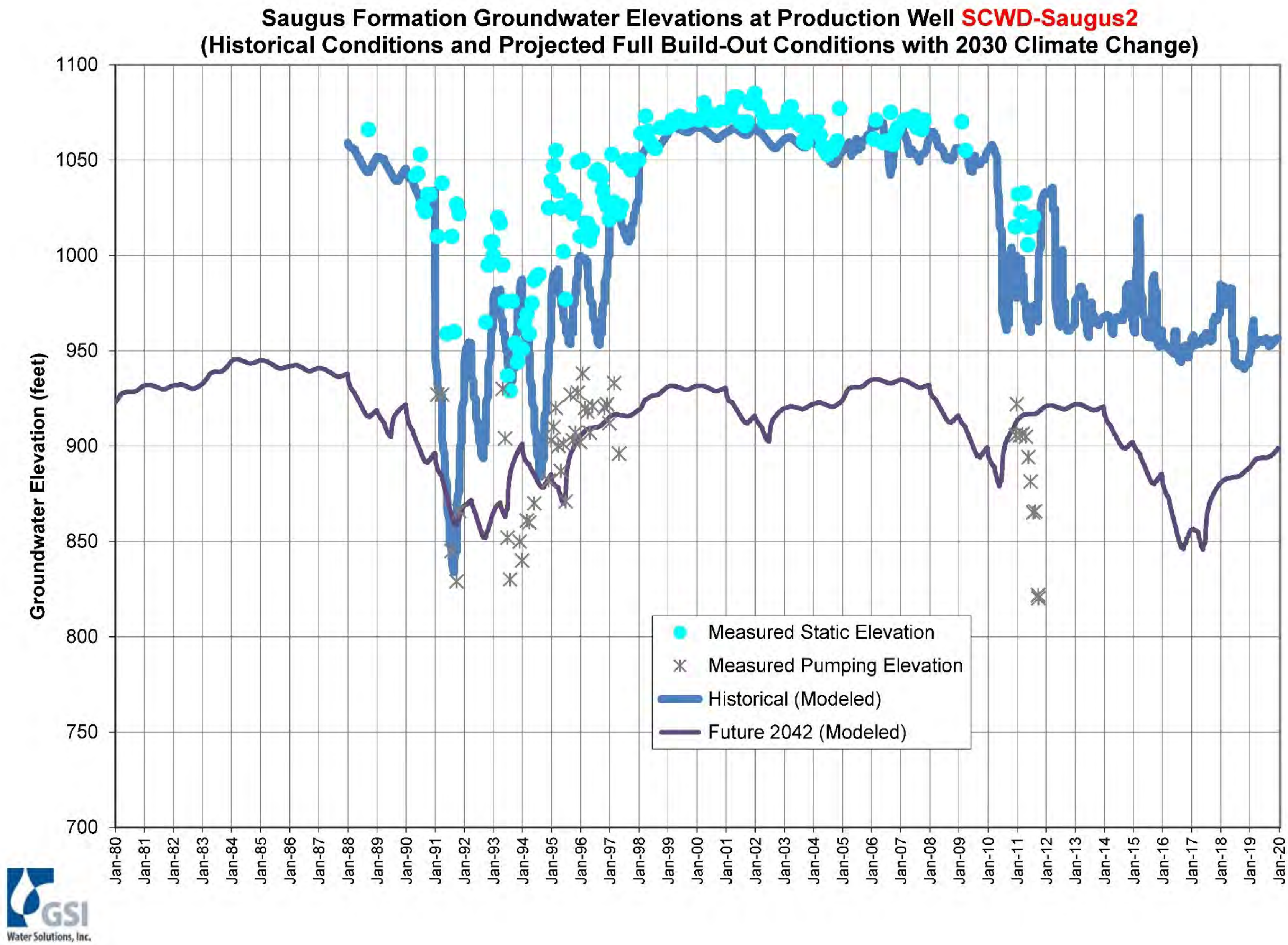
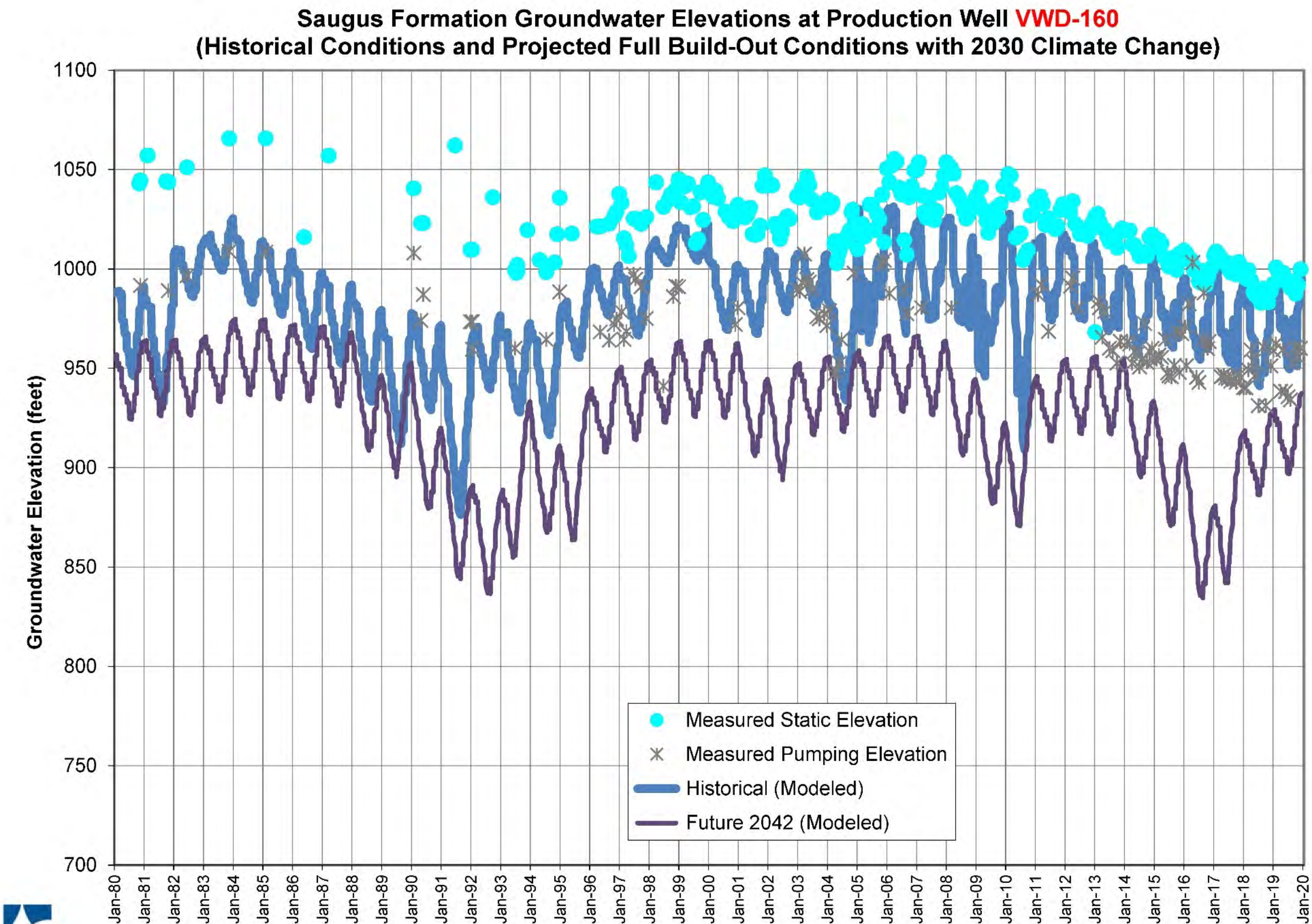

Saugus Formation Groundwater Elevations at Production Well SCWD-Saugus2
(Historical Conditions and Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet)
1100
1050
1000
950
900
850
800
750
700
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Measured Static Elevation
Measured Pumping Elevation
Historical (Modeled)
Future 2042 (Modeled)
GSI
Water Solutions, Inc.

LSCE



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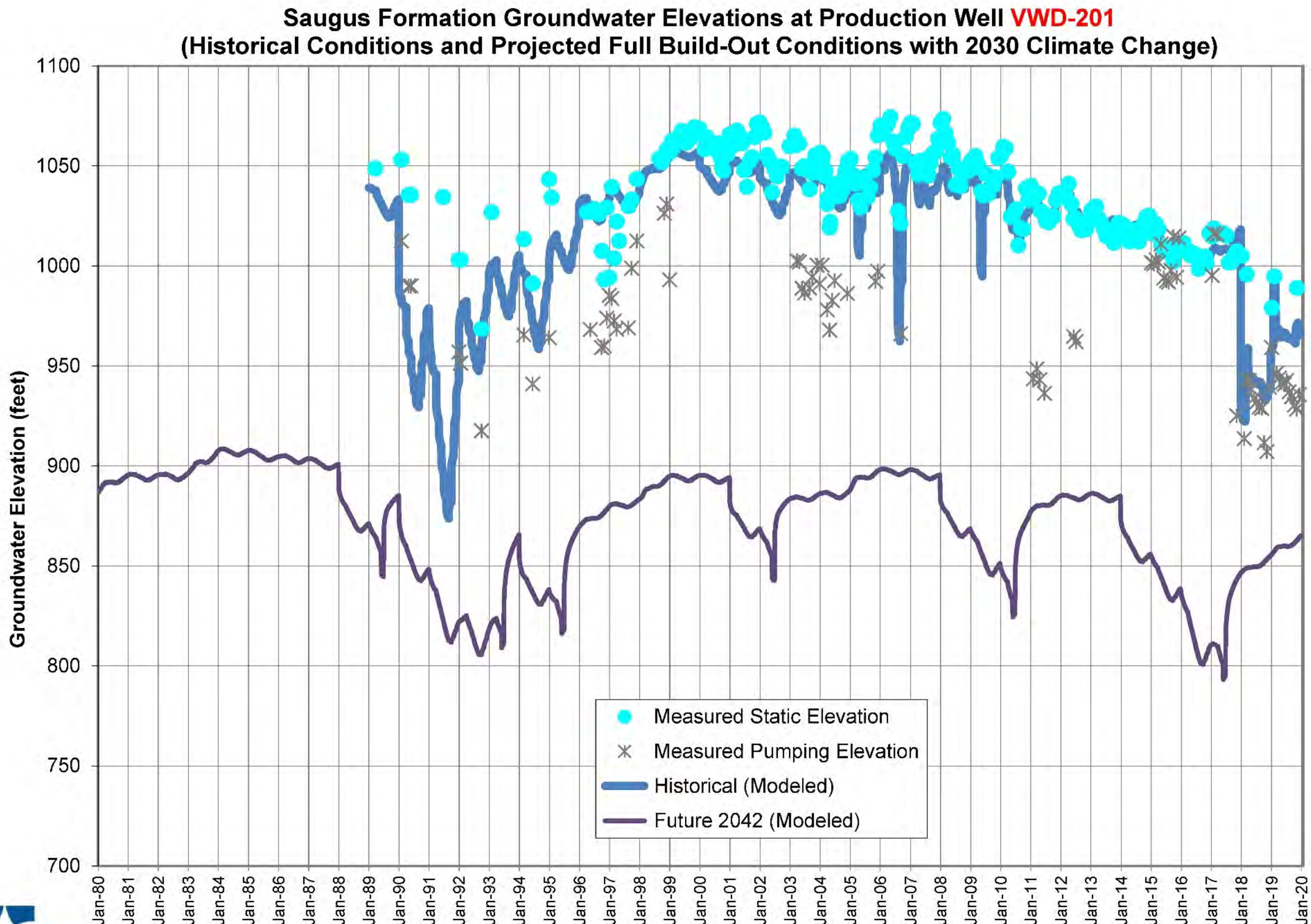
LSCE



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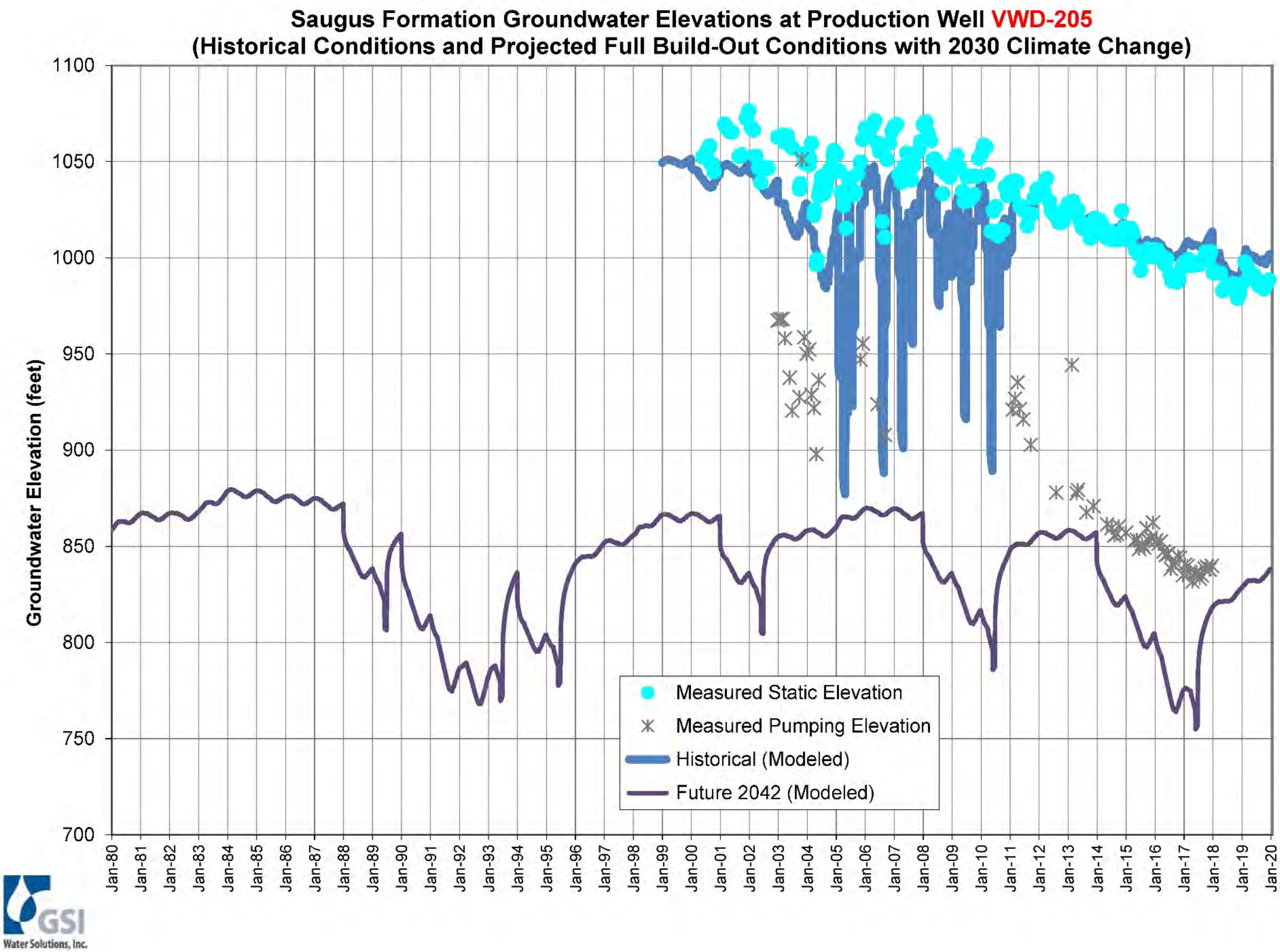
Saugus Formation Groundwater Elevations at Production Well VWD-205
(Historical Conditions and Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet)
1100
1050
1000
950
900
850
800
750
700
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
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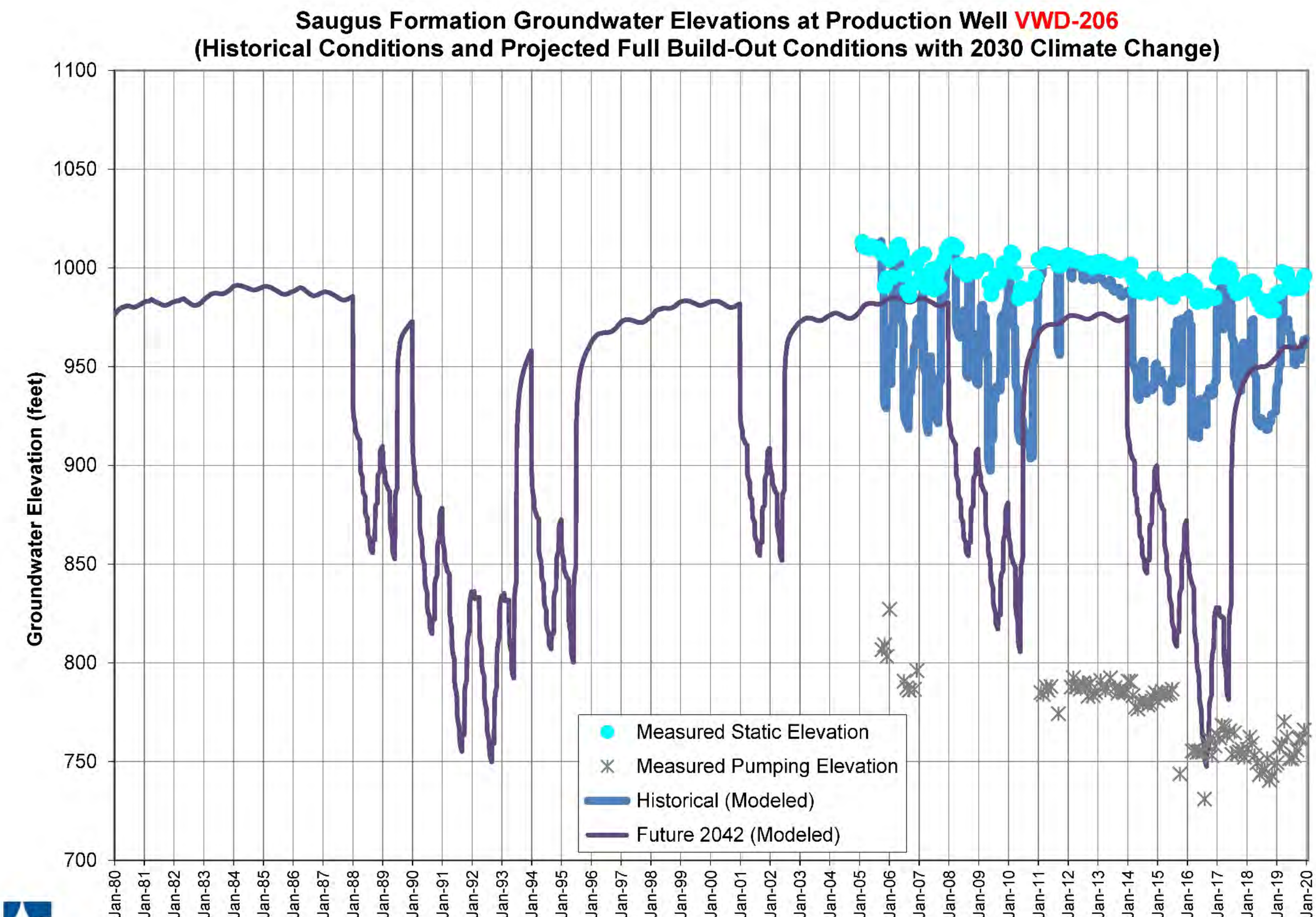
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Measured Static Elevation
Measured Pumping Elevation
Historical (Modeled)
Future 2042 (Modeled)
GSI
Water Solutions, Inc.

LSCE



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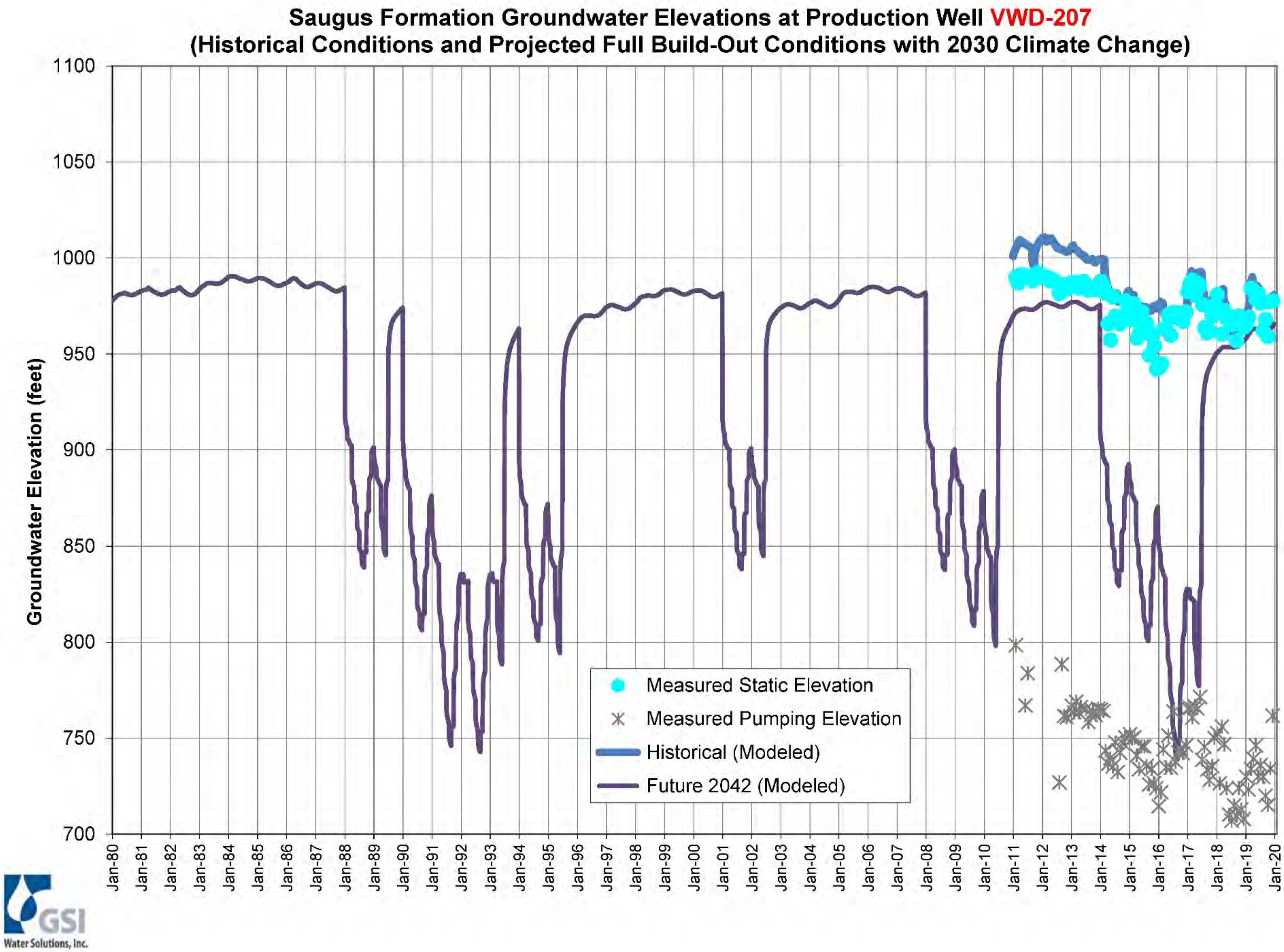
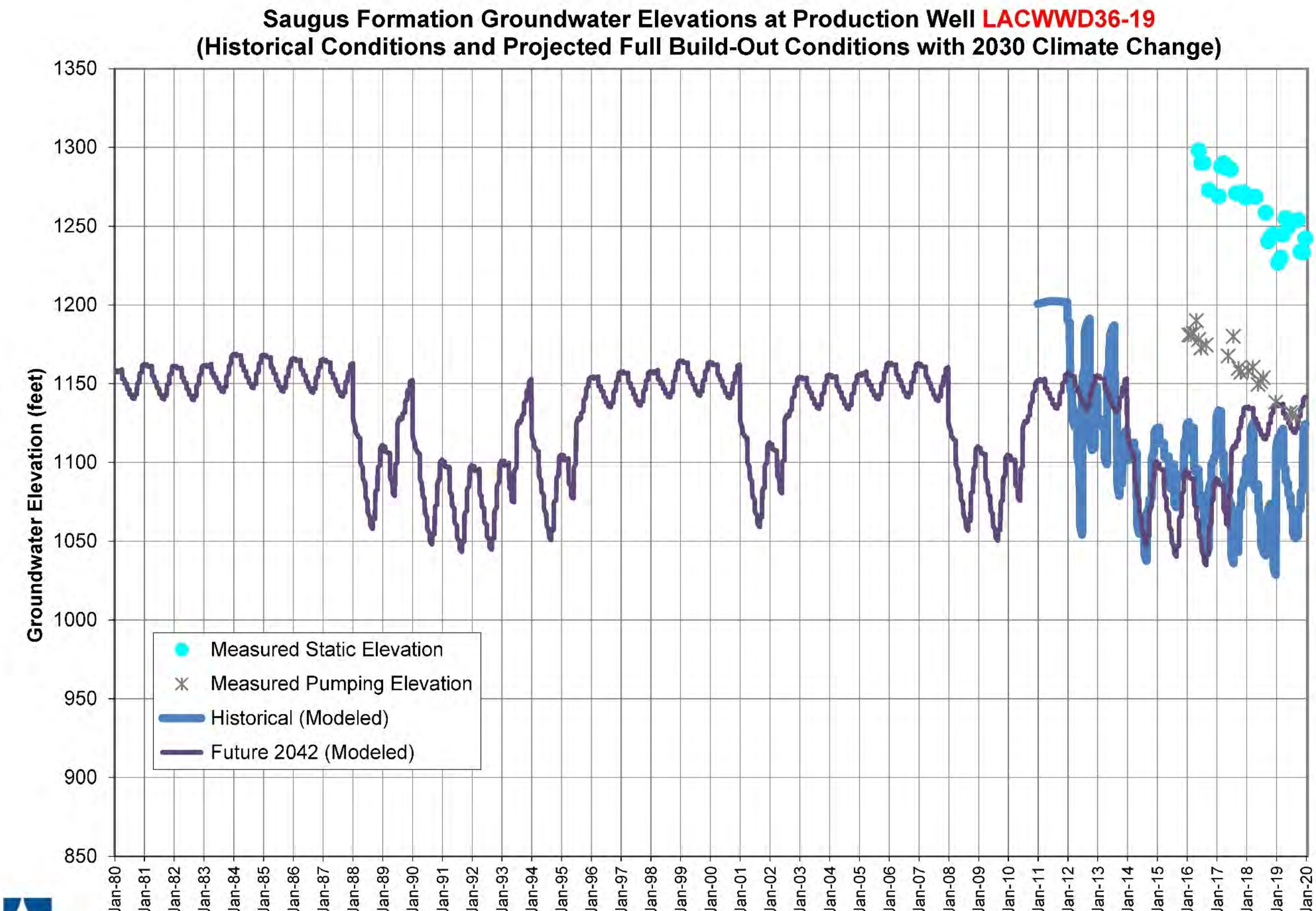
LSCE



Saugus Formation Groundwater Elevations at Production Well VWD-207
(Historical Conditions and Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet)
1100
1050
1000
950
900
850
800
750
700
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Measured Static Elevation
Measured Pumping Elevation
Historical (Modeled)
Future 2042 (Modeled)
GSI
Water Solutions, Inc.

LSCE



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APPENDIX K

Assessment of Existing Data and Data Gaps Analysis, Santa Clarita Valley Water Agency Groundwater Sustainability Plan, Prepared by Luhdorff & Scalmanini, Consulting Engineers

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Water Solutions, Inc.

Transmittal

To:	Rick Viergutz	**From:**	**Jeff Barry**
Address:	Santa Clarita Valley Water Agency 27234 Bouquet Canyon Road Santa Clarita, CA 91350	**Date:**	January 7, 2020
Re:			

X Attachments X For Review X Please Comment • For Your Use

Date	Number of Copies	Description
1/3/2020	1	DRAFT TASK 2D ASSESSMENT OF EXISTING DATA AND DATA GAPS ANALYSIS, SANTA CLARITA VALLEY WATER AGENCY GROUNDWATER SUSTAINABILITY PLAN

418 Chapala Street, Suite H, Santa Barbara, CA 93101 805.895.3956 info@gsiws.com www.gsiws.com

Technical Memorandum

DATE: March 15, 2021 PROJECT: 18-1-132

TO: **Mr. Jeff M. Barry**

FROM: **William L. Halligan and Lisa Lavagnino**

SUBJECT: **DRAFT TASK 2D ASSESSMENT OF EXISTING DATA AND DATA GAPS ANALYSIS, SANTA CLARITA VALLEY WATER AGENCY GROUNDWATER SUSTAINABILITY PLAN**

INTRODUCTION

This technical memorandum (TM) is prepared as a required deliverable for Task 2D in Task Order Agreement No. 1. Described below are the following elements of this TM:

- Inventory and evaluation of available data sources,
- Identification of existing monitoring programs,
- Recommendation of an appropriate data management system (DMS) platform for groundwater sustainability plan (GSP) purposes,
- Development of DMS structure,
- Populating the DMS,
- Development of DMS documentation,
- Identify and prioritize existing data gaps, and
- An action plan to fill data gaps.

The DMS developed as part of this task order (SCVGSA DMS) is intended to provide the Santa Clarita Valley Water Agency (SCV Water) with a data management tool that, at a minimum, will store and produce data for use in GSP and related annual report submittals to the Department of Water Resources. In addition, this DMS will also have the capability to be linked to visualization tools for stakeholder outreach and can also be transitioned up to a larger-scale or enterprise level database. The SCVGSA DMS is intended to store datasets that will be used in the development of various aspects of the GSP and related annual reports, including the following:

- Basin Setting,
- Well location density maps,
- Groundwater pumping distribution,
- Sustainability indicator data (groundwater levels, groundwater quality, and subsidence, groundwater dependent ecosystems), and

- Water budget data used to support GSP numerical modeling development.

The SCVGSA DMS stores data related to GSP development and also includes automated queries and report objects that format and output data into groundwater level hydrographs (and other time-series plots as needed), and well location maps that will be useful in the presentation and interpretation of groundwater conditions in the basin. For reporting purposes, exportable data summary tables are readily generated from the DMS for inclusion in the GSP and subsequent annual reports. Additional queries as needed beyond the basic queries already established will be developed in coordination with GSI in order to produce maps, figures, and hydrographs for the GSP. The SCVGSA DMS allows for direct input of future data collection efforts conducted as part of the GSP monitoring program and produce maps of monitoring locations which will allow for the identification of areas of limited data (data gaps). These maps will help in the development of an implementation schedule for SCV Water to address data gaps for those sustainability indicators which have limited historical data sets, such as groundwater dependent ecosystems, streamflow (to assist in evaluating interconnected surface water), and others.

Inventory and Evaluation of Available Data Sources

An inventory and evaluation of available data sources that were accessed are listed below in Table 1. This table includes a list of the data sources, the types of data obtained from each source, and the relative quality of the data obtained from each source. Generally, the quality of data from each source is moderate to high quality, while there was only one data source in which the data could be improved with a field survey (LA County well location accuracy is moderate to low quality). Most of the data incorporated into the SCVGSA DMS is groundwater and surface water data measured in the Santa Clarita Valley.

Table 1
SCVGSA DMS Data Sources

DATA SOURCE	DATA TYPE	DATA QUALITY RANK*
Santa Clarita Valley Water Agency *(including LA County Waterworks District 36)*	Groundwater Wells Groundwater Levels Groundwater Quality Groundwater Production Imported Water Precipitation	High to Moderate (L/E) Moderate (M/D) High High High High
CA Department of Water Resources	Well Completion Reports Water Levels (CASGEM) Precipitation Castaic Reservoir Releases	Moderate (L) Varies by Original Source High High
Los Angeles County Department of Public Works *including Pitchess Detention Center and LA County Flood Control District*	Wells Groundwater Levels Groundwater Production Streamflow Discharge	Moderate to Low (L/E/A) Moderate/Unknown (M) Moderate/Unknown Moderate/Unknown (M)
Five Star *(formerly Newhall Land and Farming)*	Wells Water Levels Production	Moderate (L/E/A) Moderate (M) Moderate (M)
Whittaker Bermite	Wells Groundwater Levels Groundwater Quality	High High High
Regional Water Quality Control Board	Stream Water Quality	High
National Centers for Environmental Information	Precipitation	High
SWRCB-Division of Drinking Water	Groundwater Wells Groundwater Quality	Moderate (L/E/A) High
SWRCB-Geotracker	Wells Groundwater Levels Groundwater Quality	High to Moderate (A) High to Moderate (R) High
Los Angeles County Sanitation District	Wastewater Discharge	High
United States Geological Survey	Streamflow Discharge	High
Geosyntec	Groundwater Wells Groundwater Levels Groundwater Quality	Unknown (L/E/A) Unknown (M/R) Unknown (M/R)
UNAVCO - University NAVSTAR Consortium	Continuous GPS *(land surface elevation monitoring)*	High

**Moderate and Unknown Rankings are qualified with basis for imprecision and/or inaccuracy: Measurement Method (M), Date (D), Location Coordinates (L), Elevation (E), and Attribute Completeness (A), or Record Completeness (R).*

Identification of Existing Monitoring Programs

The following is a list of ongoing monitoring programs that are being conducted on an ongoing basis in the Subbasin:

- Division of Drinking Water for municipal water supply well groundwater quality monitoring,
- SCV Water rainfall, groundwater level, and groundwater quality monitoring,
- Whittaker Bermite Monitoring for soil and groundwater quality,
- California Statewide Groundwater Monitoring Program (CASGEM) for annual monitoring of groundwater levels in the Subbasin,
- National Pollutant Discharge Elimination System (NPDES) for potable water discharge quality,
- SCV Water Salt and Nutrient Management Plan monitoring,
- Municipal Separate Stormwater System (MS4) monitoring,
- Los Angeles County (Department of Public Works for streamflow monitoring, Flood Control District for groundwater levels, and Sanitation District for wastewater discharge monitoring),
- Regional Water Quality Control Board regulated sites (Landfills and other sites with ongoing groundwater monitoring)
- UNAVCO continuous GPS monitoring of land surface elevation changes (subsidence).

Recommended Data Management System Platform for GSP Development

In order to ensure user flexibility, the database was designed using Microsoft Access 2007-2016 and the *.accdb* database format. Access has the capacity to store related tables of data, up to a total of 2 GB of data and can be transitioned to larger-scale database software as necessary. The currently archived data occupy about 85 MB, or less than half, of the available storage capacity. Access is capable of importing data from and exporting data to other commercially available software programs for data visualization or to an enterprise level database for multi-user needs. For geospatial data, a file geodatabase (SCVGSAgdb) has been constructed in ArcGIS using thematically grouped feature datasets. The geodatabase contains spatial data and is related to the SCVGSA DMS Access database to support the production of tables, figures, and maps for GSP development purposes.

Development of DMS Structure

The database structure was designed to maximize the utility of the data by using a similar structure as developed by the DWR, USGS, and DPH. Each data record entered into the database identifies the data source and has a unique identification number. Each site is uniquely identified by a Local Well Name, usually with a corresponding State Well Number, Site ID, or Source Name, and other related IDs from other monitoring programs. The main data tables and LOV (List of Values) tables included in the SCVGSA DMS are listed below. Further detailed descriptions of these tables, a visual depiction of these tables and their related fields, and examples of the data they contain can be found in the **Appendix A**.

As a general overview, there are six main data tables related to the central T_WELL data table in the SCVGSA DMS and currently seven additional supporting LOV tables. The main data tables are:

1. T_WELL - groundwater well and monitoring point records; linked to the SCVwells dataset in SCVGSAgdb by [WELL_NAME] field,
2. T_WL –groundwater level records,
3. T_WQ – ground and surface water quality data,
4. T_PROD – groundwater production data,
5. T_SWP –State Water Project and Imported Water data by Purveyor/Division,
6. T_STREAM – streamflow discharge data, and
7. T_PRECIP – precipitation data.

Supporting List of Values (LOV) tables include:

- T_LOV_WQ_AN – Water Quality Analyte
- T_LOV_SRC – Data/Record Source
- T_LOV_WL_QLFR – Water Level Measurement Qualifier
- T_LOV_WELLTYP – Well Type
- T_LOV_WL_MTHD – Water Level Measurement Method
- T_LOV_UOM – Unit of Measure

The DMS T_WELL table currently contains 1,206 entries that are a subset of the 2,082 records in the SCVwells dataset in the SCVGSAgdb. The wells in T_WELL have associated temporal water level, quality, or production data records in the other data tables of the DMS. The fields in the T_WELL table are carried over from the SCVwells dataset in the SCVGSAgdb. The description of the SCVwells dataset and the definition of these fields can be found in **Appendix B**.

Populating the DMS

The SCVGSA DMS currently contains fourteen data/LOV tables which store all the data for a total number of more than 176,000 records. As mentioned above, the number of data records currently stored in the SCVGSA DMS is only 85 megabytes out of two gigabyte capacity. Future importing of data and information into the SCVGSA DMS should first include a review of the data and formatting the data into a format that is compatible with the existing data table formats in the SCVGSA DMS.

Development of DMS documentation

Documentation of the SCVGSA DMS is ongoing as the DMS is further developed through the GSP process. The Appendix includes screenshots of the tables and existing queries that will be updated through the GSP development process.

Identify and prioritize existing data gaps

The identification and prioritization of data gaps will be developed predominantly during the development of the Basin Setting, Water Budget, and Monitoring Network portions of the GSP. Described herein, is a preliminary identification and prioritization of data gaps which will be refined during the GSP development process. The identification of data gaps is a requirement of a GSP with a focus on the six sustainability indicators that are listed below. The historical and spatial distribution of data that exists for the six sustainability indicators were evaluated and the data gaps that exist for each indicator is listed below, along with an initial prioritization of high/medium/low.
Sustainability Indicators:
Minimal data gaps:
Reduction in Storage in Alluvial Aquifer (metric=extraction volume)
Chronic Lowering of Groundwater Levels in the Alluvial Aquifer (metric=groundwater elevations)
Moderate data gaps:
Degraded Water Quality (historical focus has been on Whittaker Bermite site and municipal well locations)
Pronounced Data Gap
Depletion of Interconnected Surface Water (including GDEs) as a result of incomplete surface water gage locations, mapping of historical groundwater dependent ecosystems (GDEs) in the Subbasin, and monitoring locations for shallow groundwater occurrence.

Not Applicable:
Seawater Intrusion

An action plan to fill data gaps

The action plan to address data gaps will be developed and described in the GSP and will include an implementation schedule and an estimate of costs for addressing data gaps. At this preliminary stage in GSP development, SCV Water is currently installing monitoring locations to collect shallow groundwater level data in areas likely to contain GDEs and to evaluate the presence of interconnected surface water. It is expected that during the first five years following GSP adoption in 2022, SCV Water will address the data gaps that are present regarding groundwater levels and quality in the Saugus Formation, subsidence benchmark survey locations in the Santa Clarita Valley, and additional surface water flow gage locations installed along the Santa Clara River in the vicinity of treated wastewater discharges and areas where there are tributary inflows to the Santa Clara River. The schedule for addressing these data gaps and the funding mechanisms to fund the installation on monitoring are still in development.

Appendix A

Appendix A – Access Views

SCVGSA DMS Data Tables and List of Value Tables

T_Well – Well Table (and other site observation points)

T_WL – Water Level Data Table

T_PROD – Production Data Table

T_SWP – State Water Project Data Table

T_STREAM – Streamflow Data Table

T_PRECIP – Precipitation Data Table

T_WQ – Water Quality Data Table

T_LOV_SCR – Source List of Values Table

T_LOV_WELLTYP – Well Type List of Values Table

T_LOV_WL_MTHD – Water Level Measurement Method List of Values Table

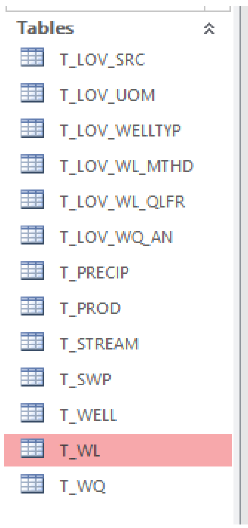
T_LOV_WL_QLFR – Water Level Measurement Qualifier List of Values Table

T_LOV_WQ_AN – Water Quality Analyte List of Values Table

(not all included as figures yet)

Figure A1

List of Tables



Relationships

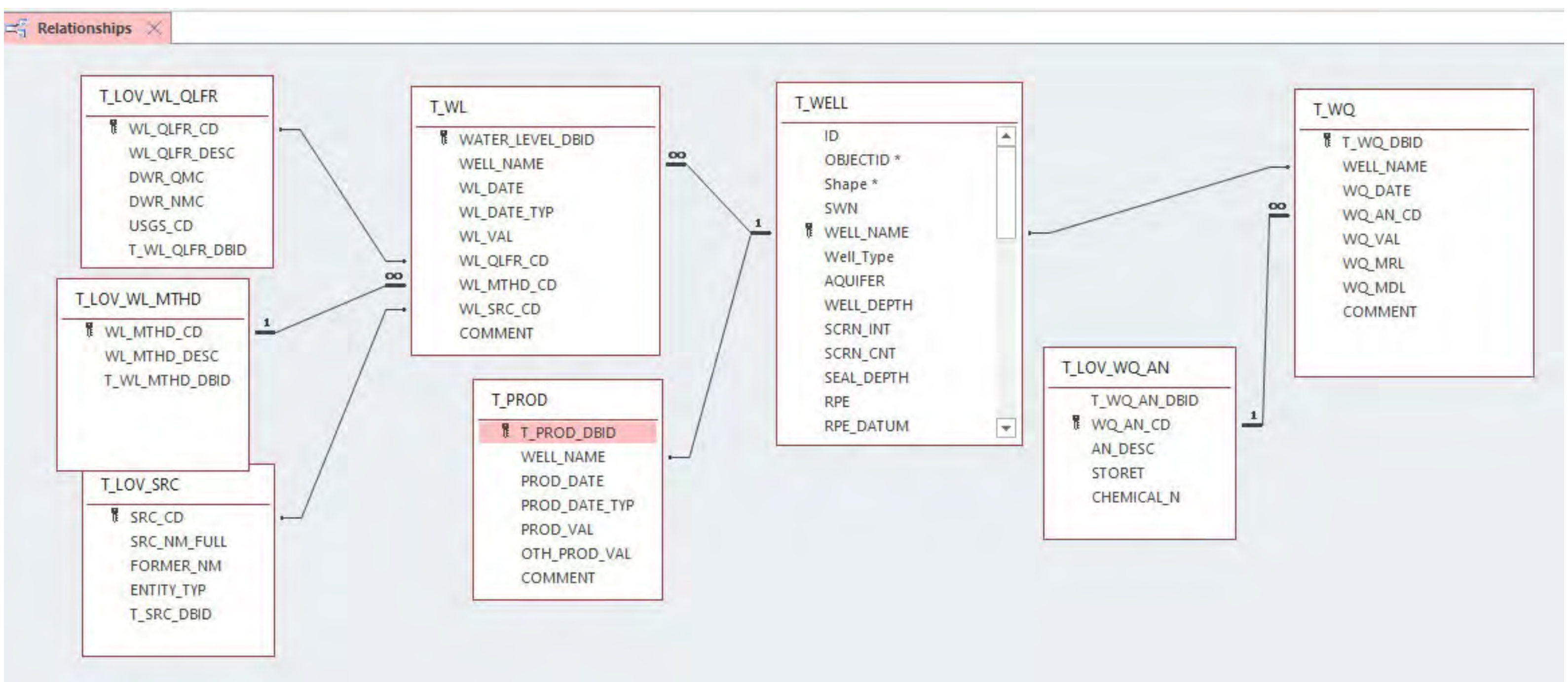


Figure A2

T_WELL - Well Table

(Data View)

T_WELL

SWN	Note	Data_Source	WELL_NAME	Well_Type	AQUIFER	WEL	SCRI	SCRI	SEAL	RPE	RPE_	Dup	MTR	MTR	MTR	MTR	Internal_
		USGS-GAMA GIS	SCRVU-05	MUN													
04N/16W-22K06	Perc 1997; old P	SCWD	SCVWA-Saugus 1	MUN	Saugus	1683	490-16	8	450	1165.5			S0040N	S0040N	S0040N	S0040N	**04N16W**
04N/16W-22K10	Perc 1997; old P	SCWD	SCVWA-Saugus 2	MUN	Saugus	1649	490-15	8	80	1170			S0040N	S0040N	S0040N	S0040N	04N16W
04N/16W-12N02	same well as LAC	SCWD	SCWD-Clark	MUN	Alluvium	160	20-120	1	UNK	1253			S0040N	S0040N	S0040N	S0040N	
04N/15W-06P01	same well as LAC	SCWD	SCWD-Guida	MUN	Alluvium	150	56-150	1	UNK	1342			S0040N	S0040N	S0040N	S0040N	DOCU000
04N/15W-18N03	same well as LAC	SCWD	SCWD-Honby	MUN	Alluvium	202	50-202	1	30	1280			S0040N	S0040N	S0040N	S0040N	SCWD_H
04N/16W-13D01	per CASGEM info	CASGEM	SCWD-Lombardi	MUN	Unknown												
	??? Same well as	SCWD	SCWD-LOMBARDIold	UNK	Saugus	1150	260-11	1		1280							
04N/15W-23F06	prob LACFCD-718	SCWD	SCWD-Lost Canyon 2	MUN	Alluvium	310	95-125	1	30	1532			S0040N	S0040N	S0040N	S0040N	
04N/15W-23F07	possibly LACFCD	SCWD	SCWD-Lost Canyon 2A	MUN	Alluvium	252	95-125	1	60	1532			S0040N	S0040N	S0040N	S0040N	DOCU000
04N/16W-14E03		SCWD	SCWD-Methodist	DES	Alluvium	160	60-160	1	60	1188			S0040N	S0040N	S0040N	S0040N	
04N/15W-22J01	same well as LAC	SCWD	SCWD-Mitchell	DES	Alluvium	262	76-246	1	UNK	1486			S0040N	S0040N	S0040N	S0040N	
04N/15W-22J01'	same well as LAC	SCWD	SCWD-Mitchell #5A	MUN	Alluvium	360			76	1486			S0040N	S0040N	S0040N	S0040N	SCWD_M
04N/15W-22H04		SCWD	SCWD-Mitchell #5B	MUN	Alluvium	164			50	1486			S0040N	S0040N	S0040N	S0040N	DOCU000
04N/15W-21N01	same well as LAC	SCWD	SCWD-N. Oaks Central	MUN	Alluvium	244	50-244	1	40	1391			S0040N	S0040N	S0040N	S0040N	
04N/15W-21N03	same well as LAC	SCWD	SCWD-N. Oaks East	MUN	Alluvium	150	81-150	1	UNK	1391			S0040N	S0040N	S0040N	S0040N	
04N/15W-21N02	same well as LAC	SCWD	SCWD-N. Oaks West	MUN	Alluvium	136	80-118	1	UNK	1387			S0040N	S0040N	S0040N	S0040N	
04N/15W-23C05	same well as LAC	SCWD	SCWD-Sand Canyon	MUN	Alluvium	250	60-140	1	60	1525			S0040N	S0040N	S0040N	S0040N	DOCU000
04N15W18P005		SCWD	SCWD-SantaClara	MUN	Alluvium	160	90-135	1	50	1289			S0040N	S0040N	S0040N	S0040N	DOCU000
04N/15W-21K01	same well as LAC	SCWD	SCWD-Sierra	MUN	Alluvium	175	60-175	1	60	1417			S0040N	S0040N	S0040N	S0040N	
04N/16W-23F01	same well as LAC	SCWD	SCWD-Stadium	DES	Alluvium	130	33-130	1	UNK	1198			S0040N	S0040N	S0040N	S0040N	
04N16W13J001S		SCWD	SCWD-Valley Center	MUN	Alluvium	133	90-125	1	50	1256			S0040N	S0040N	S0040N	S0040N	DOCU000

(Data View continued)

T_WELL

Internal_I	Repc	Pern	Addi	Strei	Tow	Zip	APN	Filer	Flag	GSE	Owr	PS_Code	CASGEM_ID	Well_Status	Location_Metho	E_FTSPZ5_83	N_FTSPZ5_83	*Click to Add*
															GAMA GIS	6417234.274007	1991200.72752	
04N16W22K	296741	6/15/1	23308	MAGIC				04N16	Remove	1162		1910048-004		ACTIVE	Aerial	6397846.774396	1973451.518596	
04N16W22R	296743							04N16	Remove	1158		1910048-005		ACTIVE	Aerial	6398513.847209	1972539.563071	
										1253		1910017-002		ACTIVE	Aerial	6405893.870835	1983060.406202	
DOCU00000	30661							04N15	Remove	1342		1910017-006	344312N118535	ACTIVE	Aerial	6411663.285477	1988665.96192	
SCWD_Honb	30663							SCWD_		1280		1910017-007	344244N118498	ACTIVE	Aerial	6411408.101276	1977202.117722	
													344342N118523	ACTIVE	UNK	6403858.909025	1980789.482923	
										1280				DESTROYED	UNK	6393571.675991	1959227.236021	
										1532		1910017-008		ACTIVE	Aerial	6433582.410274	1975573.284694	
DOCU00000	289287	1989-1		SAND C				04N15	Remove	1532		1910017-009		ACTIVE	Aerial	6433491.529222	1975619.886963	
										1188				DESTROYED	UNK	6400975.823256	1979515.242033	
										1486				DESTROYED	UNK	6430168.317036	1974420.434637	
SCWD_Mitch	77402							SCWD_		1486		1910017-012	344162N118436	ACTIVE	Aerial	6430168.317036	1974420.434637	
DOCU00000	74700	2001-0						04N15	Remove	1486		1910017-025		ACTIVE	Aerial	6430329.728787	1974433.92772	
										1391		1910017-013		ACTIVE	Aerial	6421382.864135	1972922.236518	
										1391		1910017-014		ACTIVE	Aerial	6421651.361958	1972936.280125	
										1387		1910017-015		ACTIVE	Aerial	6421186.814658	1972856.546361	
DOCU00000	82129	1973-0		LOST CA				04N15	Remove	1525		1910017-016		ACTIVE	Aerial	6432953.073934	1975589.051394	
DOCU00000	E00864	2008-1		FURNIV				04N15	Remove	1285		1910017-040		ACTIVE	Aerial	6412135.113274	1977554.805337	
										1417		1910017-019		ACTIVE	Aerial	6423745.155342	1973271.682342	
										1198		1910017-020		DESTROYED	Aerial	6402384.747932	1974713.448487	
DOCU00000	e00864	2008-1						04N16	Remove	1259		1910017-039	344230N118505	ACTIVE	Aerial	6409100.027808	1976689.230625	

T_WELL - Well Table

(Design View)

T_WELL

Field Name	Data Type	Description (Optional)
ID	AutoNumber	
OBJECTID *	Number	
Shape *	Short Text	
SWN	Short Text	
WELL_NAME	Short Text	Unique Well Name
Well_Type	Short Text	Well Type (see LOV table)
AQUIFER	Short Text	Designated Aquifer
WELL_DEPTH	Short Text	Well Depth in feet below ground surface
SCRN_INT	Short Text	Screened Interval (Top and Bottom) in feet below ground surface
SCRN_CNT	Short Text	Count of Screened Intervals
SEAL_DEPTH	Short Text	Depth of Seal in feet below ground surface
RPE	Short Text	Reference Point Elevation (feet above specific vertical datum) - point on well from where DTW measurement made or Well Pad or Land Surface
RPE_DATUM	Short Text	RPE vertical datum (NAVD88, NGVD29, Unknown)
Duplicate_Explanation	Short Text	
MTRSTS	Short Text	
MTRST	Short Text	
MTRS	Short Text	
MTR	Short Text	
Internal_ID	Short Text	
Report_ID	Short Text	
Permit_Date	Short Text	
Address_No	Short Text	
Street	Short Text	
Town	Short Text	
Zip	Short Text	
APN	Short Text	
Filename	Short Text	

Field Properties

(Design View continued)

Flag	Short Text	
Note	Short Text	
Data_Source	Short Text	
GSE	Short Text	
Owner_SiteNm	Short Text	
PS_Code	Short Text	
CASGEM_ID	Short Text	
Well_Status	Short Text	
Location_Method	Short Text	
E_FTSPZ5_83	Short Text	
N_FTSPZ5_83	Short Text	

Figure A3

T_WL - Water Level Table

(Design View)

T_WL

Field Name	Data Type	Description (Optional)
WATER_LEVEL_DBID	AutoNumber	
WELL_NAME	Short Text	
WL_DATE	Date/Time	Water Level Measurement Date; include time if available
WL_DATE_TYP	Short Text	Water Level Date Type (currently D=Day, M=Month, or Y=Year); followed by 'u' if uncertain
WL_VAL	Number	Water Level Value/Depth to Water below measurement/reference point in feet
WL_QLFR_CD	Short Text	Water Level Qualifier Code (lookup)
WL_MTHD_CD	Short Text	Water Level Method Code (lookup)
WL_SRC_CD	Short Text	
COMMENT	Short Text	

(Data View)

T_WL

WATER_LEVEL	WELL_NAME	WL_DATE	WL_DATE_TYP	WL_VAL	WL_QLFR_CD	WL_MTHD_CD	WL_SRC_CD	COMMENT	*Click to Add*
2	NWD-07	11/19/1959	Du	105	No_code	UNK	NWD		
3	NWD-07	11/29/1960	Du	102	No_code	UNK	NWD		
4	NWD-07	12/2/1963	Du	142.4	No_code	UNK	NWD		
5	NWD-07	11/19/1964	Du	169	No_code	UNK	NWD		
6	NWD-07	11/29/1965	Du	166	No_code	UNK	NWD		
7	NWD-07	10/28/1967	Du	147.8	No_code	UNK	NWD		
8	NWD-07	3/26/1968	Du	161.3	No_code	UNK	NWD		
9	NWD-07	11/7/1968	Du	156.2	No_code	UNK	NWD		
10	NWD-07	4/22/1969	Du	142.6	No_code	UNK	NWD		
11	NWD-07	8/15/1973	Du	160	No_code	UNK	NWD		
12	NWD-07	9/15/1973	Du	244	No_code	UNK	NWD		
13	NWD-07	1/15/1974	Du	232	No_code	UNK	NWD		
14	NWD-07	2/15/1974	Du	232	No_code	UNK	NWD		
15	NWD-07	3/15/1974	Du	218	No_code	UNK	NWD		
16	NWD-07	4/15/1974	Du	142	No_code	UNK	NWD		
17	NWD-07	7/1/1984	Mu	292	Pumping	UNK	NWD		
18	NWD-07	7/15/1984	Mu	148	No_code	UNK	NWD		
19	NWD-07	8/1/1984	Mu	293	Pumping	UNK	NWD		
20	NWD-07	8/15/1984	Mu	138	No_code	UNK	NWD		

Figure A4

T_PROD - Production Data Table

(Design View)

T_PROD

Field Name	Data Type	Description (Optional)
T_PROD_DBID	AutoNumber	
WELL_NAME	Short Text	
PROD_DATE	Date/Time	Production Date (1st of month or year depending on PROD_TYP)
PROD_DATE_TYP	Short Text	Production Date Type (currently M=Month or Y=Year)
PROD_VAL	Number	Well Production total in acre-feet (into distribution system for muni well)
OTH_PROD_VAL	Number	Other/Non-Public Water Supply Production in acre-feet (i.e., Saugus 1/2 pumping to river)
COMMENT	Short Text	

(Data View)

T_PROD

WELL_NAME	PROD_DATE	PROD_DATE_T	PROD_VAL	OTH_PROD_VAL	COMMENT	Click to Add
NWD-Castaic 7	12/1/2009	M	49.95			
NWD-Castaic 7	1/1/2010	M	50.46			
NWD-Castaic 7	2/1/2010	M	46.96			
NWD-Castaic 7	3/1/2010	M	69.25			
NWD-Castaic 7	4/1/2010	M	79.17			
NWD-Castaic 7	5/1/2010	M	119.1			
NWD-Castaic 7	6/1/2010	M	119.78			
NWD-Castaic 7	7/1/2010	M	128.1			
NWD-Castaic 7	8/1/2010	M	127.98			
NWD-Castaic 7	9/1/2010	M	109.23			
NWD-Castaic 7	10/1/2010	M	80.29			
NWD-Castaic 7	11/1/2010	M	67.71			
NWD-Castaic 7	12/1/2010	M	44.76			
NWD-Castaic 7	1/1/2011	M	54.12			
NWD-Castaic 7	2/1/2011	M	56.52			
NWD-Castaic 7	3/1/2011	M	54.03			
NWD-Castaic 7	4/1/2011	M	75.95			
NWD-Castaic 7	5/1/2011	M	102.5			
NWD-Castaic 7	6/1/2011	M	115.49			
NWD-Castaic 7	7/1/2011	M	136.86			
NWD-Castaic 7	8/1/2011	M	134.49		changed from 163.15 af per MAlvord e	
NWD-Castaic 7	9/1/2011	M	114.22			

Figure A5

T_LOV_WL_QLFR - Water Level Measurement Qualifier List of Values Table

(Design View)

T_LOV_WL_QLFR

Field Name	Data Type	Description (Optional)
WL_QLFR_CD	Short Text	Water Level Code
WL_QLFR_DESC	Short Text	Code Description
DWR_QMC	Short Text	DWR Questionable Measurement Code (accompanied by measurement)
DWR_NMC	Short Text	DWR No Measurement Code (no measurement made)
USGS_CD	Short Text	USGS Water Level Code
T_WL_QLFR_DBID	AutoNumber	

(Data View)

T_LOV_WL_QLFR

WL_QLFR_CD	WL_QLFR_DESC	DWR_QMC	DWR_NMC	USGS_CD	*Click to Add*
Acous_msmt	Acoustical sounder measurement	9			
Air_Press_msmt	Air or pressure gauge measurement	5			
Atmos_pres	Water level was affected by atmospheric pressure			A	
Casing_lkng_wet	Casing leaking or wet	3	8		
Caved	Caved or deepened	0			
Destroyed	The well was destroyed (no water level was recorded)		6	W	
Discontinued	The measurement was discontinued		0	N	
Dry	The site was dry (no water level is recorded)		D	D	
Flow_rcnt	The site was flowing recently			E	
Flowing	The site was flowing. Water level or head could not be measured without additional equipment		F	F	
Foreign_sub	A foreign substance was present on the surface of the water	8		V	
Ice_effect	Water level was affected by ice			C	
No_access	Temporarily inaccessible		9		
No_code	No code necessary; Measurement represents static water level				
No_locate	Unable to locate well		5		
Nr_flow	A nearby site that taps the same aquifer was flowing			G	
Nr_flow_rcnt	A nearby site that taps the same aquifer had been flowing recently			H	
Nr_pump	A nearby site that taps the same aquifer was being pumped	2		S	
Nr_pump_rcnt	A nearby site that taps the same aquifer had been pumped recently			T	
Nr_rchrg	A nearby site that taps the same aquifer was injecting recharge water	7		J	
Nr_sfc	The water level was affected by stage in nearby surface-water site			X	
Obstruction	An obstruction was encountered in the well (no water level was recorded)		4	O	
Other_DWR	Other	6			
Other_USGS	Other conditions existed that would affect the measured water level			Z	
Plugged	Well was plugged and not in hydraulic contact with formation			M	
Pump_rcnt	The site had been pumped recently	4		R	
Pumphs_lck	Pumphouse locked		2		
Pumping	The site was being pumped	1	1	P	

Figure A6

T_LOV_SRC - Source List of Values Table

(Design View)

Field Name	Data Type	Description (Optional)
SRC_CD	Short Text	Source Code
SRC_NM_FULL	Short Text	Source Name Full
FORMER_NM	Short Text	Fomer Name
ENTITY_TYP	Short Text	Entity Type (currently no restricted LOVs)
T_SRC_DBID	AutoNumber	

(Data View)

SRC_CD	SRC_NM_FULL	FORMER_NM	ENTITY_TYP	T_SRC_I
CIMIS	California Irrigation Management Information System		State Government	
DPH	CA Department of Public Health	DHS - Department of Health Services	State Government	
DWR	CA Department of Water Resources		State Government	
Geotracker	CA State Water Resources Control Board Geotracker Database		State Government	
GSI	GSI Water Solutions		Private Consultant	
LACFCD	Los Angeles County Flood Control District		County Government	
LACWD36	Los Angeles County Waterworks District 36		Muni-Public Water Agency	
LSCE	Luhdorff and Scalmanini Consulting Engineers		Private Consultant	
NCEI	National Centers for Environmental Information	NCDC - National Climatic Data Center	Federal Government	
NLF_FP	Five Points (former NLF)	NLF - Newhall Land and Farming	Private Company	
NWD	Newhall Water Division	NCWD - Newhall County Water District	Muni-Public Water Agency	
PDC	Pitchess Detention Center	WHR - Wayside Honor Rancho	County Government	
RCS	Richard C Slade & Associates		Private Consultant	
SCVWA	Santa Clarita Valley Water Agency	CLWA - Castaic Lake Water Agency	Muni-Public Water Agency	
SCWD	Santa Clarita Water Division		Muni-Public Water Agency	
USGS	United States Geological Survey		Federal Government	
VWD	Valencia Water Division	VWC-Valencia Water Company	Muni-Public Water Agency	

Appendix B

SCVwellsNov2019

File Geodatabase Feature Class

Thumbnail Not Available

Tags

SGMA, GSP, groundwater, sustainability, Santa Clarita Valley, wells, inventory

Summary

To create an updated, current dataset of existing and historical wells in the Santa Clara River Valley Groundwater Basin - East Subbasin.

Description

This well dataset is an inventory of current and historical wells in the Santa Clarita Valley. It contains well information including, related well names, construction (well depth, screened interval, seal depth, permit/construction date, lithology, designated source aquifer/geologic formation, well use, well status, location and elevation (and accuracy, method, and source), and links to well completion reports or other well lithologic logs, construction diagrams, and/or geophysical logs.

Credits

Santa Clarita Valley Water Agency (SCVWA), Luhdorff & Scalmanini Consulting Engineers (LSCE), Richard C. Slade & Associates LLC

Use limitations

Permission Required: These data contain sensitive and confidential information, do not distribute without permission.

Extent

West	-118.715938	**East**	-118.175957
North	34.748393	**South**	34.312892

Scale Range

Maximum (zoomed in) 1:50,000
Minimum (zoomed out) 1:5,000,000

ArcGIS Metadata ►

Topics and Keywords ►

THEMES OR CATEGORIES OF THE RESOURCE geoscientificInformation

* CONTENT TYPE Downloadable Data

Hide Topics and Keywords ▲

Citation ►

TITLE SCVwellsNov2019
ALTERNATE TITLES SCVGSP Well Inventory Resource Citations
CREATION DATE 2019-11-14 00:00:00
PUBLICATION DATE 2019-11-14 00:00:00

EDITION 1

PRESENTATION FORMATS digital document, digital document
FGDC GEOSPATIAL PRESENTATION FORMAT document, document

COLLECTION TITLE SCVWA/RCS/LSCE Well Documentation Effort

RESOURCE IDENTIFIER
VALUE RCS

REFERENCE THAT DEFINES THE VALUE ►
TITLE Data Submittal for Task 2 of Task Order 1A SCVGSA Groundwater Sustainability Plan
ALTERNATE TITLES TECHNICAL MEMORANDUM
CREATION DATE 2019-08-19 00:00:00
PUBLICATION DATE 2019-08-19 00:00:00

EDITION 1

SERIES
NAME Job No. 693-LAS01
ISSUE 1
PAGE 1

COLLECTION TITLE TECHNICAL MEMORANDUM

OTHER CITATION DETAILS
Data included in the geodatabase and the updated GSA Tracking sheet were derived from three original sources: a shapefile provided by LSCE; a “GSA Tracking Sheet” excel file created by the Santa Clarita Valley Water District (SCVWD) and associated scanned images of well records; and RCS databases complied over time as part of RCS’s work in the Santa Clarita Valley. The geodatabase was originated using the LSCE-provided shapefile and the updated GSA Tracking sheet. The geodatabase was enhanced by plotting the locations of wells using Los Angeles County parcel maps and Public Land Survey System (PLSS) data. Nearly every well included in the geodatabase either exists in the LSCE-provided shapefile or has an associated document listed in the updated GSA Tracking sheet (documents could be one or more of well completion reports (WCRs), well logs, and location maps).
Well Data Review & Compilation Methodology
The subject geodatabase was created through a stepwise multifaceted approach using the provided LSCE data and internal RCS databases. RCS first compiled and compared the SCVWD-WCRs and the GSA Tracking sheet to internal RCS databases to identify potential missing groundwater well information.
Results from this first data set comparison indicated the RCS database contained well logs for three wells in or near the Santa Clarita groundwater basin that were not present in either the original GSA Tracking sheet or LSCE-provided shapefile. This

determination was based on comparisons of State Well Numbers, well completion report numbers, and Los Angeles County Flood Control District numbers. These three wells were added to both the updated GSA Tracking sheet and the attached geodatabase. The locations of the three added wells were determined from each well's State Well Number by plotting their locations as the centroid of each well's respective PLSS section.

Comparison of the original GSA Tracking sheet to the SCVWD-provided files resulted in several categorical discrepancies. Out of 1,026 files (WCRs, maps, and logs) in the SCVWD-provided data set, 14 files did not have an associated WCR and were therefore excluded from the geodatabase compilation (discussed in more detail below) but were flagged in the updated GSA

Tracking sheet. In addition, any well record in the GSA Tracking sheet that was identified as having a potential duplicate record within the GSA Tracking sheet was flagged, with detail on the noted duplication provided in the "Flag"

and "Duplicate_Explanation" columns. RCS also identified 40 electronic well record files among the SCVWD-provided files that were not included in the original GSA Tracking sheet. These 40 files were added as new well entries to the updated GSA Tracking sheet from the SCVWD-provided files, summing to a new total of 1,028 well entries from the original 987 well entries. Further review of the original GSA Tracking sheet revealed errors regarding location data, discordant values, and file names. Discovered errors or omissions were corrected when possible. As a result of these corrections, the original GSA Tracking sheet was refined and updated into the new "Updated" version to include entries for all SCVWDprovided files. Please note, except for two records in the original GSA Tracking sheet that were missing corresponding files, every record in the updated GSA Tracking sheet has a corresponding file in the SCVWD-provided dataset or the "Logs_From_RCS" folder. None of the records or attributes in the SCVWD-provided shapefile were added to the updated GSA Tracking sheet because their associated documents' file locations were unknown.

Geodatabase Compilation Methodology

Following data compilation and review, the updated GSA Tracking sheet was cross-referenced with the LSCE-provided shapefile to further refine well locations, duplicate entries, and attribute values. The LSCE-provided shapefile consisted of geospatial and attribute information for 190 wells. The sole unique identifier present in both the LSCE-provided shapefile and the updated GSA Tracking sheet was the State Well Number, formulated based on Public Land Survey System (PLSS) entries in the original files (entries present for Meridian, Township, Range, Section, Tract, and Sequence [MTRSTS]). Therefore, only wells with unique and complete PLSS entries that included tract and sequence information in the LSCE-provided shapefile could be matched and checked for duplicates against wells in the updated GSA Tracking sheet. When a well with a unique and complete PLSS entry was found in both data sources, the missing data

from the different sources was merged together into the geodatabase included in this submittal. All other entries not identified as a duplicate were added from the updated GSA Tracking sheet to the geodatabase. Several well entries in the LSCE-provided shapefile had PLSS data that were duplicate, incomplete, or entirely missing. For such entries, a definitive match to a well entry in the updated

GSA Tracking sheet could not be determined and, as a result, duplicate entries may exist for these wells in the geodatabase. There were also many well entries in the GSA Tracking sheet that lacked complete PLSS data (often missing "Sequence", and less frequently, "Tract"), as well as entries with complete PLSS data that were not present in the LSCE-provided shapefile. For

3-3- these well entries not present in the LSCE-provided shapefile, the location of each well was determined based on a hierarchical location assignment method. If a well location was available in the LSCE-provided shapefile, that location was used, but if a well location was not available in the LSCE-provided shapefile, a location was determined based on the "best" available location

data in the updated GSA Tracking sheet. The source of the location information was also recorded in the "Location_Source" field in the geodatabase.

For three of the wells, the "best" location information available was the Assessor's Identification Number (AIN) listed on each well's log. For these three wells, the associated parcel centroids were not used because the centroid of each well's parcel plotted outside of the actual parcel boundaries as a result of the irregular shape of the parcels in question (the parcels are apparently
split into more than one piece according to County data). These three wells (associated with AINs 2836-012-032, 3210-013-037, and 3210-017-040) were instead assigned locations derived from their respective MTRS or MTR numbers, as available. All the centroids of the MTRS polygons plotted within their source MTRS polygons, and all the centroids of the MTR polygons plotted
within their source MTR polygons.

RESPONSIBLE PARTY
INDIVIDUAL'S NAME Edward Linden, Anthony Hicke, and Earl LaPensee
ORGANIZATION'S NAME Richard C. Slade & Associates LLC
CONTACT'S POSITION Project Geologists

CONTACT INFORMATION ►
PHONE
VOICE 707.963.3914

ADDRESS
TYPE physical
DELIVERY POINT 14051 Burbank Blvd, Suite 300
CITY Sherman Oaks
ADMINISTRATIVE AREA CA
POSTAL CODE 91401
E-MAIL ADDRESS info@rcslade.com

HOURS OF SERVICE
9:00 - 17:00

Hide Contact information ▲

RESOURCE LOCATION ONLINE
LOCATION NA

Hide Reference that defines the value ▲

RESOURCE IDENTIFIER
VALUE SCVWA

REFERENCE THAT DEFINES THE VALUE ►
TITLE SCVWA Staff Efforts Regarding GSA Well Locations
CREATION DATE 2019-03-19 00:00:00
PUBLICATION DATE 2019-03-19 00:00:00

OTHER CITATION DETAILS
FROM: Rick Vasilopulos, Ernesto Velazquez

DATA ENTRY

DWR provided SCVWA with Well Completion Reports for all of the wells within the GSA's boundary in PDF or TIF file format. SCVWA staff was tasked with creating a database in order to organize and track all of the information provided by DWR. Staff included the

following information into the database:
• Internal ID
o The name of the PDF or TIF file was used as an internal ID so that we could easily find a particular document. This was also done because some of the older reports don't have Report IDs to reference.
• Report ID
o Number assigned by DWR which is unique to each report.
• Permit Date
o Staff used either the permit issue date or the project completion date depending on availability.
• State Well ID
o Unique identification number assigned by DWR. Staff included this number in the table when it was provided in the reports. Note that in most cases a full state well ID number was not assigned.
• Address (street, town, zip)
o Well address was used in the table. In many cases, only the address of the individual applying for the permit (sometimes out of area) was provided. In these instances, the address was left blank.
• APN
• Coordinates
o Provided in decimal and degree format when/where available.
• Township, Range, Section
• Well Type
o CAT- Cathodic Protection Well
o Des- Destroyed Well
o Dom- Domestic Well
o HEAT- Heat Exchange Well
o IND- Industrial Well
o INJ- Injection Well
o IRR- Irrigation Well
o Mon- Monitoring Well
o Mun- Municipal Well
o OTH – Other
o PIE- Piezometer
o Pub- Public
o Rec- Reconstruction
o VAP- Vapor Extraction Well
• Well Links
o These are hyperlinks to the PDF and TIF files specific to the well data entry presented in the same row. The well links share the same ID as the Internal ID provided in Row A.

DATABASE NAVIGATION

The slicers at the top of the DATA table tab can be used to quickly filter data between Township, Range and Well Type. However, each column in the table can also be filtered to isolate a particular zip code or range of dates.

The GIS Master Sheet tab in the workbook was created without using a pivot table in an attempt to link each well entry into a GIS database using a compatible format. The DATA Table sheet was created so that all the information in the GIS Master sheet could be input into pivot table format with filtering capabilities that allow for quick data evaluation. Well links, aka hyperlinks, are also available in the pivot table for quick reference to the DWR reports without having to search through multiple folders. The Missing Report tab contains the file names for maps that were provided by DWR without a Well Completion Report to go along for reference. Lastly, all of the PDF and TIF files provided by DWR are located in the Unredacted Well Log Data folder.

GIS ArcMap SHAPEFILE CREATION

The information from the database was cross-referenced with a shapefile showing all of the properties in LA County within the GSA boundary. Using the available information in the well reports, staff positioned 564 well locations to match seen elements in the aerial views when possible.

Staff concentrated on public, municipal, irrigation and domestic wells, but a few of the other categories listed above were also located.

After wells were located, staff generated new latitude and longitude coordinates for each based on aerial imagery. If the location of the well could not be determined based on imagery, the location was approximated as the center of the parcel containing the well.

The shapefiles can be made available to the consultant on either a jump drive or possibly a dvd depending on the size.

Hide Reference that defines the value ▲

Hide Citation ▲

Citation Contacts ►

RESPONSIBLE PARTY
INDIVIDUAL'S NAME Rick Viergutz
ORGANIZATION'S NAME Santa Clarita Valley Water Agency
CONTACT'S POSITION Principal Water Resources Water Planner
CONTACT'S ROLE point of contact

CONTACT INFORMATION ►
PHONE
VOICE 661-297-1600

ADDRESS
TYPE physical
DELIVERY POINT 27234 Bouquet Canyon Road
CITY Santa Clarita
ADMINISTRATIVE AREA CA
POSTAL CODE 91350
COUNTRY US
E-MAIL ADDRESS rviergutz@scvwa.org

Hide Contact information ▲

Hide Citation Contacts ▲

Resource Details ►

DATASET LANGUAGES English (UNITED STATES)
DATASET CHARACTER SET utf8 - 8 bit UCS Transfer Format

STATUS on-going
SPATIAL REPRESENTATION TYPE vector

SPATIAL RESOLUTION
DATASET'S SCALE

SCALE DENOMINATOR 400000

GROUND SAMPLE DISTANCE
PRECISION OF SPATIAL DATA 400000 [ft_us] (foot)

PROCESSING ENVIRONMENT Version 6.2 (Build 9200) ; Esri ArcGIS 10.7.1.11595

CREDITS
Santa Clarita Valley Water Agency (SCVWA), Luhdorff & Scalmanini Consulting Engineers (LSCE), Richard C. Slade & Associates LLC

ARCGIS ITEM PROPERTIES
* NAME SCVwellsNov2019
* LOCATION file://\\server-01\clerical\2018\18-132 GSI Water Solutions - Santa Clarita Valley GSP\REPORT\DELIVERABLES\SCVGSA.gdb
* ACCESS PROTOCOL Local Area Network

Hide Resource Details ▲

Extents ►

EXTENT
DESCRIPTION
2019

GEOGRAPHIC EXTENT
BOUNDING RECTANGLE
EXTENT TYPE Extent used for searching
WEST LONGITUDE -118.715938
EAST LONGITUDE -118.175957
NORTH LATITUDE 34.748393
SOUTH LATITUDE 34.312892
EXTENT CONTAINS THE RESOURCE Yes

EXTENT IN THE ITEM'S COORDINATE SYSTEM
* WEST LONGITUDE 6346601.478265
* EAST LONGITUDE 6508534.463782
* SOUTH LATITUDE 1937011.221398
* NORTH LATITUDE 2094785.641413
* EXTENT CONTAINS THE RESOURCE Yes

Hide Extents ▲

Resource Points of Contact ►

POINT OF CONTACT
INDIVIDUAL'S NAME Lisa Lavagnino
ORGANIZATION'S NAME LSCE
CONTACT'S POSITION Project Geologist
CONTACT'S ROLE resource provider

CONTACT INFORMATION ►
PHONE
VOICE (530) 661-0109

ADDRESS
TYPE physical

Delivery point 500 First St.
City Woodland
Administrative area CA
Postal code 95695
Country US
E-mail address llavagnino@lsce.com

Hours of service
8:00 - 17:00

Hide Contact information ▲

Hide Resource Points of Contact ▲

Resource Maintenance ►

Resource maintenance
Update frequency continual

Hide Resource Maintenance ▲

Resource Constraints ►

Constraints
Limitations of use
Permission Required: These data contain sensitive and confidential information, do not distribute without permission.

Legal constraints
Access constraints restricted
Use constraints other restrictions

Other constraints
These data should not be distributed to users unless distribution is explicitly granted. Please check sources, scale, accuracy, currency and other available information. Please confirm that you are using the most recent copy of both data and metadata.

Hide Resource Constraints ▲

Spatial Reference ►

ArcGIS coordinate system
* Type Projected
* Geographic coordinate reference GCS_NAD_1983_CORS96
* Projection NAD_1983_CORS96_StatePlane_California_V_FIPS_0405_Ft_US
* Coordinate reference details
Projected coordinate system
Well-known identifier 103242
X origin -117608900
Y origin -91881400
XY scale 3048.0060960121928
Z origin -100000
Z scale 10000
M origin -100000

M SCALE 10000
XY TOLERANCE 0.0032808333333333331
Z TOLERANCE 0.001
M TOLERANCE 0.001
HIGH PRECISION true
LATEST WELL-KNOWN IDENTIFIER 103242
VCSWKID 5703
LATESTVCSWKID 5703
WELL-KNOWN TEXT PROJCS ["NAD_1983_CORS96_StatePlane_California_V_FIPS_0405_Ft_US",GEOGCS ["GCS_NAD_1983_CORS96",DATUM["D_NAD_1983_CORS96",SPHEROID ["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT ["Degree",0.0174532925199433]],PROJECTION["Lambert_Conformal_Conic"],PARAMETER ["False_Easting",6561666.666666666],PARAMETER ["False_Northing",1640416.666666667],PARAMETER["Central_Meridian",-118.0],PARAMETER["Standard_Parallel_1",34.03333333333333],PARAMETER ["Standard_Parallel_2",35.46666666666667],PARAMETER["Latitude_Of_Origin",33.5],UNIT ["Foot_US",0.3048006096012192]],VERTCS["NAVD_1988",VDATUM ["North_American_Vertical_Datum_1988"],PARAMETER["Vertical_Shift",0.0],PARAMETER ["Direction",1.0],UNIT["Meter",1.0]]

REFERENCE SYSTEM IDENTIFIER
VALUE 4326
CODESPACE Esri
VERSION 10.0.0

Hide Spatial Reference ▲

Spatial Data Properties ►

VECTOR ►
* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS
FEATURE CLASS NAME SCVwellsNov2019
* OBJECT TYPE point
* OBJECT COUNT 2082

Hide Vector ▲

ARCGIS FEATURE CLASS PROPERTIES ►
FEATURE CLASS NAME SCVwellsNov2019
* FEATURE TYPE Simple
* GEOMETRY TYPE Point
* HAS TOPOLOGY FALSE
* FEATURE COUNT 2082
* SPATIAL INDEX TRUE
* LINEAR REFERENCING FALSE

Hide ArcGIS Feature Class Properties ▲

Hide Spatial Data Properties ▲

Data Quality ►

SCOPE OF QUALITY INFORMATION ►

RESOURCE LEVEL dataset

Hide Scope of quality information ▲

Hide Data Quality ▲

Lineage ►

LINEAGE STATEMENT

The SCVwells dataset (as of Nov2019) originated from a collection of 1,026 Well Completion Reports (WCR) provided by California Department of Water Resources (DWR) for wells within the SCV-GSA boundary and provided to SCVWA in PDF or TIF file format. SCVWA staff were initially tasked with creating a database to organize and track the WCR information provided by DWR. A "GSA Tracking Sheet" was created in Excel and populated from the WCR information. The initial attributes included: Internal ID, Report ID, Permit Date, State Well ID, Address, APN, Coordinates, Township, Range, Section, Well Type, and a hyperlink field to the WCR file. The entries in the "GSA Tracking Sheet" were then located in a GIS shapefile (where possible) using LA County Assessor parcel maps, aerial images and information taken from each WCR. SCVWA staff concentrated on public, municipal, irrigation and domestic wells, but a few other well types were also located. A total of 987 wells were entered in this initial GSA Tracking Sheet (see SCVWA citation section of metadata).

The next phase of work to inventory and locate wells within the SCV-GSA was performed by RCS whereby they reconciled well datasets originating from three sources:
1) the SCVWA GSA Tracking Sheet,
2) a point shapefile created from an LSCE internal database (LSCE DB) of mostly municipal wells (legacy Purveyors-VWC/NCWD/SCWD, now part of SCVWA) and including other significant groundwater wells used for production and monitoring in the Valley (LA County and Newhall Land and Farming (NLF), and some smaller private entities) that have been used for the last twenty years to support groundwater modeling efforts and annually report on groundwater conditions in the Santa Clarita Valley, and
3) RCS databases compiled over many years as part their extensive geologic and groundwater development work in the Santa Clarita Valley.

The RCS effort to merge these three datasets into one geodatabase feature class included the removal of duplicate well entries and addition of new wells, identification of additional WCRs, and refinement of well locations. More wells from the SCVWA dataset were located using the State Well Number and Public Land Survey System (PLSS), street addresses, aerial images, and other resources, where possible (see RCS citation section of metadata).

The Internal ID field in both the "GSA Tracking Sheet" and the SCVwells dataset is populated with the name of the PDF or TIF file that contains the associated well documentation (WCRs, lithologic logs, well construction diagram, and/or geophysical logs), and these files can be accessed through the hyperlink field or directly by searching through the folder of documents by the Internal ID string. The Report ID is the original DWR Well Completion Report Form ID, a sequential number imprinted on the form in the upper right corner of the document. Older WCRs and non-DWR logs do not have this ID number.

LSCE added new fields to the SCVwells dataset to further qualify well documentation. The Data_Source field indicates the origin and primary source including: SCVWD-Provided Records, RCS, NWD, VWD, SCWD, LA County, CASGEM, LSCE DB, and others as described below. The Location_Method field (originally the Location_Source field) was refined to describe the well location determination method (whether GPS survey, address, approximation from aerial photo or if unknown). Fields were added to cross-reference the various public IDs including the State Well Number (initially included), CASGEM ID and the Primary Station Code/State Source Number from the CA Division of Drinking Water. A

Well_Status field was also added, however some 'active' or 'inactive' designations may no longer be accurate. See current domain lists in the Fields portion of the metadata (although actual domains are not yet in place).

LSCE subsequently updated the LSCE DB from well logs and datasheets recently obtained from Los Angeles County for Pitchess Detention Center (PDC- formerly Wayside Honor Rancho) and for wells monitored and/or reported by Los Angeles County Flood Control District (LACFCD). Approximately 100 LA County well records were updated with well construction information. About 25 of those wells were determined to be duplicates of other public wells and were removed (the primary well record now references the LACFCD ID). 60 new well datasheets and/or logs were compiled, 8 records were matched/merged to existing well records/logs in the SCVwells feature class and GSA Tracking Sheet, and 7 had minimal or no information. Through the QA process, LACFCD well coordinates were checked against aerial photos, and it was determined that the well location accuracy was variable. LA County confirmed that these well locations were estimated from a topographic map. PDC well location is still more variable in accuracy, and there is no documentation of how these well coordinates were determined.

SCVWA (and other) well records in the LSCE DB were also further reconciled and updated from the SCVWA/RCS geodatabase and GSA Tracking Sheet. Extensive effort (begun by RCS) was made to identify and input well documentation for each well record and remove duplicates. Well documents (WCRs and lithologic logs) were compiled for another 7 municipal wells from internal LSCE files, and another 54 SCVWA and NLF were matched and merged to the well record in the geodatabase and Tracking Sheet. Removed duplicates were noted in the Flag field.

A total of 237 wells from the LSCE DB were reincorporated to the SCVwells geodatabase feature class, and the 67 new well logs from LSCE and LA County were incorporated into the "GSA Tracking Sheet" in PDF format with an Internal ID to indicate the new document file name.

LSCE also downloaded and reviewed publicly available well datasets through the California State Water Resources Control Board (SWRCB) Geotracker and GAMA Program websites (data portals for local, state and federally monitored wells). Most of the SCVWA municipal wells had already been incorporated in the LSCE DB, but an additional 36 public supply wells including three older destroyed SCVWA wells were added to the SCVwells geodatabase feature class from the CA Department of Public Health (DPH) dataset. Another batch of 288 wells from DWR and 20 wells from the USGS were reviewed and incorporated into the SCVwells geodatabase feature class after duplicates were removed (based on matching state well number with an existing record). Some of these wells may have logs amongst the original WCRs, but an effort beyond state well number matching has not been done. Despite the minimal information provided for these wells, they do provide a link to well monitoring data and some basic location information.

Environmental wells were obtained through the Geotracker EDF site, and LSCE also compiled well information from other consultants' environmental and remediation work in the Valley. A total of 630 records representing wells from Whittaker Bermite (on and offsite) and 37 other regulated sites around the Valley including water reclamation plants, landfills, former gas stations, and industrial sites were added to the SCVwells geodatabase feature class. Limited effort was made to reconcile these against the existing wells in the geodatabase. Of these 630 records, 77 wells were readily matched with the pre-existing records/logs in the geodatabase and the GSA Tracking Sheet, and these records were merged with the Geotracker information (giving priority to the more precise and accurate surveyed coordinates when available). 17 new well logs were compiled as PDFs and added to the GSA Tracking Sheet. More duplicates exist among the remaining 536 wells; however, a pre-emptive and thorough review them is not feasible to do at this time. And more environmental wells exist at other regulated sites beyond what is documented in this dataset. Some additional sites can be viewed through the SWRCB GAMA website and are not included here because they do not have well records in a readily downloadable format.

These sites/wells can still be reviewed and considered for their usefulness on an individual basis.

The Division of Oil and Gas wells dataset provided by RCS has been included in this geodatabase as a separate feature class called 'DOGGRwells'.

Coordinates for well records in the SCVwells geodatabase feature class were initially compiled from the various sources in different coordinate systems. Individual well datasets were projected into State Plan Zone 5 NAD83 (feet) prior to adding them to 'SCVwells'.

A total of 2,082 well records are contained in this dataset currently.

SOURCE DATA ▶

DESCRIPTION

• Well/Data Source
o SCVWA (868) - originating from DWR Well Completion Reports
o RCS Database (3)
o LSCE Water Purveyors DB (237) - including
o GAMA DWR/USGS/DPH (344) - publicly available on-line data clearinghouse, some duplicates exist between this and other sources
o Geotracker EDF (340)
o Geosyntec (7)
o Other Consultants associated with Whittaker Bermite (283)

RESOLUTION OF THE SOURCE DATA

SCALE DENOMINATOR 100000

Hide Source data ▲

Hide Lineage ▲

Distribution ▶

DISTRIBUTION FORMAT

NAME File Geodatabase Feature Class

Hide Distribution ▲

Fields ▶

DETAILS FOR OBJECT SCVwellsNov2019 ▶

* TYPE Feature Class
* ROW COUNT 2082

DEFINITION

Santa Calarita Valley Wells

DEFINITION SOURCE

LSCE

FIELD OBJECTID ▶

* ALIAS OBJECTID
* DATA TYPE OID
* WIDTH 4

* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Internal feature number.

DESCRIPTION SOURCE

Esri

DESCRIPTION OF VALUES

Sequential unique whole numbers that are automatically generated.

Hide Field OBJECTID ▲

FIELD Shape ►

* ALIAS Shape
* DATA TYPE Geometry
* WIDTH 0
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Feature geometry.

DESCRIPTION SOURCE

Esri

DESCRIPTION OF VALUES

Coordinates defining the features.

Hide Field Shape ▲

FIELD SWN ►

* ALIAS SWN
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

State Well Number - Unique identification number assigned by DWR (or may be estimated by others). Staff included this number in the table when it was provided in the reports.

DESCRIPTION SOURCE

LSCE

Hide Field SWN ▲

FIELD WELL_NAME ►

* ALIAS WELL_NAME
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Well Names
Entity - agency - name followed by sequential numbers

DESCRIPTION SOURCE
LSCE

Hide Field WELL_NAME ▲

FIELD Well_Type ►
* ALIAS Well_Type
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Types of Well are:
o CAT- Cathodic Protection Well
o Des- Destroyed Well
o Dom- Domestic Well
o HEAT- Heat Exchange Well
o IND- Industrial Well
o INJ- Injection Well
o IRR- Irrigation Well
o Mon- Monitoring Well
o Mun- Municipal Well
o OTH – Other
o PIE- Piezometer
o Pub- Public
o Rec- Reconstruction
o VAP- Vapor Extraction Well
o Ext – Groundwater Extraction Well
o Piez – Piezometer
o SVP – Submerged Vapor Probe

DESCRIPTION SOURCE
LSCE

Hide Field Well_Type ▲

FIELD AQUIFER ►
* ALIAS AQUIFER
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Designated aquifer in which well is screened
o Alluvium
o Saugus
o Saugus (S-1, S-IIIa, S-III, S-V, S-VII)
o Perched
o Other (Pico or other)
o Unknown

Description source
LSCE

Hide Field AQUIFER ▲

Field WELL_DEPTH ▶
* Alias WELL_DEPTH
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description
Depth of well in feet

Description source
LSCE

Measurement frequency as needed

Hide Field WELL_DEPTH ▲

Field SCRN_INT ▶
* Alias SCRN_INT
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description
ScreenedInterval - The top of the first screen and the bottom of last screen

Description source
LSCE

Measurement frequency not planned

Hide Field SCRN_INT ▲

Field SCRN_CNT ▶
* Alias SCRN_CNT
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description
Count of screen sections

Description source
LSCE

Measurement frequency not planned

Hide Field SCRN_CNT ▲

Field SEAL_DEPTH ▶
* Alias SEAL_DEPTH

* Data type String
* Width 255
* Precision 0
* Scale 0

Field description

The depth in feet of well seal

Description source

LSCE

Measurement frequency not planned

Hide Field SEAL_DEPTH ▲

Field RPE ►

* Alias RPE
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description

Reference Point Elevation (feet)

Description source

LSCE

Hide Field RPE ▲

Field RPE_DATUM ►

* Alias RPE_DATUM
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description

Reference Point Elevation Datum:
UNK - Unkown
NGVD29 - Northern Geodetic Vertical Datum 1929
NAVD88 - North American Vertical Datum, 1988
LOC - Local

Description source

LSCE

Hide Field RPE_DATUM ▲

Field Duplicate_Explanation ►

* Alias Duplicate_Explanation
* Data type String
* Width 255
* Precision 0
* Scale 0

Field description

Explnations about duplicate records

Description source

LSCE

Hide Field Duplicate_Explanation ▲

FIELD MTRSTS ►

* ALIAS MTRSTS
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Meridian code, Township, Range, Section, Tract, and Sequence information

DESCRIPTION SOURCE

LSCE

Hide Field MTRSTS ▲

FIELD MTRST ►

* ALIAS MTRST
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Meridian code, Township, Range, Section, and Tract information

DESCRIPTION SOURCE

LSCE

Hide Field MTRST ▲

FIELD MTRS ►

* ALIAS MTRS
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Meridian code, Township and Range number, Section number

DESCRIPTION SOURCE

LSCE

Hide Field MTRS ▲

FIELD MTR ►

* ALIAS MTR
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Meridian code, Township and Range number

DESCRIPTION SOURCE
LSCE

Hide Field MTR ▲

FIELD Internal_ID ►
* ALIAS Internal_ID
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
The name of the PDF or TIF file was used as an internal ID so that we could easily find a particular document.

DESCRIPTION SOURCE
SCVWA

Hide Field Internal_ID ▲

FIELD Report_ID ►
* ALIAS Report_ID
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
The name of the PDF or TIF file was used as an internal ID so that we could easily find a particular document.

DESCRIPTION SOURCE
SCVWA

Hide Field Report_ID ▲

FIELD Permit_Date ►
* ALIAS Permit_Date
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Staff used either the permit issue date or the project completion date depending on availability

DESCRIPTION SOURCE
SCVWA

Hide Field Permit_Date ▲

FIELD Address_No ►
* ALIAS Address_No
* DATA TYPE String
* WIDTH 255
* PRECISION 0

* SCALE 0

FIELD DESCRIPTION

Well address was used in the table. In many cases, only the address of the individual applying for the permit (sometimes out of area) was provided. In these instances, the address was left blank.

DESCRIPTION SOURCE

SCVWA

Hide Field Address_No ▲

FIELD Street ►

* ALIAS Street
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Well Street address was used in the table. In many cases, only the address of the individual applying for the permit (sometimes out of area) was provided. In these instances, the address was left blank.

DESCRIPTION SOURCE

SCVWA

Hide Field Street ▲

FIELD Town ►

* ALIAS Town
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Well Town name

DESCRIPTION SOURCE

SCVWA

Hide Field Town ▲

FIELD Zip ►

* ALIAS Zip
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Well address Zip code

DESCRIPTION SOURCE

LSCE

Hide Field Zip ▲

FIELD APN ►

* ALIAS APN
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Assessor's Parcel Number - used for identifying well locations

DESCRIPTION SOURCE

LSCE

MEASUREMENT FREQUENCY as needed

Hide Field APN ▲

FIELD Filename ►

* ALIAS Filename
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Well Log file name

DESCRIPTION SOURCE

SCVWA

Hide Field Filename ▲

FIELD Flag ►

* ALIAS Flag
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Identifies how duplicate records were handeled

DESCRIPTION SOURCE

LSCE

Hide Field Flag ▲

FIELD Note ►

* ALIAS Note
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Note space for comments about the well record

DESCRIPTION SOURCE

LSCE

Hide Field Note ▲

FIELD Data_Source ▶
* ALIAS Data_Source
* DATA TYPE String
* WIDTH 255
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Data Sources:
RCS Database
SCVWD-Provided Records
LA County - Los Angeles County Flood Control District, Pitchess Detention Center, and Los Angeles County Waterworks Division 36
NWD - Newhall Water Division
SCWD - Santa Clarita Water Division
VWD - Valencia Water Division
CH2MHILL2007InstallRpt
CH2MHILL2013WellCompRpt
CH2MHILL2016WellCompRpt
CH2MHILLdraft_tables_figs
Environ2010DraftWellInstallRpt
WB-LSCE12-076 - Whittaker Bermite job files with LSCE
DPH-GAMA GIS - California Department of Public Health
DWR-GAMA GIS - California Department of Water Resources
USGS-GAMA GIS - United States Geological Survey
Geotracker2019Octdownload - Geotracker EDF
Geosyntec

DESCRIPTION SOURCE

LSCE

MEASUREMENT FREQUENCY as needed

Hide Field Data_Source ▲

FIELD GSE ▶
* ALIAS GSE
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Ground Sufrace Elevation

DESCRIPTION SOURCE

LSCE

MEASUREMENT FREQUENCY as needed

Hide Field GSE ▲

FIELD Owner_SiteNm ▶
* ALIAS Owner_SiteNm
* DATA TYPE String
* WIDTH 100

* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Site Owner Name

DESCRIPTION SOURCE

LSCE

MEASUREMENT FREQUENCY as needed

Hide Field Owner_SiteNm ▲

FIELD PS_Code ►

* ALIAS PS_Code
* DATA TYPE String
* WIDTH 25
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Primary Station Code used for identifying wells. PS codes are from Department of Public Health

DESCRIPTION SOURCE

DHP

Hide Field PS_Code ▲

FIELD CASGEM_ID ►

* ALIAS CASGEM_ID
* DATA TYPE String
* WIDTH 25
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Groundwater Monitoring (CASGEM) IDs

DESCRIPTION SOURCE

DWR

Hide Field CASGEM_ID ▲

FIELD Well_Status ►

* ALIAS Well_Status
* DATA TYPE String
* WIDTH 25
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION

Status of wells:
ABANDONED
ACTIVE
DESTROYED
NEW
UNKNOWN

DESCRIPTION SOURCE
LSCE

Hide Field Well_Status ▲

FIELD Location_Method ►
* ALIAS Location_Method
* DATA TYPE String
* WIDTH 155
* PRECISION 0
* SCALE 0

FIELD DESCRIPTION
Methods used to locate wells
GPS Survey - highest accuracy (usually 0.01' precision)
Aerial - identification of well site in an aerial image
LA County Parcels -
Could Not Locate Well
DecDeg Coordinates, WGS84 - Decimal degree coordinate location in GSA Tracking Sheet
DMS Coordinates, WGS84 - Degree/Minute/Second coordinate location in GSA Tracking Sheet
Township, Section - PLSS Section centroid location based on match to newly created MTRS (Meridian Township Range Section) field in the GSA Tracking Sheet
TOPO - location on a topographic map
UNK - unknown
OTHER - a local coordinate or measurement system, see comments in well record

DESCRIPTION SOURCE
LSCE

Hide Field Location_Method ▲

FIELD E_FTSPZ5_83 ►
* ALIAS E_FTSPZ5_83
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

Hide Field E_FTSPZ5_83 ▲

FIELD N_FTSPZ5_83 ►
* ALIAS N_FTSPZ5_83
* DATA TYPE Double
* WIDTH 8
* PRECISION 0
* SCALE 0

Hide Field N_FTSPZ5_83 ▲

Hide Details for object SCVwellsNov2019 ▲

Hide Fields ▲

Metadata Details ►

METADATA LANGUAGE English (UNITED STATES)
METADATA CHARACTER SET utf8 - 8 bit UCS Transfer Format

SCOPE OF THE DATA DESCRIBED BY THE METADATA dataset
SCOPE NAME dataset

LAST UPDATE 2019-11-19

ARCGIS METADATA PROPERTIES
METADATA FORMAT ESRI-ISO

LAST MODIFIED IN ARCGIS FOR THE ITEM 2020-01-06 11:20:29

AUTOMATIC UPDATES
LAST UPDATE 2020-01-06 11:20:29

Hide Metadata Details ▲

Metadata Contacts ►

METADATA CONTACT
INDIVIDUAL'S NAME Lisa Lavagnino
ORGANIZATION'S NAME Luhdorff & Scalmanini Consulting Engineers
CONTACT'S POSITION Project Geologist
CONTACT'S ROLE publisher

CONTACT INFORMATION ►
PHONE
VOICE (530) 661-0109

ADDRESS
TYPE physical
DELIVERY POINT 500 First Street
CITY Woodland
ADMINISTRATIVE AREA CA
POSTAL CODE 95695
COUNTRY US
E-MAIL ADDRESS llavagnino@lsce.com

HOURS OF SERVICE
8:00 - 17:00

Hide Contact information ▲

Hide Metadata Contacts ▲

FGDC Metadata (read-only) ►

Entities and Attributes ►

DETAILED DESCRIPTION
ENTITY TYPE

ENTITY TYPE LABEL SCVwellsNov2019
ENTITY TYPE DEFINITION
Santa Calarita Valley Wells
ENTITY TYPE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL OBJECTID
ATTRIBUTE DEFINITION
Internal feature number.
ATTRIBUTE DEFINITION SOURCE Esri
ATTRIBUTE DOMAIN VALUES
UNREPRESENTABLE DOMAIN
Sequential unique whole numbers that are automatically generated.

ATTRIBUTE
ATTRIBUTE LABEL Shape
ATTRIBUTE DEFINITION
Feature geometry.
ATTRIBUTE DEFINITION SOURCE Esri
ATTRIBUTE DOMAIN VALUES
UNREPRESENTABLE DOMAIN
Coordinates defining the features.

ATTRIBUTE
ATTRIBUTE LABEL SWN
ATTRIBUTE DEFINITION
State Well Number - Unique identification number assigned by DWR (or may be estimated by others). Staff included this number in the table when it was provided in the reports.
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL WELL_NAME
ATTRIBUTE DEFINITION
Well Names Entity - agency - name followed by sequential numbers
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL Well_Type
ATTRIBUTE DEFINITION
Types of Well are: o CAT- Cathodic Protection Well o Des- Destroyed Well o Dom- Domestic Well o HEAT- Heat Exchange Well o IND- Industrial Well o INJ- Injection Well o IRR-Irrigation Well o Mon- Monitoring Well o Mun- Municipal Well o OTH – Other o PIE-Piezometer o Pub- Public o Rec- Reconstruction o VAP- Vapor Extraction Well o Ext – Groundwater Extraction Well o Piez – Piezometer o SVP – Submerged Vapor Probe
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL AQUIFER
ATTRIBUTE DEFINITION
Designated aquifer in which well is screened o Alluvium o Saugus o Saugus (S-1, S-IIIa, S-III, S-V, S-VII) o Perched o Other (Pico or other) o Unknown
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL WELL_DEPTH
ATTRIBUTE DEFINITION
Depth of well in feet
ATTRIBUTE DEFINITION SOURCE LSCE

Attribute Measurement Frequency
009

Attribute
Attribute Label SCRN_INT
Attribute Definition
ScreenedInterval - The top of the first screen and the bottom of last screen
Attribute Definition Source LSCE
Attribute Measurement Frequency
011

Attribute
Attribute Label SCRN_CNT
Attribute Definition
Count of screen sections
Attribute Definition Source LSCE
Attribute Measurement Frequency
011

Attribute
Attribute Label SEAL_DEPTH
Attribute Definition
The depth in feet of well seal
Attribute Definition Source LSCE
Attribute Measurement Frequency
011

Attribute
Attribute Label RPE
Attribute Definition
Reference Point Elevation (feet)
Attribute Definition Source LSCE

Attribute
Attribute Label RPE_DATUM
Attribute Definition
Reference Point Elevation Datum: UNK - Unkown NGVD29 - Northern Geodetic Vertical Datum 1929 NAVD88 - North American Vertical Datum, 1988 LOC - Local
Attribute Definition Source LSCE

Attribute
Attribute Label Duplicate_Explanation
Attribute Definition
Explnations about duplicate records
Attribute Definition Source LSCE

Attribute
Attribute Label MTRSTS
Attribute Definition
Meridian code, Township, Range, Section, Tract, and Sequence information
Attribute Definition Source LSCE

Attribute
Attribute Label MTRST
Attribute Definition
Meridian code, Township, Range, Section, and Tract information
Attribute Definition Source LSCE

ATTRIBUTE
ATTRIBUTE LABEL MTRS
ATTRIBUTE DEFINITION
Meridian code, Township and Range number, Section number
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL MTR
ATTRIBUTE DEFINITION
Meridian code, Township and Range number
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL Internal_ID
ATTRIBUTE DEFINITION
The name of the PDF or TIF file was used as an internal ID so that we could easily find a particular document.
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Report_ID
ATTRIBUTE DEFINITION
The name of the PDF or TIF file was used as an internal ID so that we could easily find a particular document.
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Permit_Date
ATTRIBUTE DEFINITION
Staff used either the permit issue date or the project completion date depending on availability
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Address_No
ATTRIBUTE DEFINITION
Well address was used in the table. In many cases, only the address of the individual applying for the permit (sometimes out of area) was provided. In these instances, the address was left blank.
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Street
ATTRIBUTE DEFINITION
Well Street address was used in the table. In many cases, only the address of the individual applying for the permit (sometimes out of area) was provided. In these instances, the address was left blank.
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Town
ATTRIBUTE DEFINITION
Well Town name
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Zip
ATTRIBUTE DEFINITION

Well address Zip code
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL APN
ATTRIBUTE DEFINITION
Assessor's Parcel Number - used for identifying well locations
ATTRIBUTE DEFINITION SOURCE LSCE
ATTRIBUTE MEASUREMENT FREQUENCY
009

ATTRIBUTE
ATTRIBUTE LABEL Filename
ATTRIBUTE DEFINITION
Well Log file name
ATTRIBUTE DEFINITION SOURCE SCVWA

ATTRIBUTE
ATTRIBUTE LABEL Flag
ATTRIBUTE DEFINITION
Identifies how duplicate records were handeled
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL Note
ATTRIBUTE DEFINITION
Note space for comments about the well record
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL Data_Source
ATTRIBUTE DEFINITION
Data Sources: RCS Database SCVWD-Provided Records LA County - Los Angeles County Flood Control District, Pitchess Detention Center, and Los Angeles County Waterworks Division 36 NWD - Newhall Water Division SCWD - Santa Clarita Water Division VWD - Valencia Water Division CH2MHILL2007InstallRpt CH2MHILL2013WellCompRpt CH2MHILL2016WellCompRpt CH2MHILLdraft_tables_figs Environ2010DraftWellInstallRpt WB-LSCE12-076 - Whittaker Bermite job files with LSCE DPH-GAMA GIS - California Department of Public Health DWR-GAMA GIS - California Department of Water Resources USGS-GAMA GIS - United States Geological Survey Geotracker2019Octdownload - Geotracker EDF Geosyntec
ATTRIBUTE DEFINITION SOURCE LSCE
ATTRIBUTE MEASUREMENT FREQUENCY
009

ATTRIBUTE
ATTRIBUTE LABEL GSE
ATTRIBUTE DEFINITION
Ground Sufrace Elevation
ATTRIBUTE DEFINITION SOURCE LSCE
ATTRIBUTE MEASUREMENT FREQUENCY
009

ATTRIBUTE
ATTRIBUTE LABEL Owner_SiteNm
ATTRIBUTE DEFINITION
Site Owner Name
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE MEASUREMENT FREQUENCY
009

ATTRIBUTE
ATTRIBUTE LABEL PS_Code
ATTRIBUTE DEFINITION
Primary Station Code used for identifying wells. PS codes are from Department of Public Health
ATTRIBUTE DEFINITION SOURCE DHP

ATTRIBUTE
ATTRIBUTE LABEL CASGEM_ID
ATTRIBUTE DEFINITION
Groundwater Monitoring (CASGEM) IDs
ATTRIBUTE DEFINITION SOURCE DWR

ATTRIBUTE
ATTRIBUTE LABEL Well_Status
ATTRIBUTE DEFINITION
Status of wells: ABANDONED ACTIVE DESTROYED NEW UNKNOWN
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL Location_Method
ATTRIBUTE DEFINITION
Methods used to locate wells GPS Survey - highest accuracy (usually 0.01' precision) Aerial - identification of well site in an aerial image LA County Parcels - Could Not Locate Well DecDeg Coordinates, WGS84 - Decimal degree coordinate location in GSA Tracking Sheet DMS Coordinates, WGS84 - Degree/Minute/Second coordinate location in GSA Tracking Sheet Township, Section - PLSS Section centroid location based on match to newly created MTRS (Meridian Township Range Section) field in the GSA Tracking Sheet TOPO - location on a topographic map UNK - unknown OTHER - a local coordinate or measurement system, see comments in well record
ATTRIBUTE DEFINITION SOURCE LSCE

ATTRIBUTE
ATTRIBUTE LABEL E_FTSPZ5_83

ATTRIBUTE
ATTRIBUTE LABEL N_FTSPZ5_83

Hide Entities and Attributes ▲

APPENDIX L

Hydrographs Showing Initial Measurable Objectives and Initial Minimum Thresholds for the Representative Monitoring Well Network (Other than GDE Monitoring Wells)

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Hydrographs Showing Initial Measurable Objectives and Initial Minimum Thresholds for the Representative Monitoring Well Network

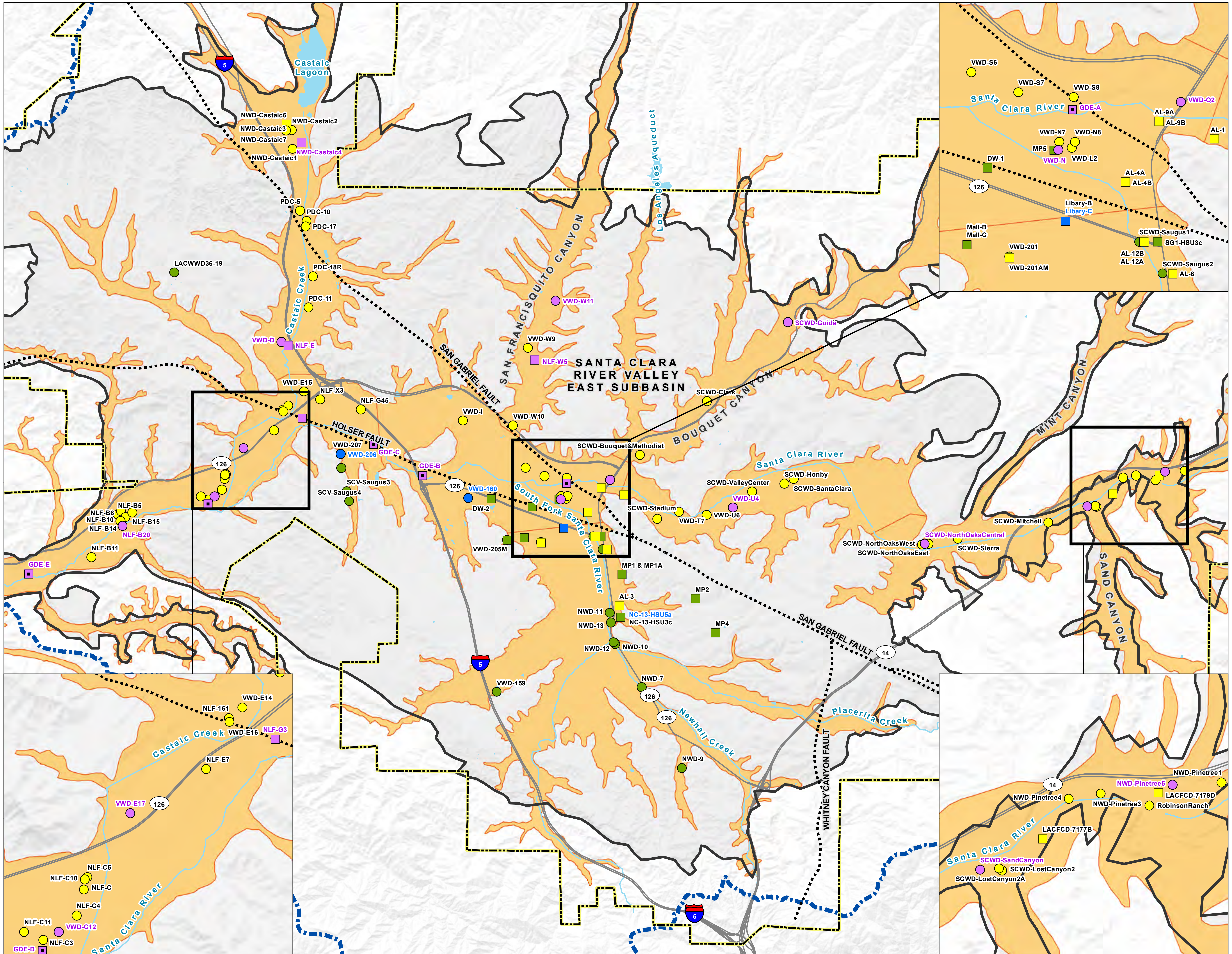
(Other Than GDE Monitoring Wells)

Santa Clara River Valley East Groundwater Subbasin
Groundwater Sustainability Plan

FIGURE 1

Locations of Representative Monitoring Wells

Santa Clara River Valley
East Groundwater Basin
Groundwater Sustainability Plan



LEGEND

- Existing Production Well
- Existing Observation Well
- New Observation Well (to be constructed)

Existing Wells

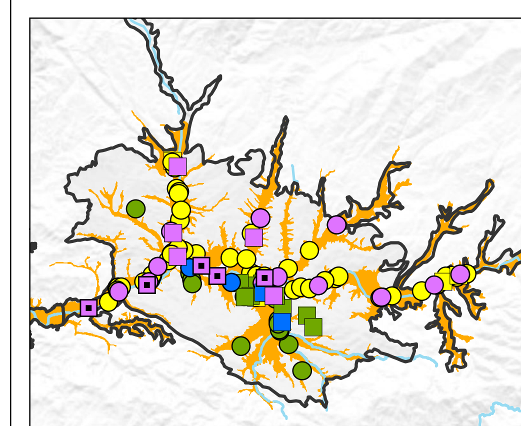
- Alluvial Aquifer
- Saugus Formation Aquifer

Representative Monitoring Well Network

- Alluvial Aquifer
- Saugus Formation Aquifer

All Other Features

- Santa Clara River Valley Groundwater Basin
- Alluvial Aquifer
- Watershed Boundary
- Service Area Boundary for SCV Water
- Major Road
- Watercourse
- Waterbody



NOTE

SCV Water: Santa Clarita Valley Water Agency

N

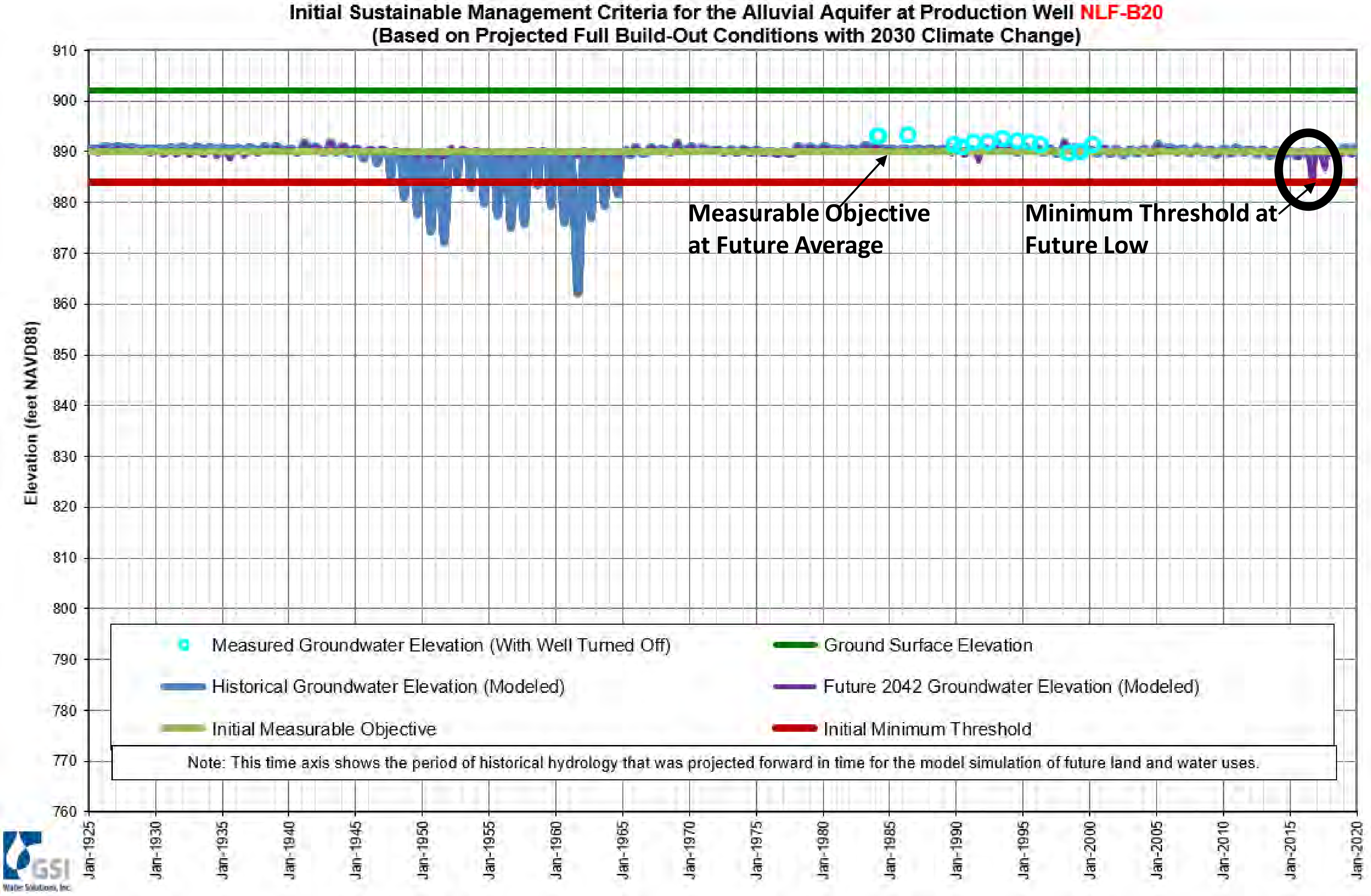
0 3,200 6,400 9,600

Feet

Date: December 14, 2021
Data Sources: USGS, DWR Bulletin 118

GSI Water Solutions, Inc.

Document Path: Y:\0420_CLWA\Source_Figures\019_EastSubbasinGSP\GSP\Appendix\Figure1_Representative_MWs.mxd, abarry



Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well NLF-B20
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
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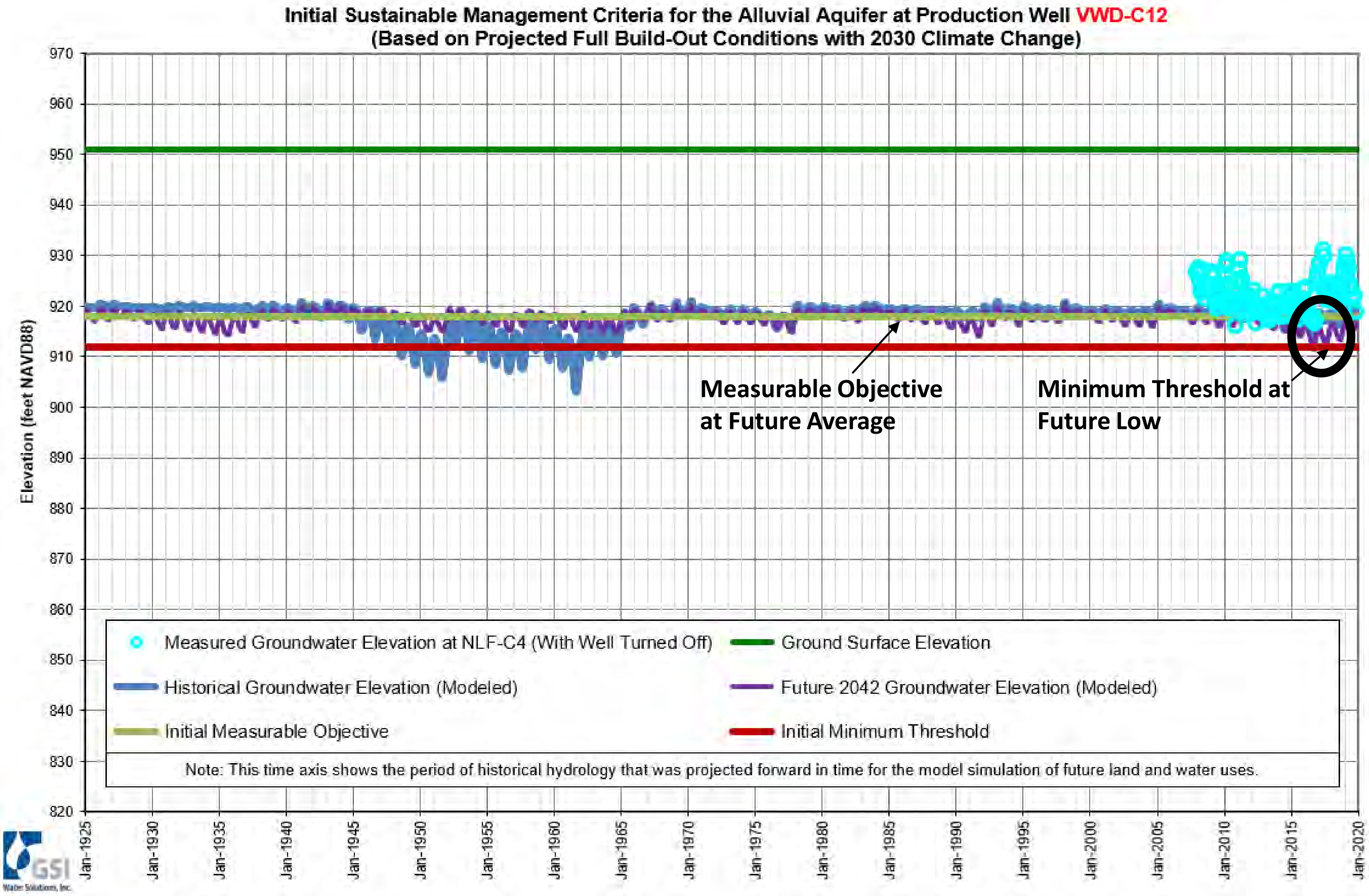
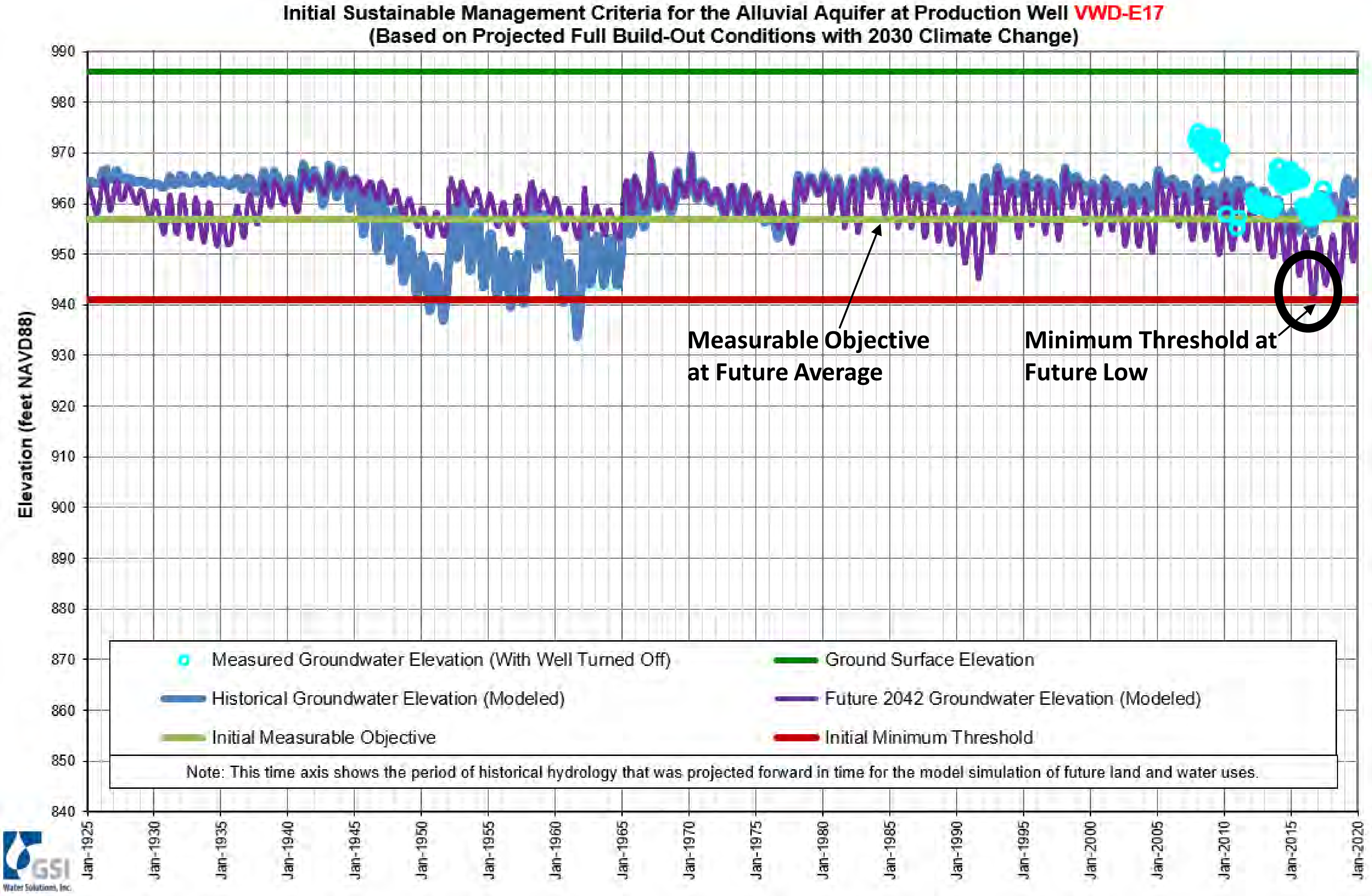
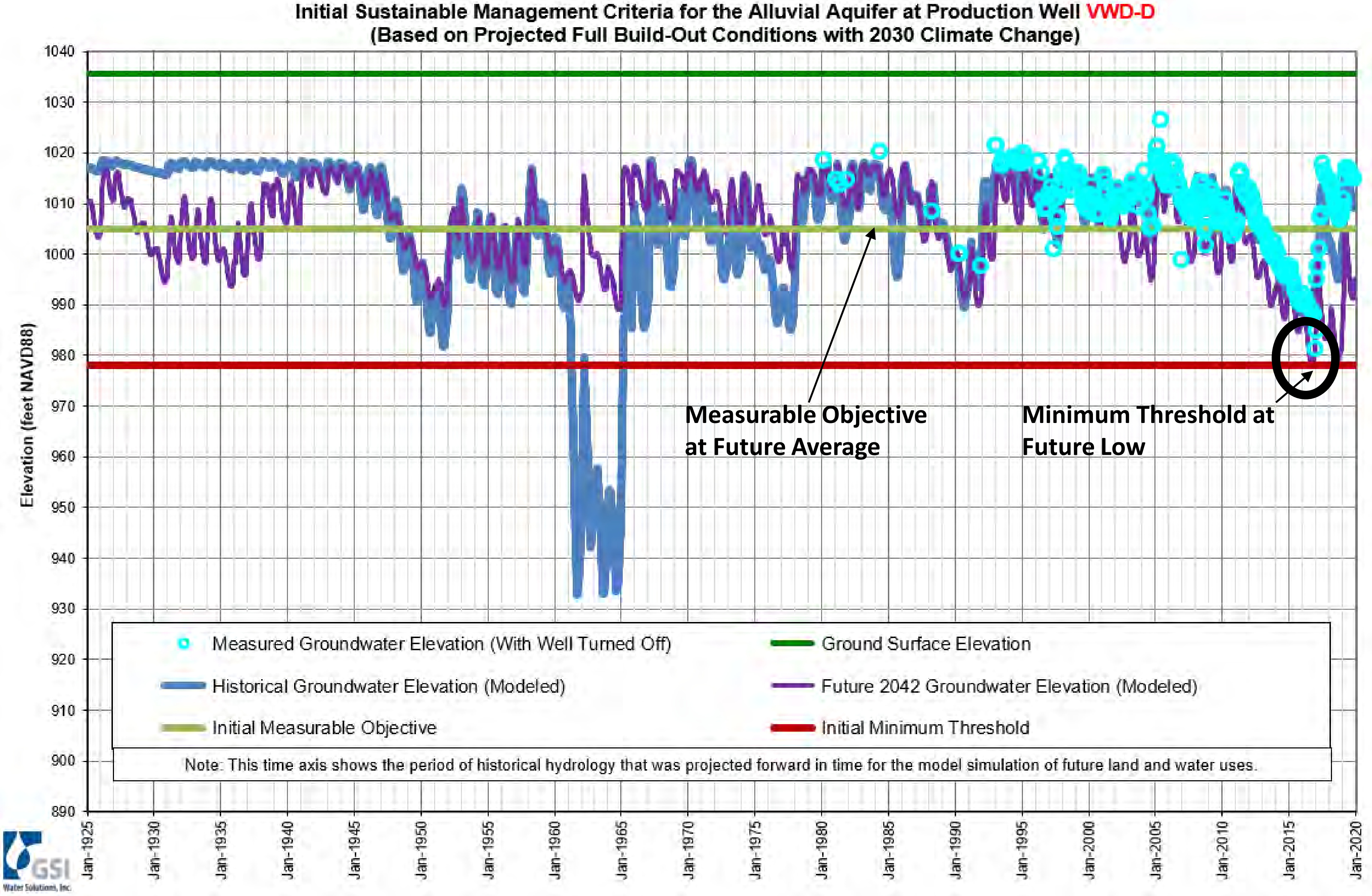
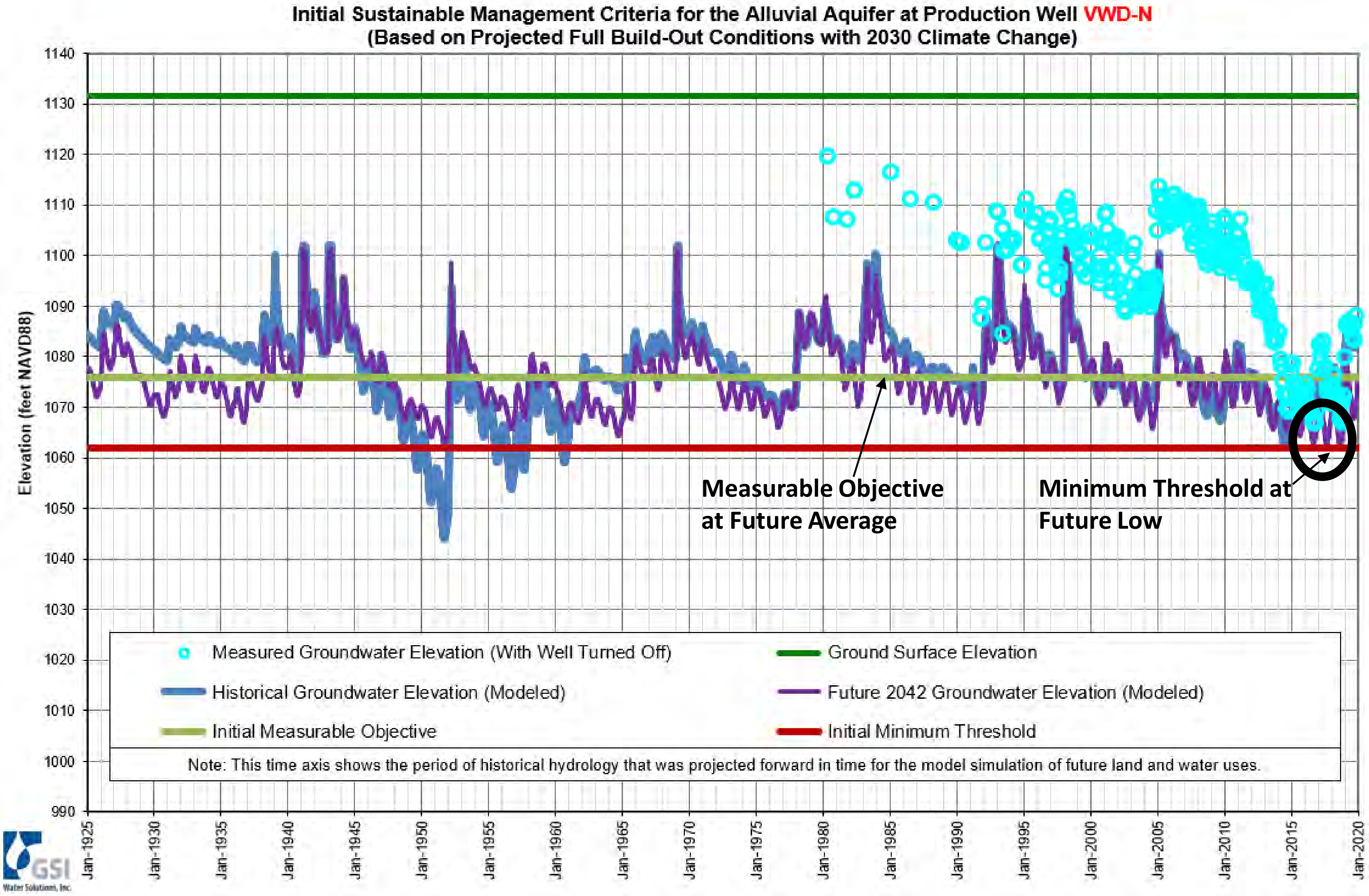

Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-C12
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
970
960
950
940
930
920
910
900
890
880
870
860
850
840
830
820
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation at NLF-C4 (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI
Water Solutions, Inc.

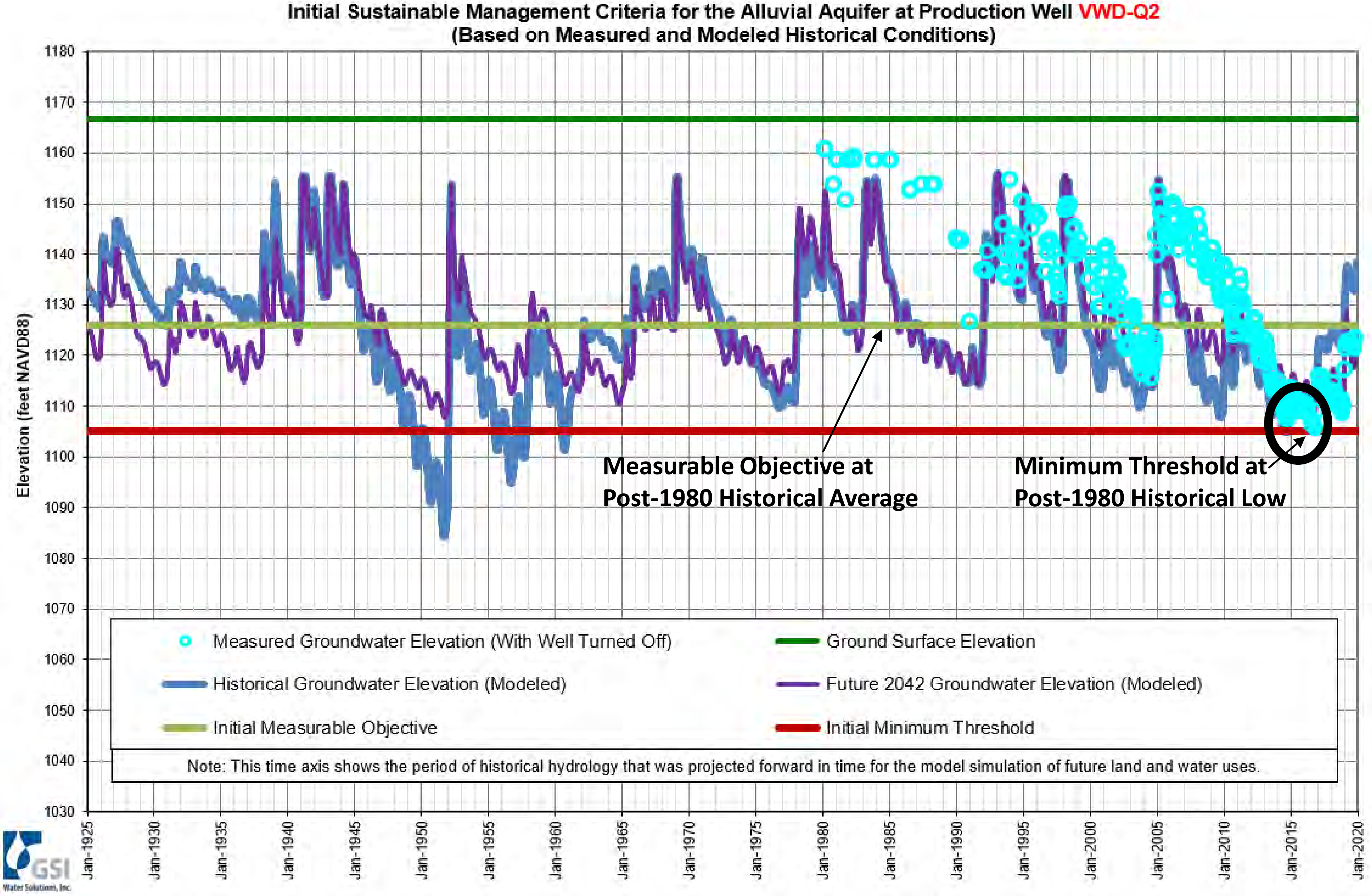


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-E17
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
990
980
970
960
950
940
930
920
910
900
890
880
870
860
850
840
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI
Water Solutions, Inc.

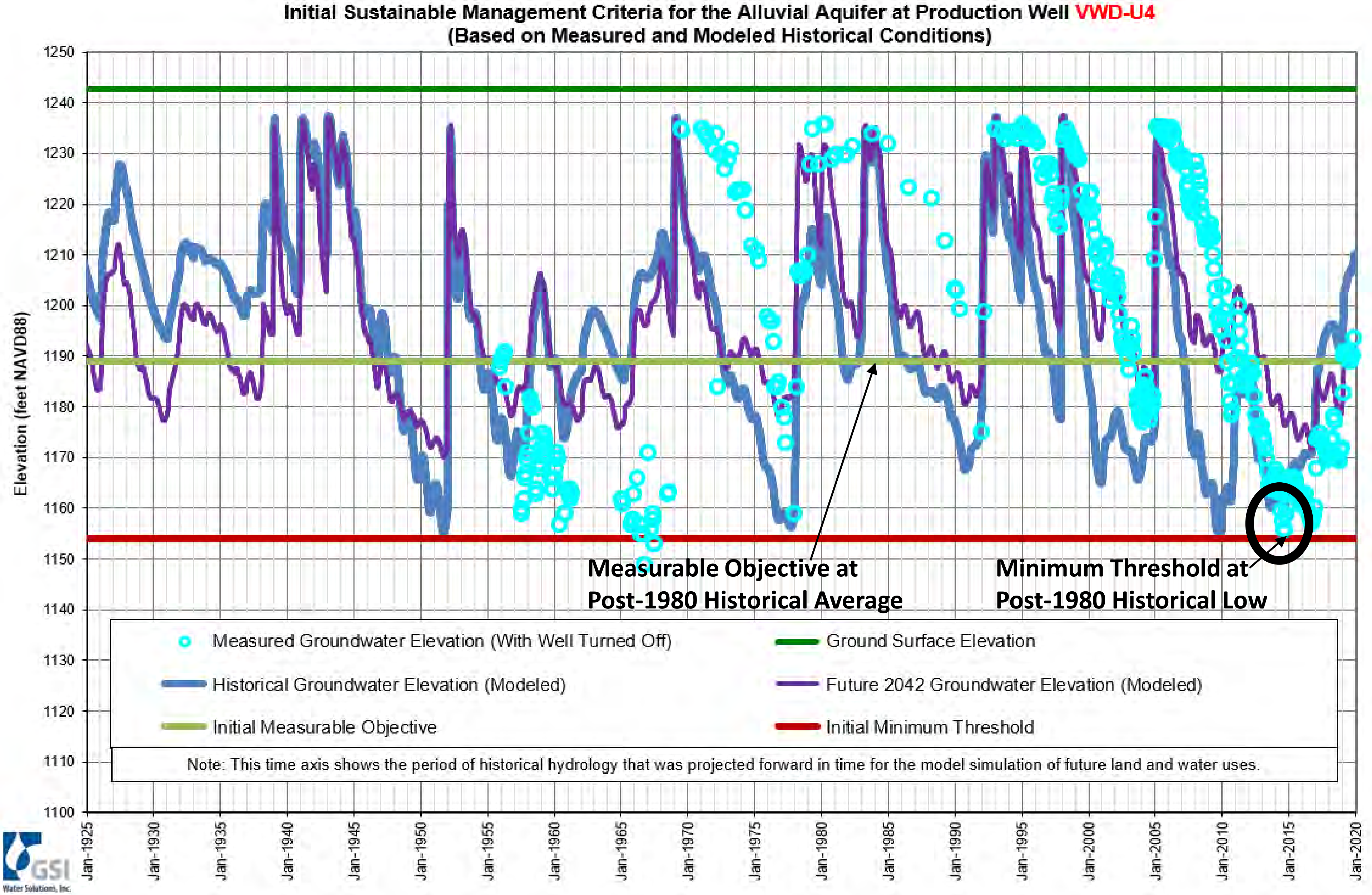


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-D
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920
910
900
890
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI Water Solutions, Inc.

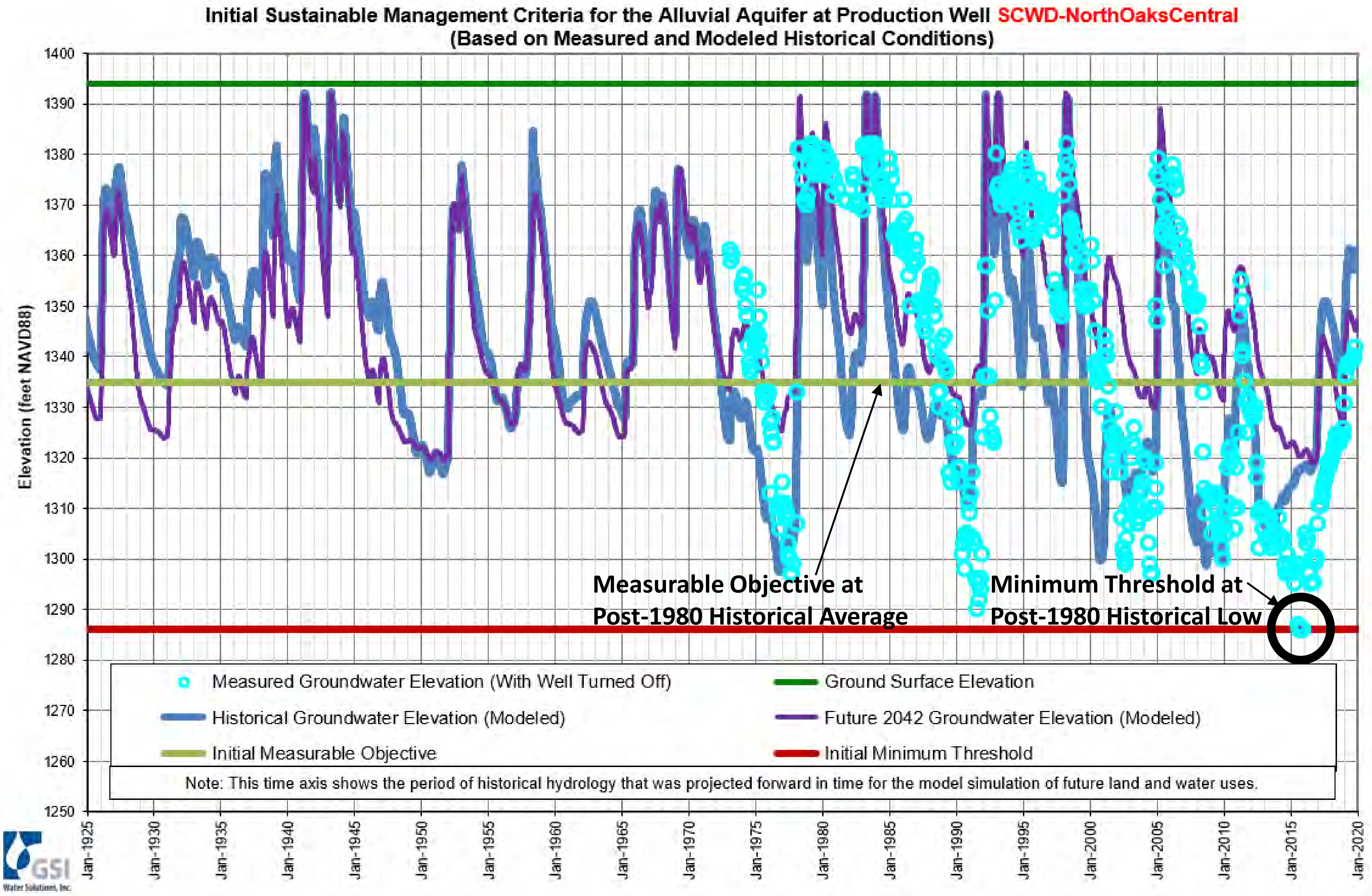

Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-N
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
990
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
GSI Water Solutions, Inc.

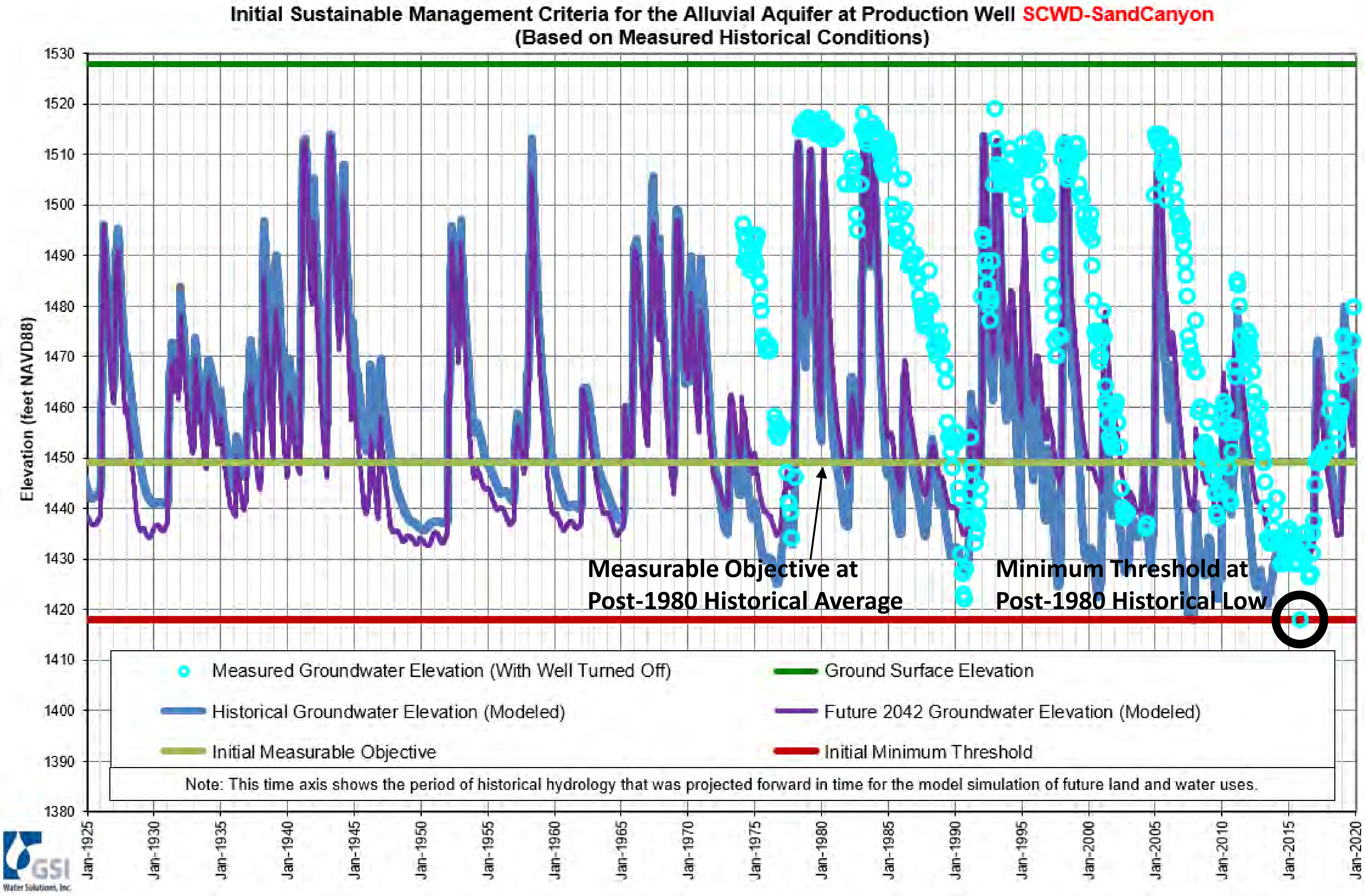


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-Q2
(Based on Measured and Modeled Historical Conditions)
Elevation (feet NAVD88)
1180
1170
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
Measurable Objective at Post-1980 Historical Average
Minimum Threshold at Post-1980 Historical Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
GSI Water Solutions, Inc.

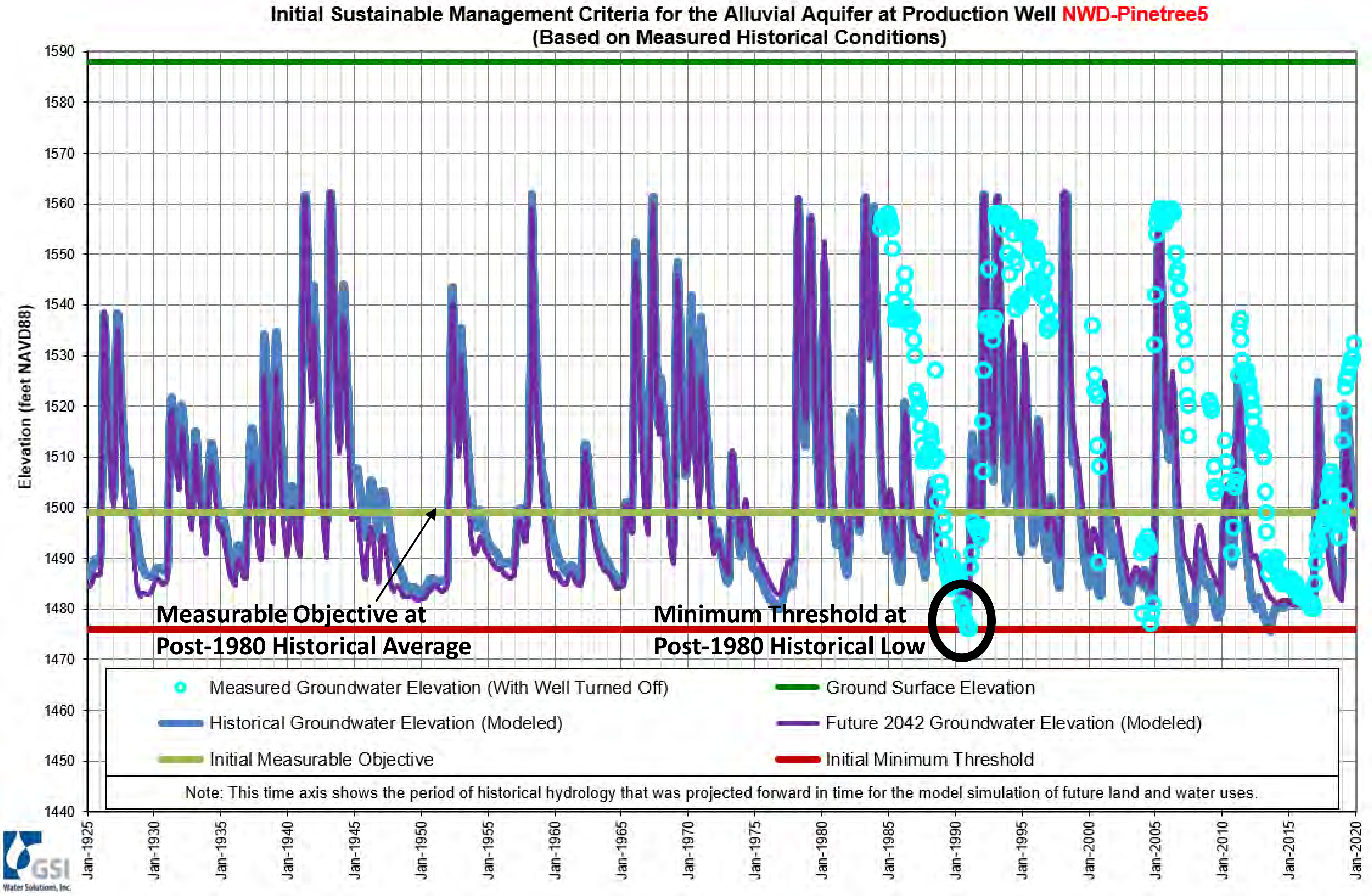


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-U4
(Based on Measured and Modeled Historical Conditions)
Elevation (feet NAVD88)
1250
1240
1230
1220
1210
1200
1190
1180
1170
1160
1150
1140
1130
1120
1110
1100
Measurable Objective at
Post-1980 Historical Average
Minimum Threshold at
Post-1980 Historical Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020

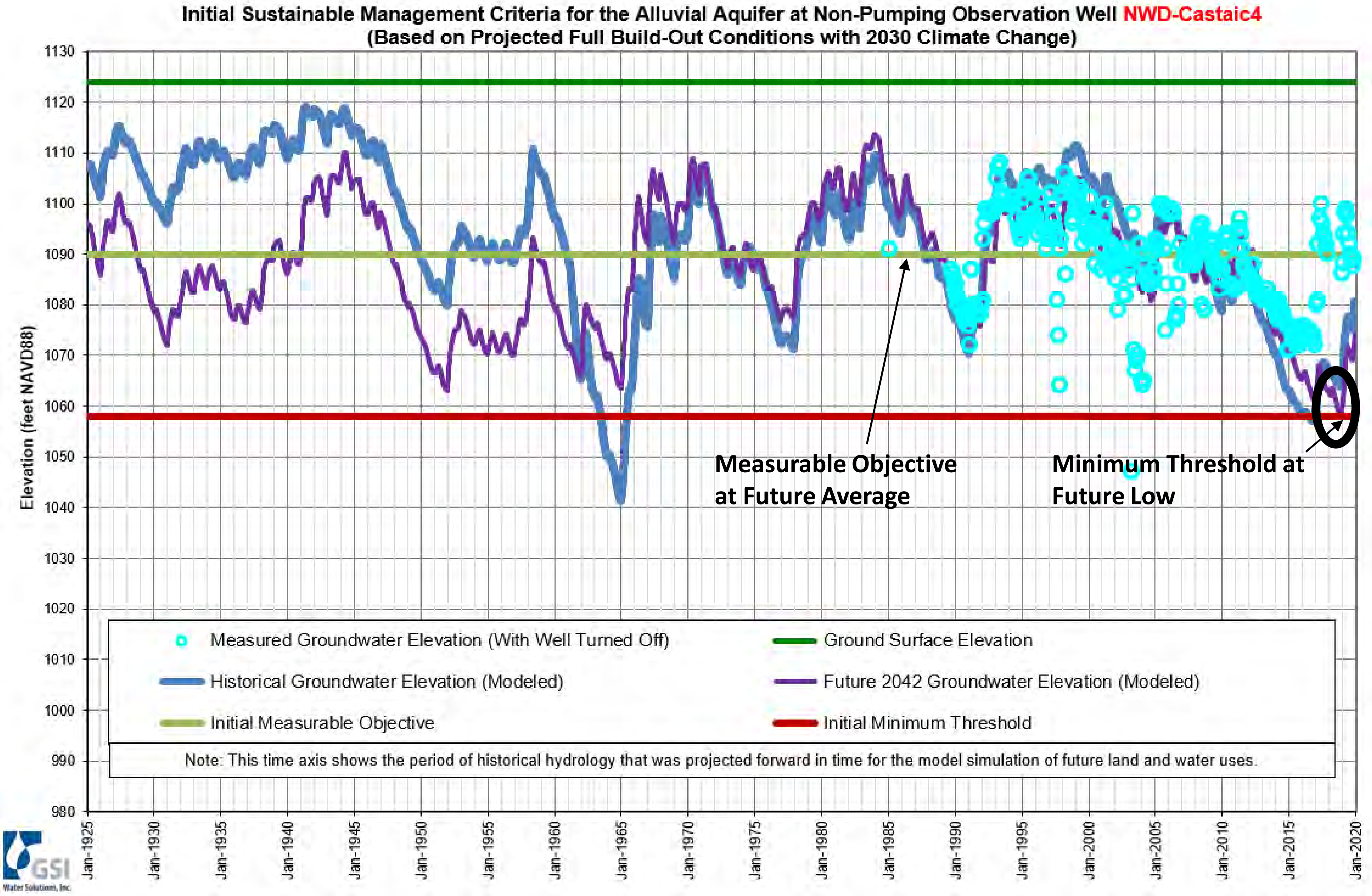

Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well SCWD-NorthOaksCentral
(Based on Measured and Modeled Historical Conditions)
Elevation (feet NAVD88)
1400
1390
1380
1370
1360
1350
1340
1330
1320
1310
1300
1290
1280
1270
1260
1250
Measurable Objective at Post-1980 Historical Average
Minimum Threshold at Post-1980 Historical Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI Water Solutions, Inc.

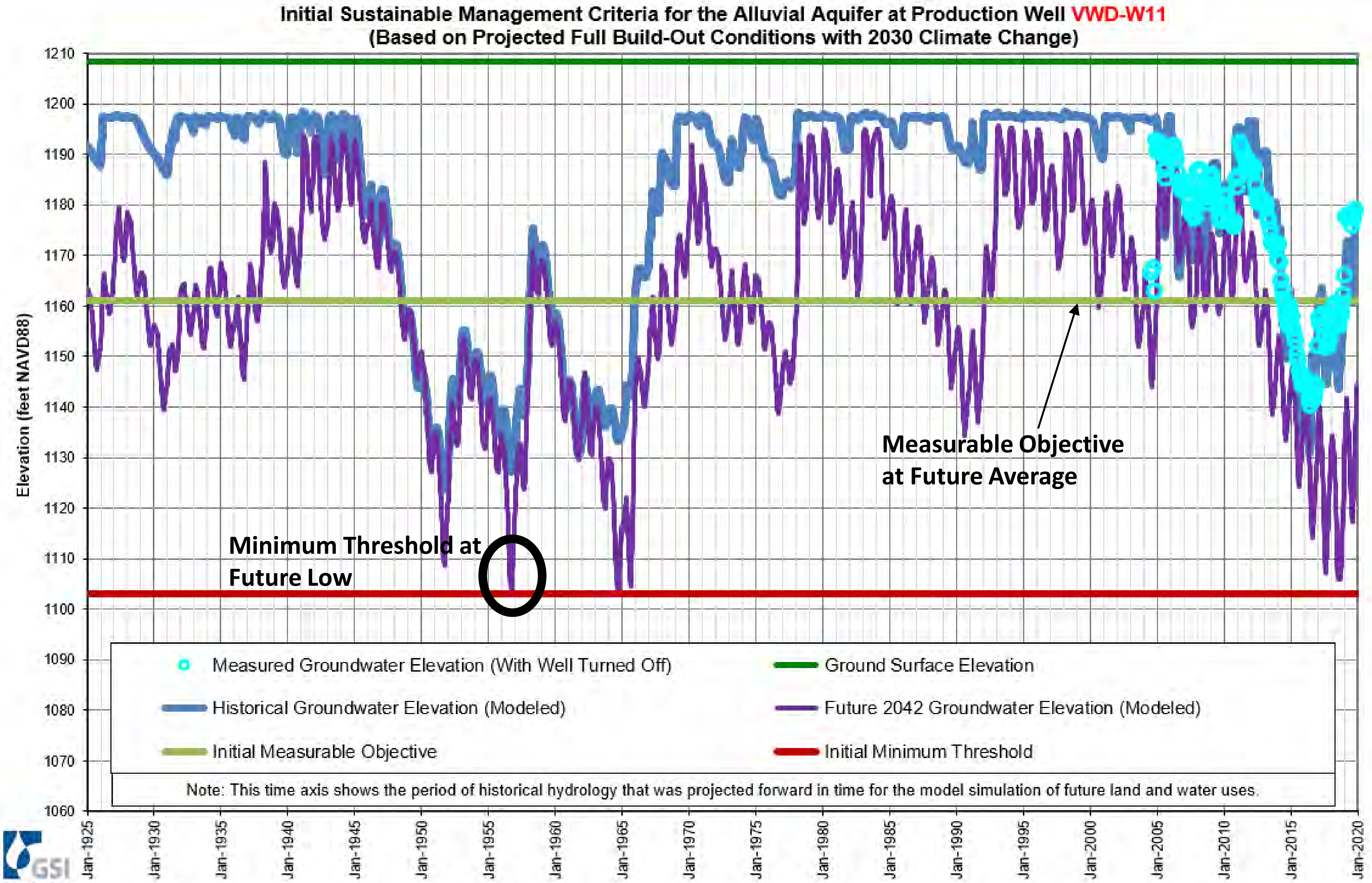


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well SCWD-SandCanyon
(Based on Measured Historical Conditions)
Elevation (feet NAVD88)
1530
1520
1510
1500
1490
1480
1470
1460
1450
1440
1430
1420
1410
1400
1390
1380
Measurable Objective at
Post-1980 Historical Average
Minimum Threshold at
Post-1980 Historical Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI
Water Solutions, Inc.

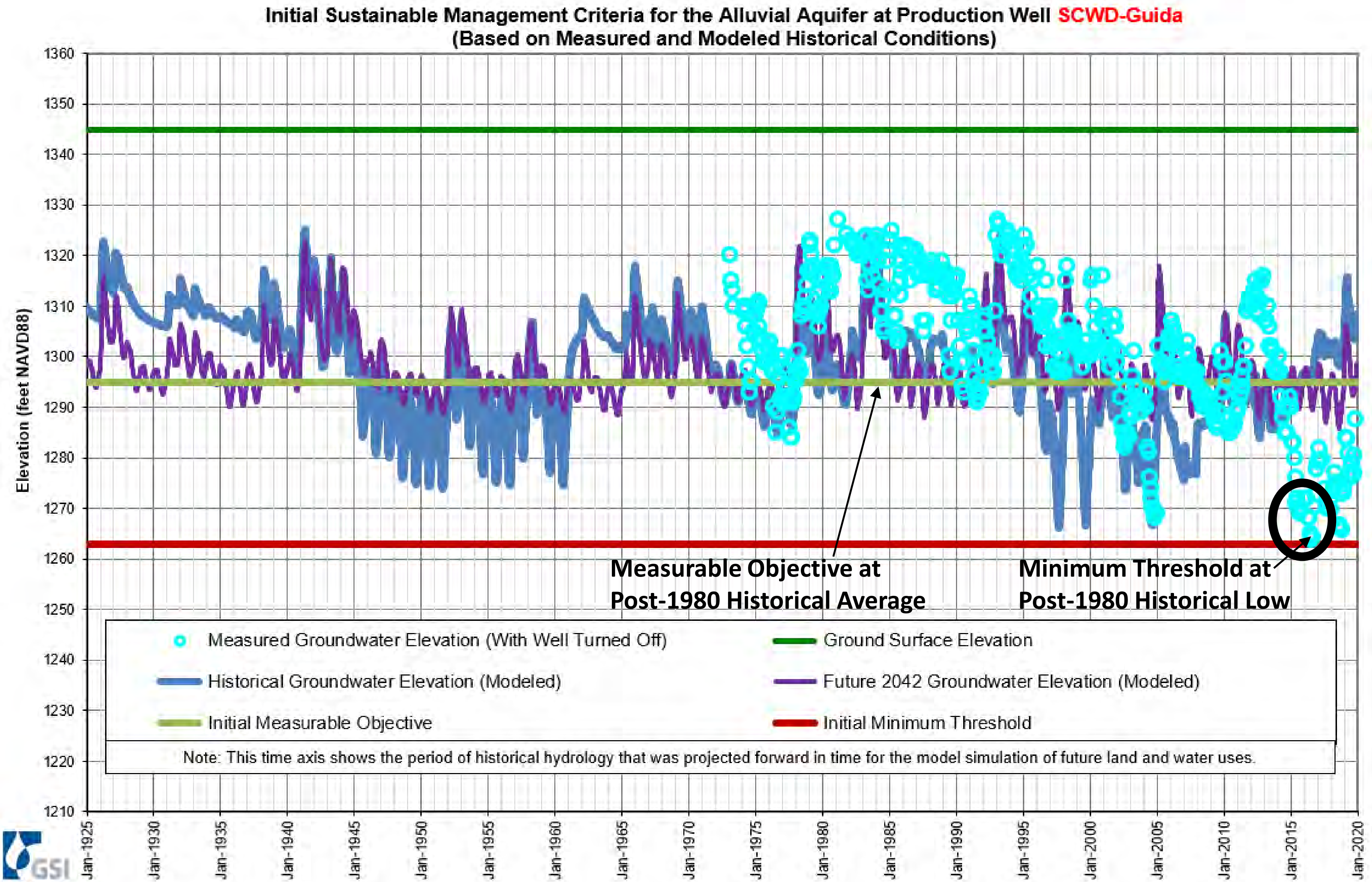


Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well NWD-Pinetree5
(Based on Measured Historical Conditions)
Elevation (feet NAVD88)
1590
1580
1570
1560
1550
1540
1530
1520
1510
1500
1490
1480
1470
1460
1450
1440
Measurable Objective at
Post-1980 Historical Average
Minimum Threshold at
Post-1980 Historical Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI
Water Solutions, Inc.


Initial Sustainable Management Criteria for the Alluvial Aquifer at Non-Pumping Observation Well NWD-Castaic4
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
990
980
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
GSI
Water Solutions, Inc.



Initial Sustainable Management Criteria for the Alluvial Aquifer at Production Well VWD-W11
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Elevation (feet NAVD88)
1210
1200
1190
1180
1170
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Ground Surface Elevation
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note: This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI Water Solutions, Inc.



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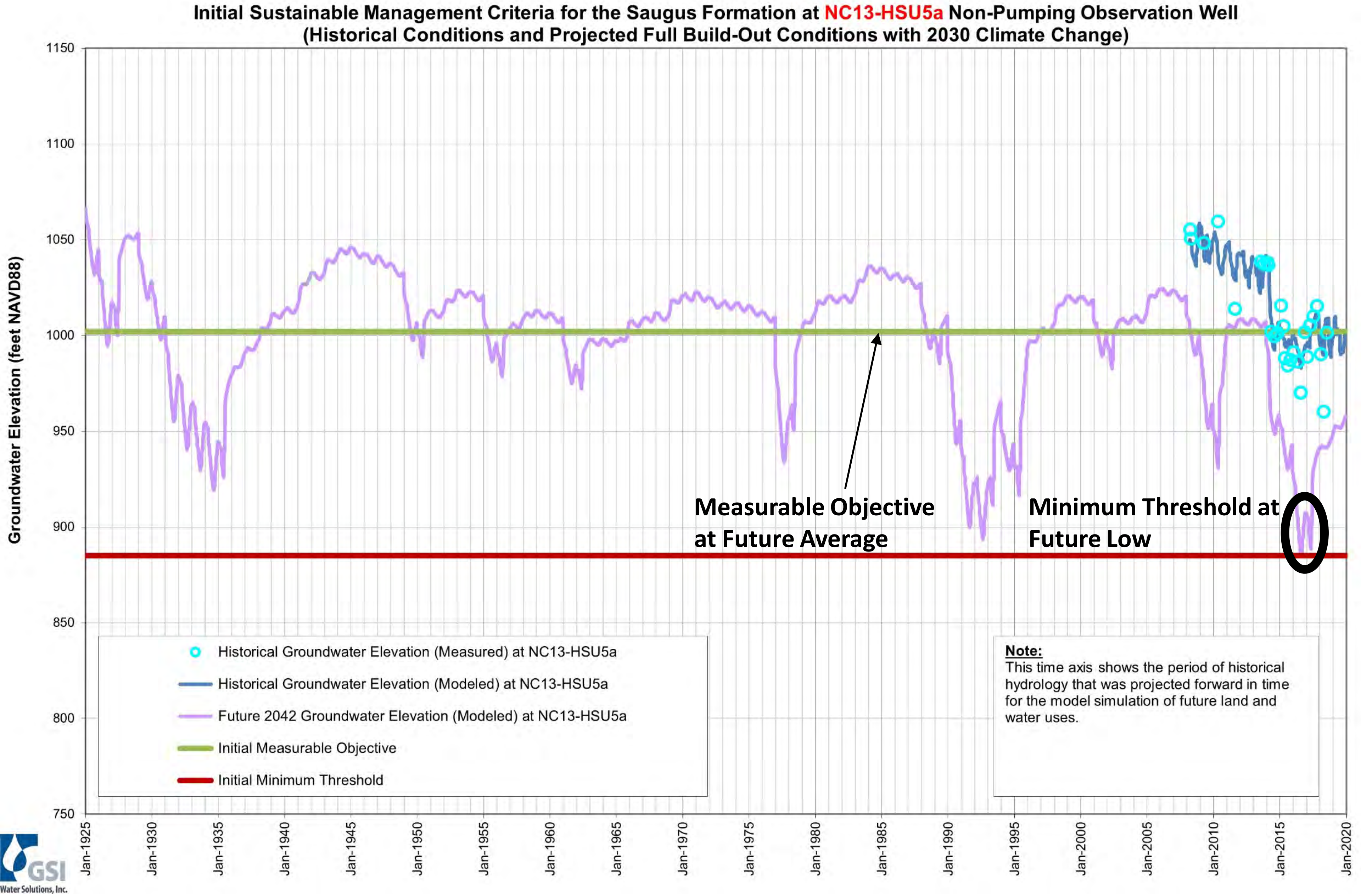
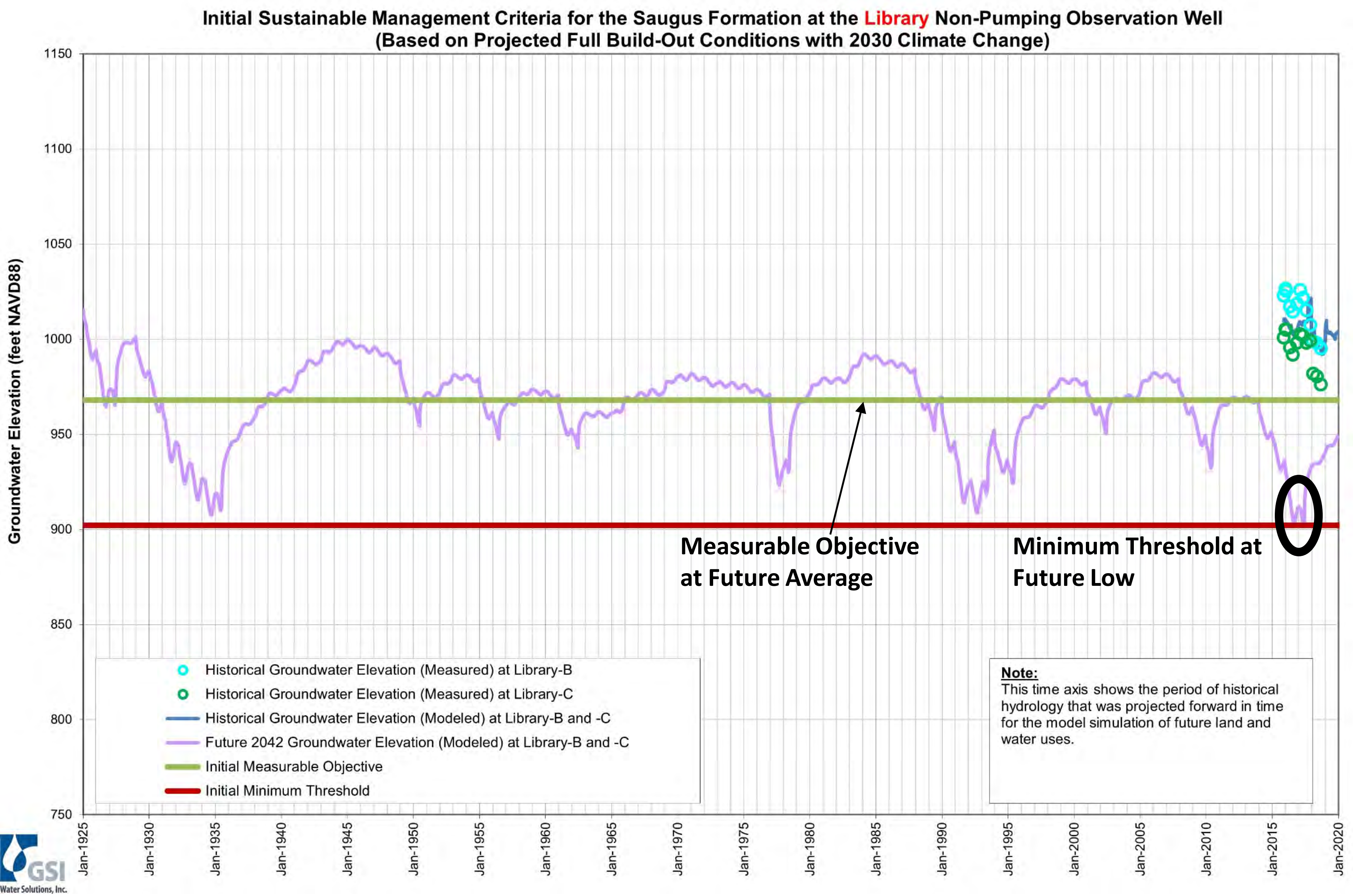
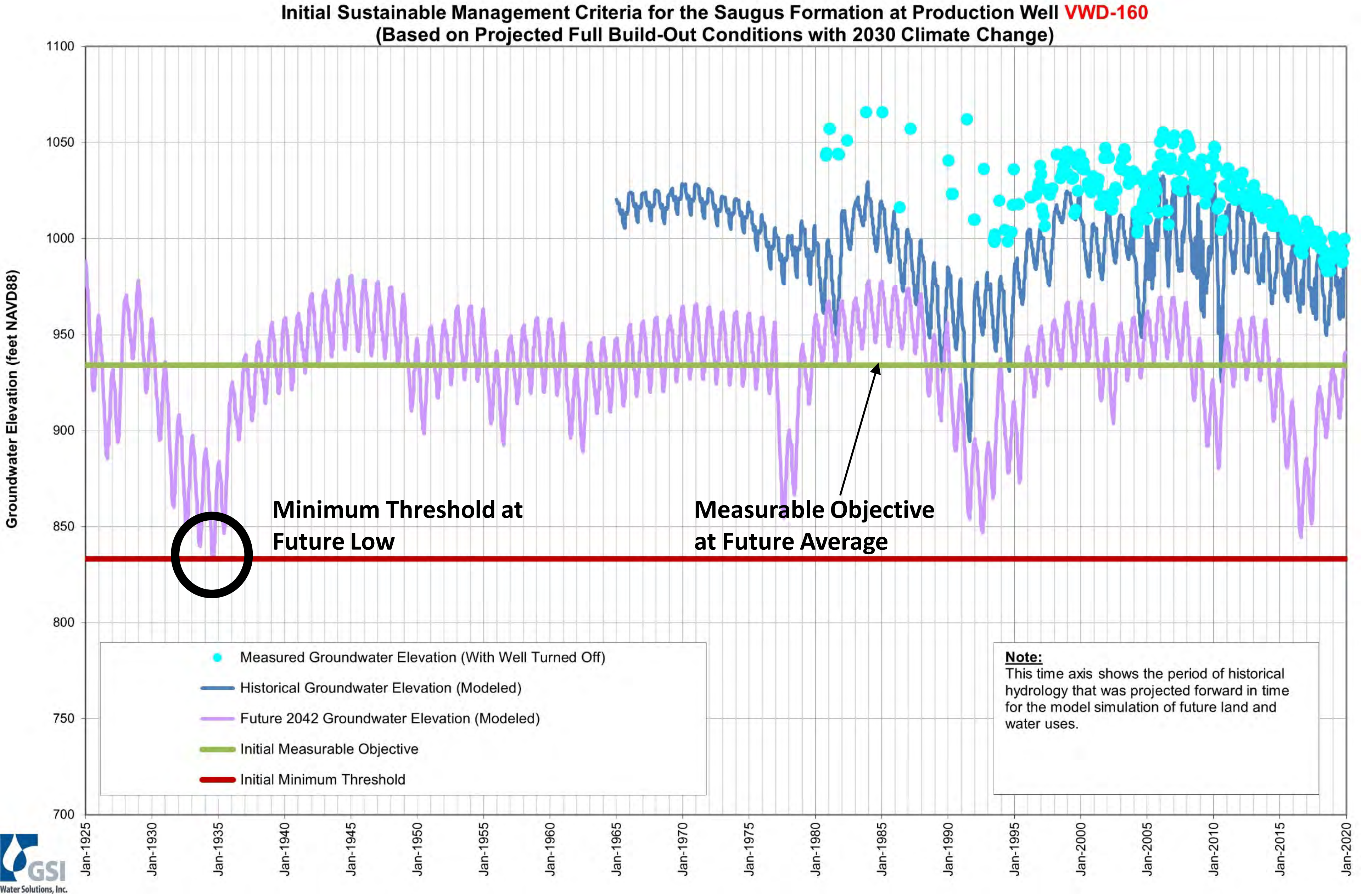
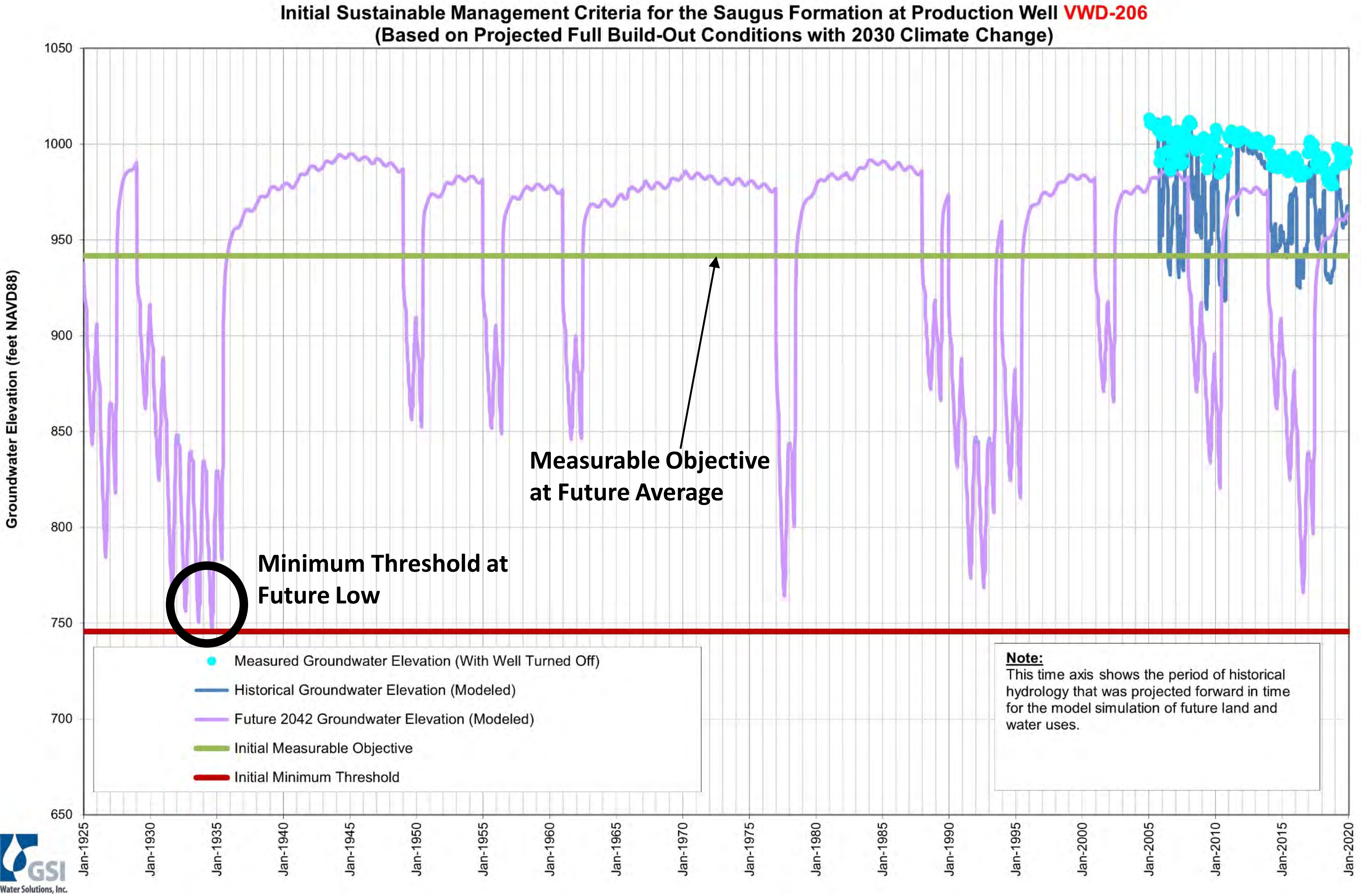


Initial Sustainable Management Criteria for the Saugus Formation at NC13-HSU5a Non-Pumping Observation Well
(Historical Conditions and Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet NAVD88)
1150
1100
1050
1000
950
900
850
800
750
Measurable Objective at Future Average
Minimum Threshold at Future Low
Historical Groundwater Elevation (Measured) at NC13-HSU5a
Historical Groundwater Elevation (Modeled) at NC13-HSU5a
Future 2042 Groundwater Elevation (Modeled) at NC13-HSU5a
Initial Measurable Objective
Initial Minimum Threshold
Note:
This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
GSI
Water Solutions, Inc.



Initial Sustainable Management Criteria for the Saugus Formation at the Library Non-Pumping Observation Well
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet NAVD88)
1150
1100
1050
1000
950
900
850
800
750
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
Measurable Objective at Future Average
Minimum Threshold at Future Low
Historical Groundwater Elevation (Measured) at Library-B
Historical Groundwater Elevation (Measured) at Library-C
Historical Groundwater Elevation (Modeled) at Library-B and -C
Future 2042 Groundwater Elevation (Modeled) at Library-B and -C
Initial Measurable Objective
Initial Minimum Threshold
Note:
This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
GSI Water Solutions, Inc.


Initial Sustainable Management Criteria for the Saugus Formation at Production Well VWD-160
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet NAVD88)
1100
1050
1000
950
900
850
800
750
700
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
Minimum Threshold at Future Low
Measurable Objective at Future Average
Measured Groundwater Elevation (With Well Turned Off)
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note:
This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
GSI
Water Solutions, Inc.


Initial Sustainable Management Criteria for the Saugus Formation at Production Well VWD-206
(Based on Projected Full Build-Out Conditions with 2030 Climate Change)
Groundwater Elevation (feet NAVD88)
1050
1000
950
900
850
800
750
700
650
Measurable Objective at Future Average
Minimum Threshold at Future Low
Measured Groundwater Elevation (With Well Turned Off)
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
Initial Measurable Objective
Initial Minimum Threshold
Note:
This time axis shows the period of historical hydrology that was projected forward in time for the model simulation of future land and water uses.
Jan-1925
Jan-1930
Jan-1935
Jan-1940
Jan-1945
Jan-1950
Jan-1955
Jan-1960
Jan-1965
Jan-1970
Jan-1975
Jan-1980
Jan-1985
Jan-1990
Jan-1995
Jan-2000
Jan-2005
Jan-2010
Jan-2015
Jan-2020
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APPENDIX M

Hydrographs Showing Initial Measurable Objectives, Initial Minimum Thresholds, and Initial Trigger Levels for the GDE Monitoring Well Network

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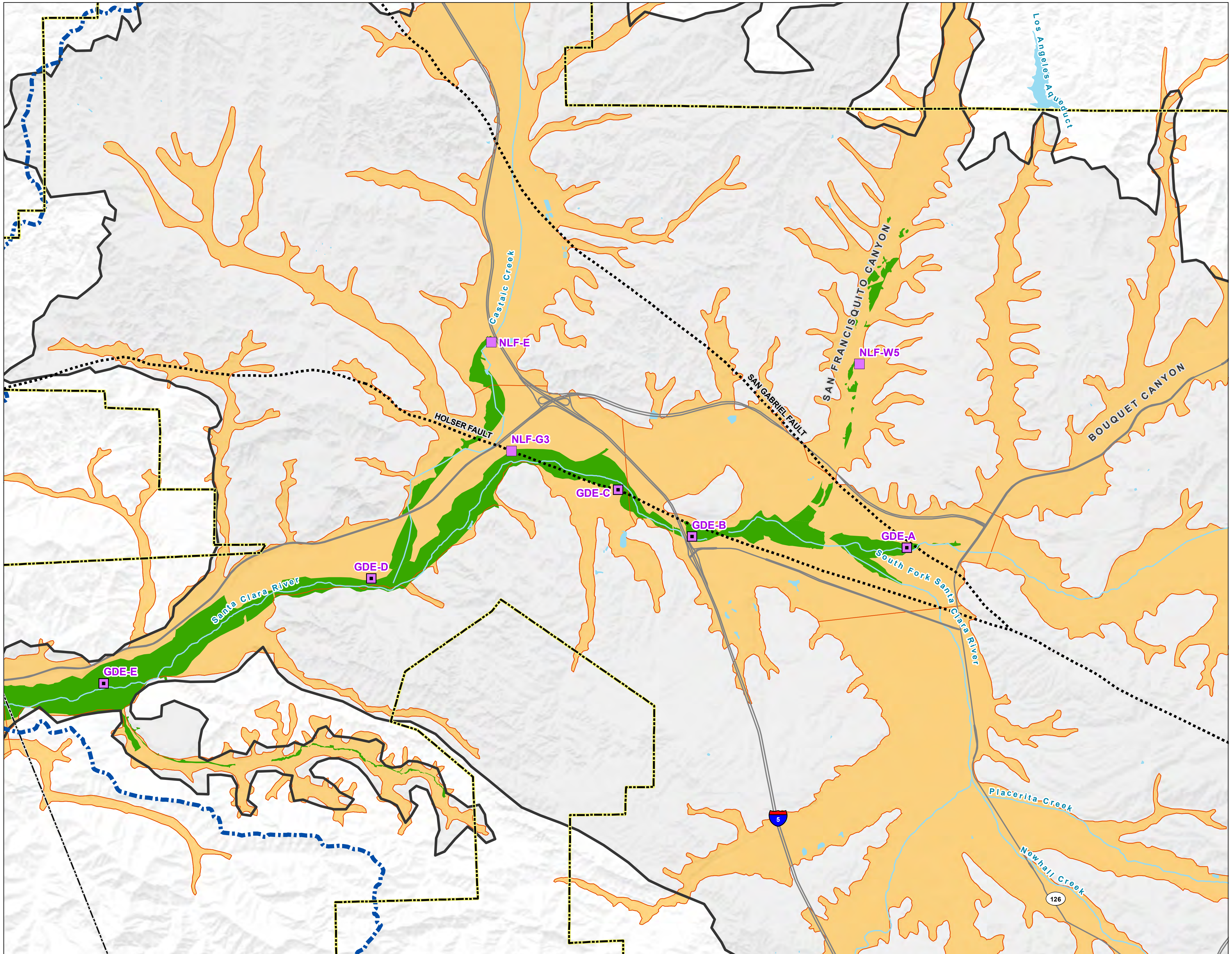


Groundwater Monitoring Network for GDEs

Santa Clara River Valley
East Groundwater Basin
Groundwater Sustainability Plan

LEGEND

GDE Monitoring Well in the Alluvial Aquifer

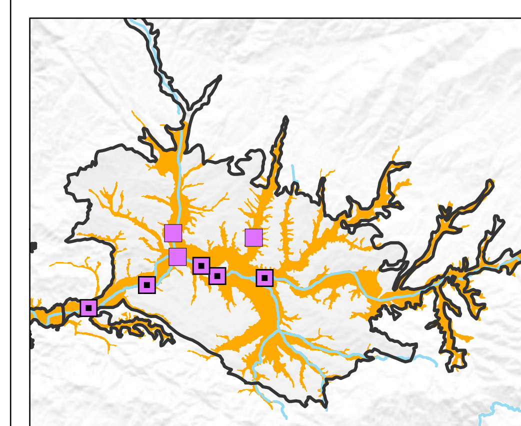
- Existing Observation Well
- New Observation Well (to be constructed)

Phreatophyte Locations

- Riparian Mixed Hardwood

All Other Features

- Santa Clara River Valley Groundwater Basin
- Alluvial Aquifer
- Watershed Boundary
- Service Area Boundary for SCV Water
- Major Road
- Watercourse
- Waterbody



NOTE

SCV Water: Santa Clarita Valley Water Agency

N

0 2,000 4,000 6,000
Feet

GSI Water Solutions, Inc.

Date: December 9, 2021
Data Sources: USGS, DWR Bulletin 118, ESA

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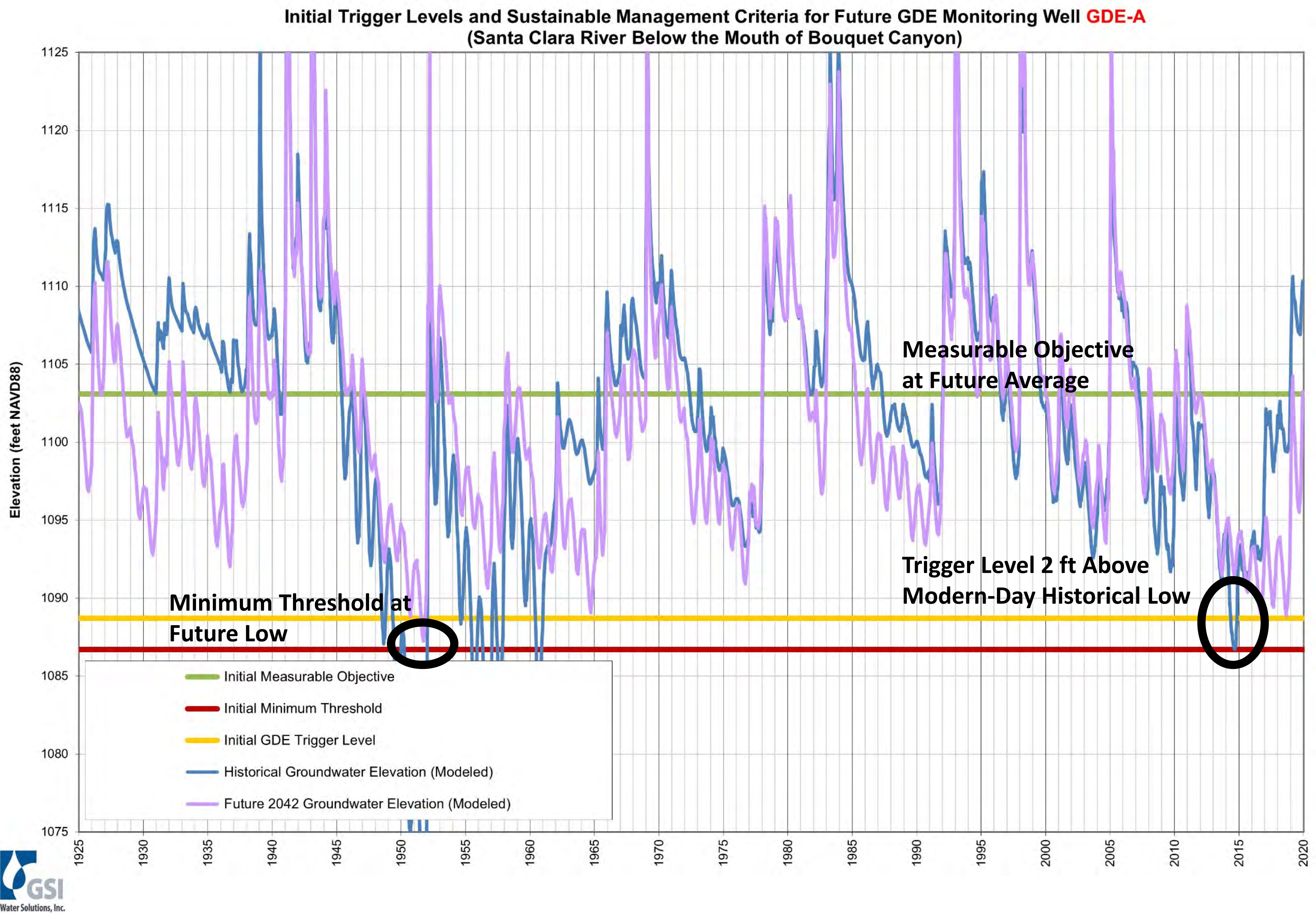
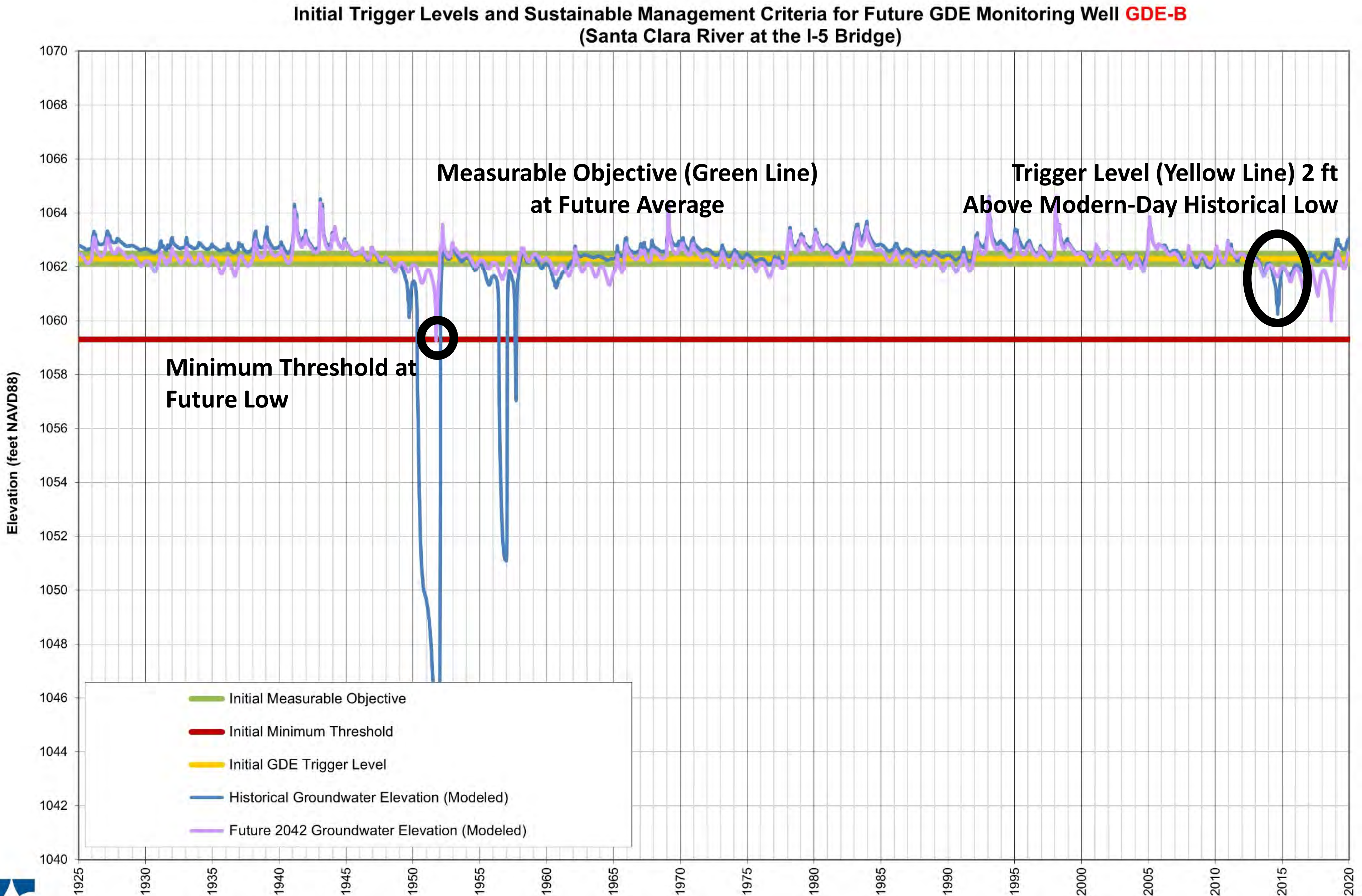
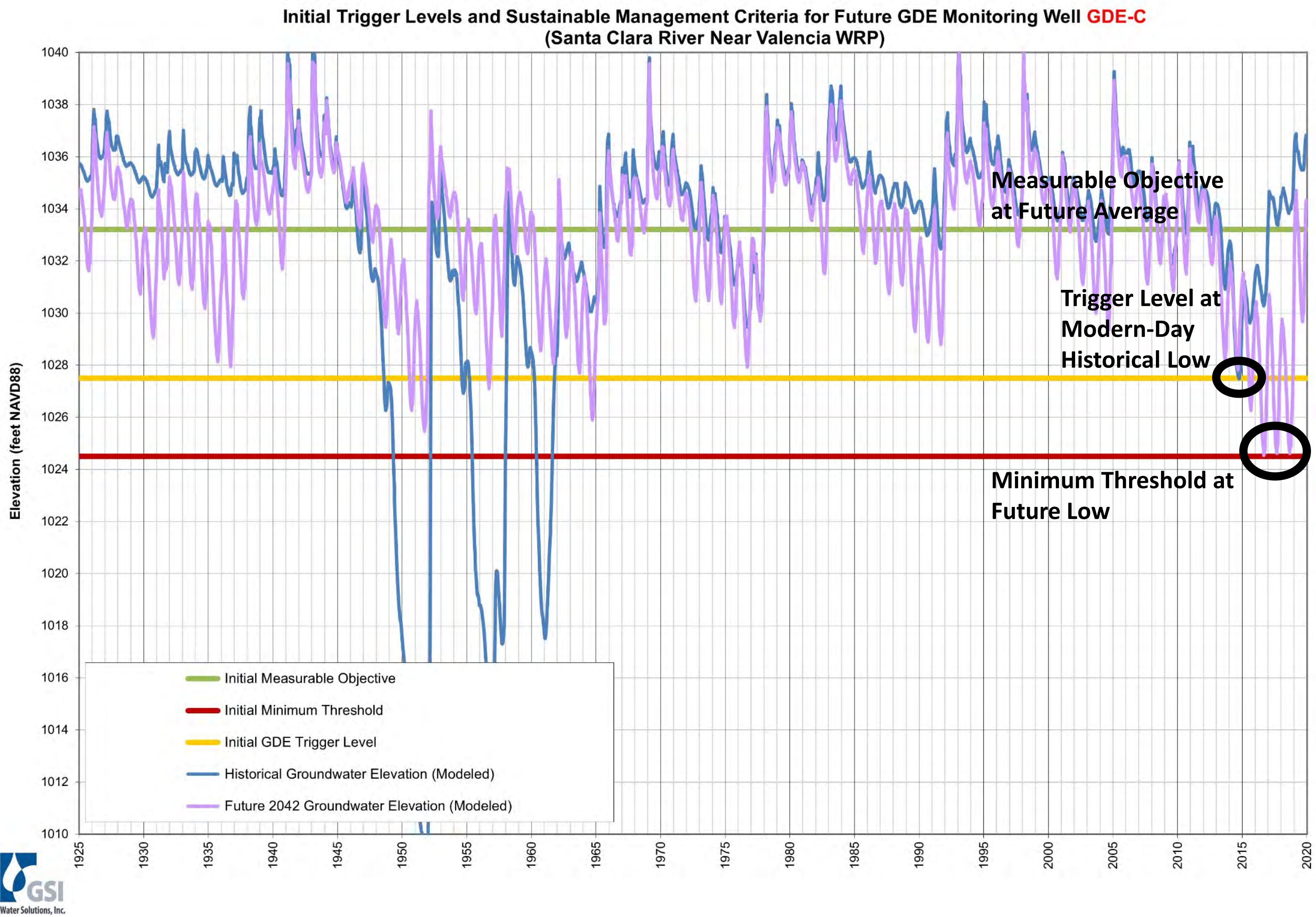


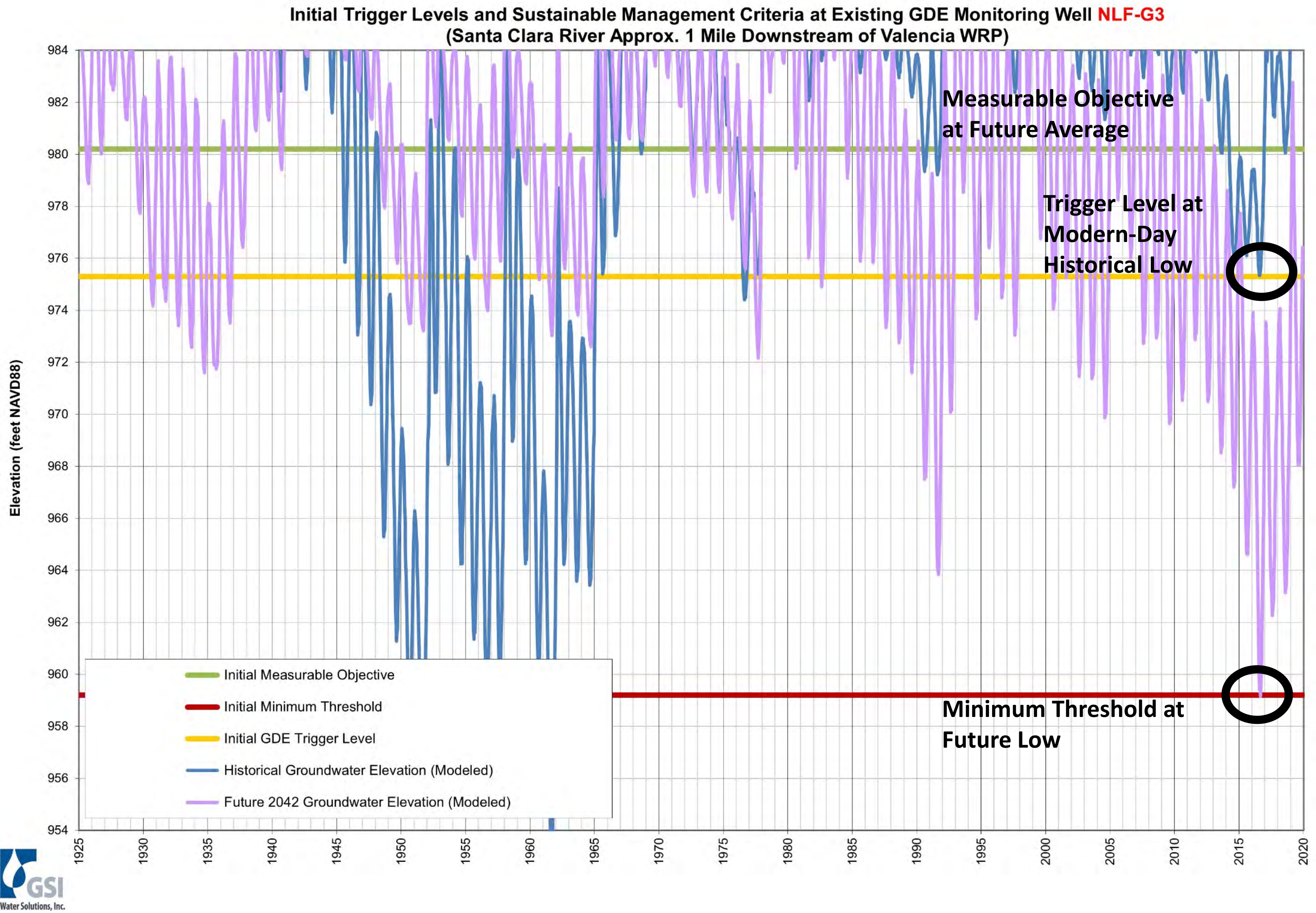
Initial Trigger Levels and Sustainable Management Criteria for Future GDE Monitoring Well GDE-A
(Santa Clara River Below the Mouth of Bouquet Canyon)
Elevation (feet NAVD88)
1125
1120
1115
1110
1105
1100
1095
1090
1085
1080
1075
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Measurable Objective at Future Average
Trigger Level 2 ft Above Modern-Day Historical Low
Minimum Threshold at Future Low
Initial Measurable Objective
Initial Minimum Threshold
Initial GDE Trigger Level
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
GSI Water Solutions, Inc.



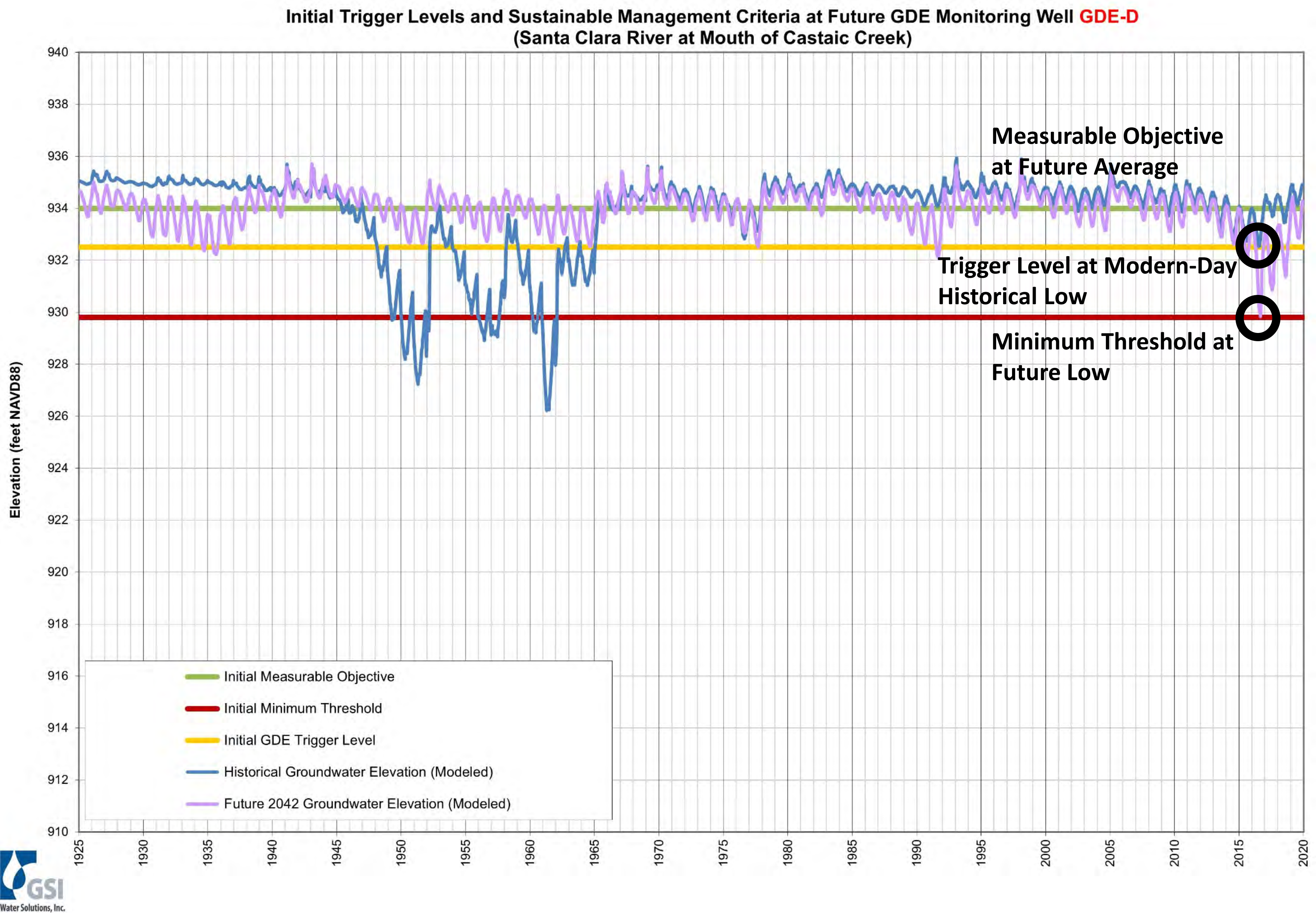
GSI Water Solutions, Inc.



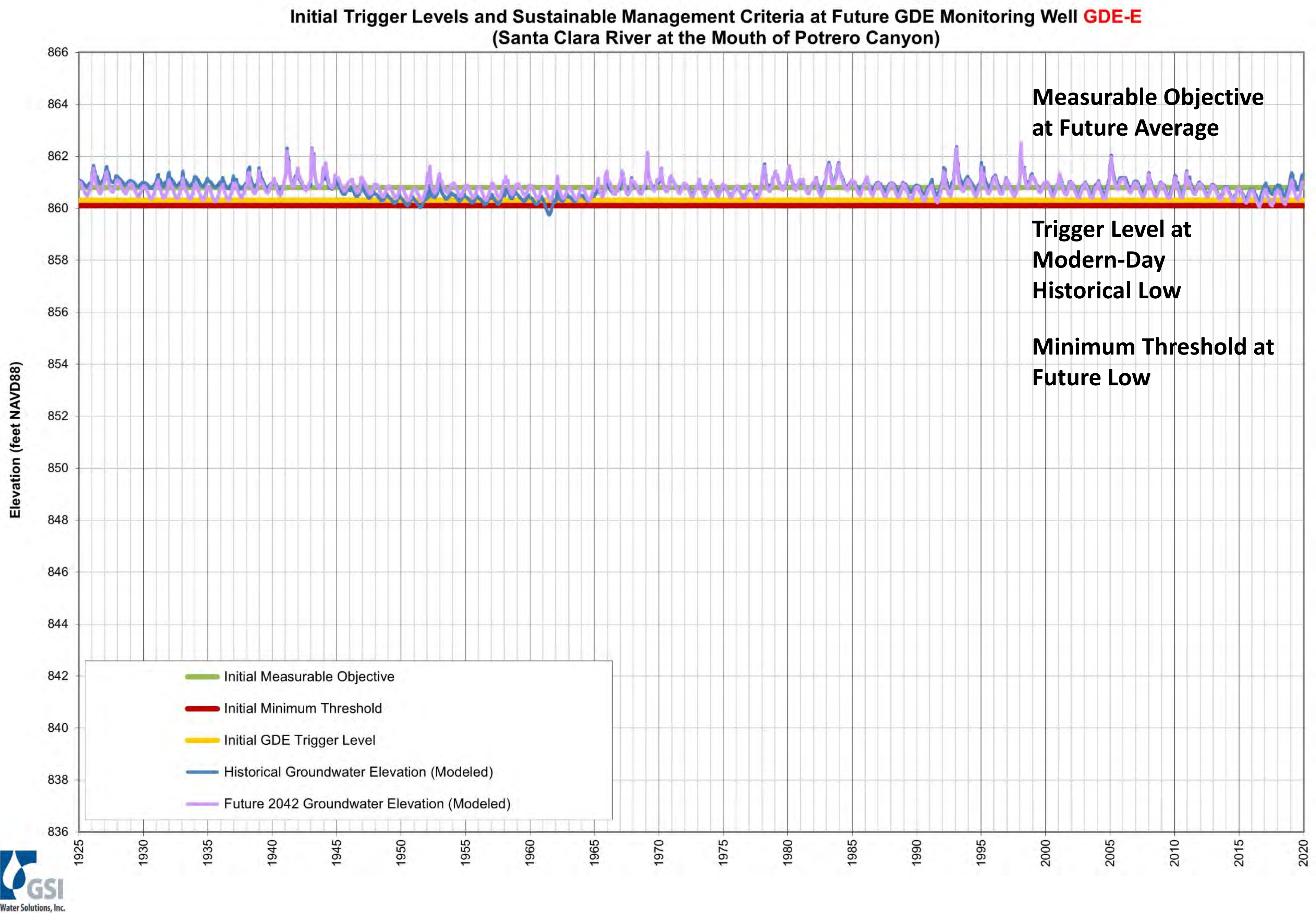
Initial Trigger Levels and Sustainable Management Criteria for Future GDE Monitoring Well GDE-C
(Santa Clara River Near Valencia WRP)
Elevation (feet NAVD88)
1040
1038
1036
1034
1032
1030
1028
1026
1024
1022
1020
1018
1016
1014
1012
1010
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Measurable Objective at Future Average
Trigger Level at Modern-Day Historical Low
Minimum Threshold at Future Low
Initial Measurable Objective
Initial Minimum Threshold
Initial GDE Trigger Level
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
GSI
Water Solutions, Inc.

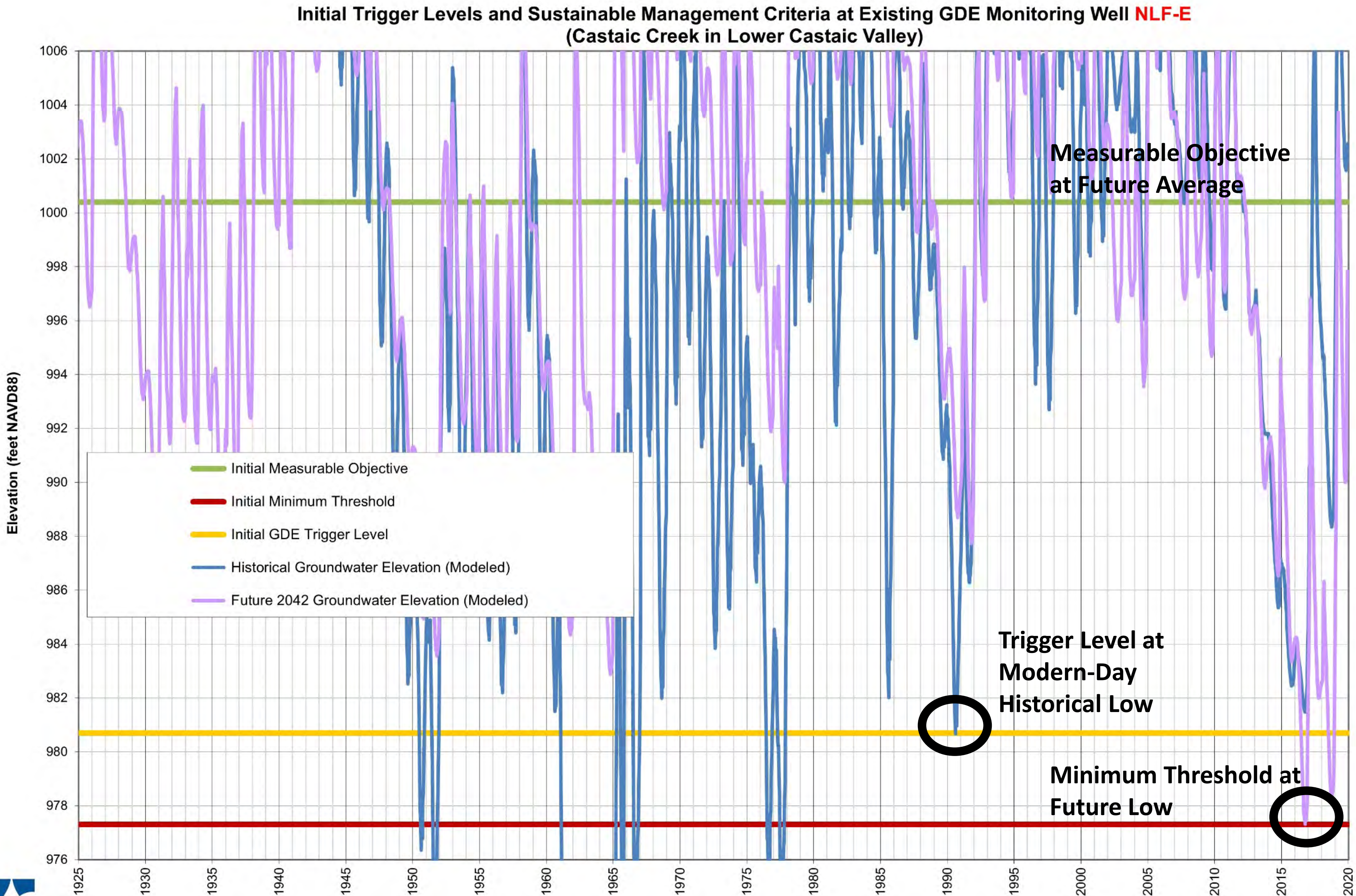


Initial Trigger Levels and Sustainable Management Criteria at Existing GDE Monitoring Well NLF-G3
(Santa Clara River Approx. 1 Mile Downstream of Valencia WRP)
Elevation (feet NAVD88)
984
982
980
978
976
974
972
970
968
966
964
962
960
958
956
954
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Measurable Objective at Future Average
Trigger Level at Modern-Day Historical Low
Minimum Threshold at Future Low
Initial Measurable Objective
Initial Minimum Threshold
Initial GDE Trigger Level
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
GSI Water Solutions, Inc.



Initial Trigger Levels and Sustainable Management Criteria at Future GDE Monitoring Well GDE-D
(Santa Clara River at Mouth of Castaic Creek)
Elevation (feet NAVD88)
940
938
936
934
932
930
928
926
924
922
920
918
916
914
912
910
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Measurable Objective at Future Average
Trigger Level at Modern-Day Historical Low
Minimum Threshold at Future Low
Initial Measurable Objective
Initial Minimum Threshold
Initial GDE Trigger Level
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
GSI
Water Solutions, Inc.


Initial Trigger Levels and Sustainable Management Criteria at Future GDE Monitoring Well GDE-E
(Santa Clara River at the Mouth of Potrero Canyon)
Elevation (feet NAVD88)
866
864
862
860
858
856
854
852
850
848
846
844
842
840
838
836
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Measurable Objective at Future Average
Trigger Level at Modern-Day Historical Low
Minimum Threshold at Future Low
Initial Measurable Objective
Initial Minimum Threshold
Initial GDE Trigger Level
Historical Groundwater Elevation (Modeled)
Future 2042 Groundwater Elevation (Modeled)
GSI
Water Solutions, Inc.



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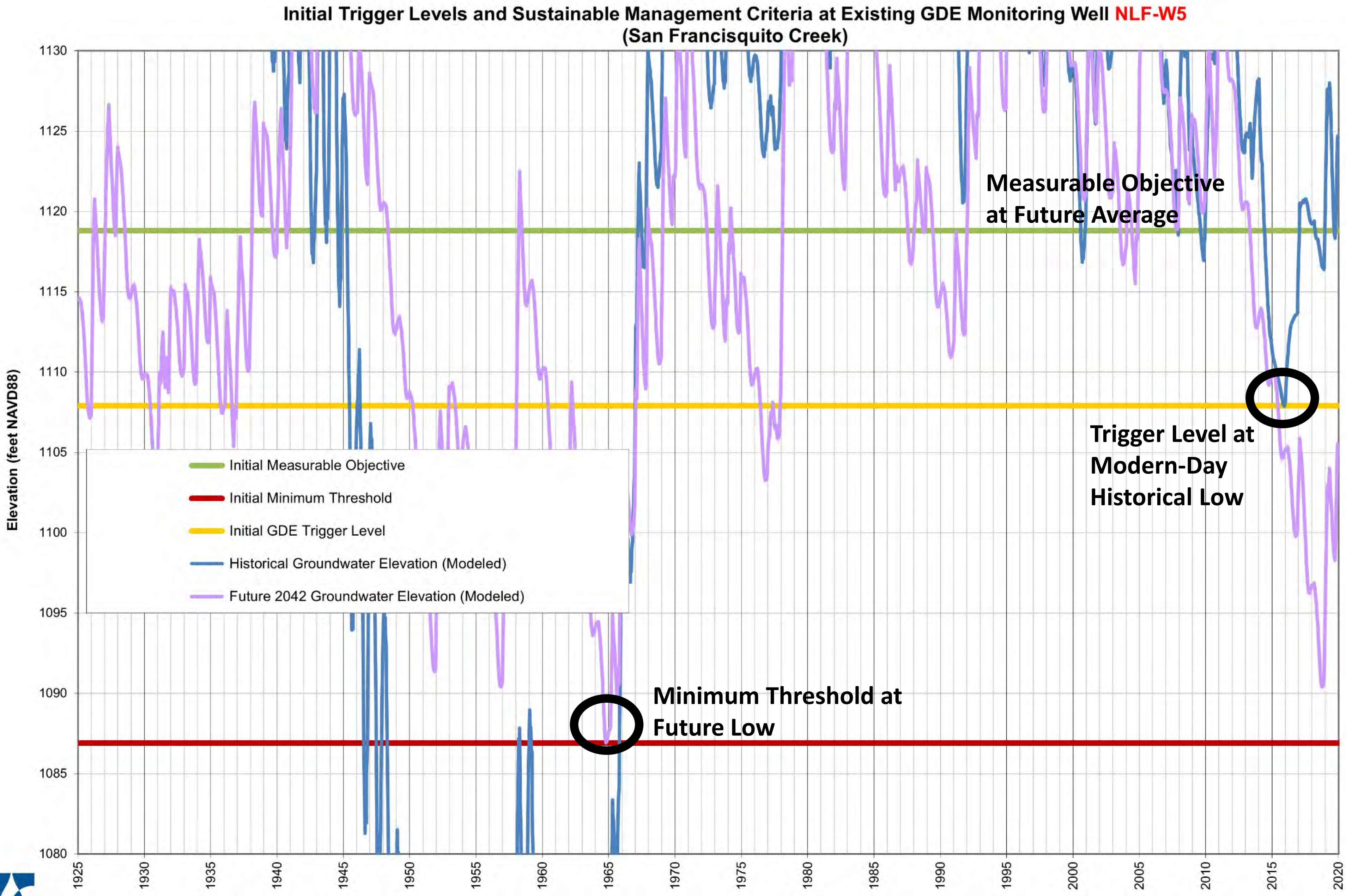

GSI Water Solutions, Inc.

APPENDIX N

Stakeholder Communication and Engagement Plan,
Prepared by CV Strategies

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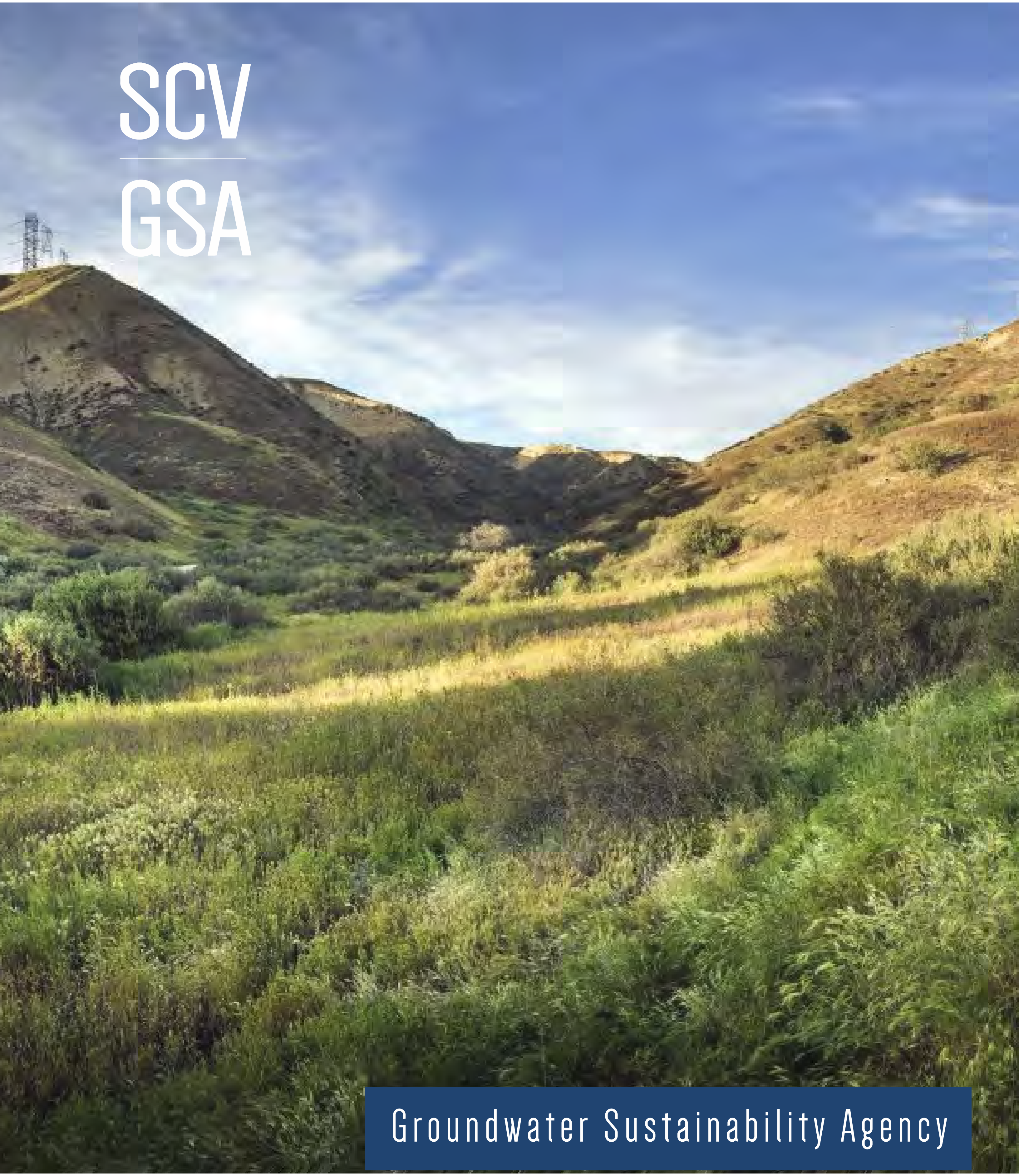


SCV GSA

Groundwater Sustainability Agency

Stakeholder Communication and Engagement Plan

Table of Contents

Figures

Glossary of Terms/Abbreviations

Abbreviations

Acronym/Term	Definition
DACs	Disadvantaged Communities
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
JPA	Joint Powers Agreement
SCV-GSA	Santa Clarita Valley Groundwater Sustainability Agency
SGMA	Sustainable Groundwater Management Act of 2014

Glossary

Aquifer - Underground layers of porous rock filled with water that can be brought to the surface through natural springs or by pumping.

Groundwater - The water beneath the earth's surface that completely fills gaps in rocks or sediment.

Groundwater basin - An aquifer or aquifer system bounded by one or more of the following features that limit groundwater flow: rocks, sediment, faults, streams or lakes.

Groundwater Sustainability Agency (GSA) – A Groundwater Sustainability Agency is charged with developing a plan to manage and protect local groundwater resources under the Sustainable Groundwater Management Act.

Groundwater Sustainability Plan (GSP) – A Groundwater Sustainability Plan is a blueprint for how a groundwater basin will reach long-term sustainability.

Joint Powers Agreement (JPA) – A JPA is a legal agreement between two or more public agencies that share a common power and want to jointly implement programs, build facilities, or deliver services. The Santa Clarita Valley Groundwater Sustainability Agency is a JPA.

Overdraft – Overdraft occurs when, over a period of years, more water is pumped from a groundwater basin than is replaced from rainfall, runoff and other sources.

Overpumping – Sustained groundwater pumping that produces declines in basin water levels and storage capacity and can cause the land above to sink, or subside.

Recharge – When surface water percolates into the aquifer below. Natural recharge involves rain and snow melt; artificial recharge involves spreading water on the surface and letting it seep into the ground or using wells to put it back into the aquifer.

Sustainable Groundwater Management Act of 2014 (SGMA) – The Sustainable Groundwater Management Act of 2014 requires local water agencies and governments to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge.

Subbasin – A subbasin is a smaller unit within a groundwater basin that is created by geologic and hydrologic barriers; often used to manage water resources and adjudicated basins.

Introduction

This Stakeholder Communication and Engagement Plan details the methods and tactics for involving individuals and organizations who have a direct interest in management of the Santa Clara River Valley East Subbasin in the development of a Groundwater Sustainability Plan (GSP).

The GSP will be developed in accordance with the Sustainable Groundwater Management Act (SGMA) of 2014, which provides local water agencies with a framework for balancing levels of groundwater pumping and recharge while empowering them to adopt groundwater management plans that are tailored to the resources and needs of their communities.

The Santa Clarita Valley Groundwater Sustainability Agency (SCV-GSA) is responsible for development of the GSP. The SCV-GSA was formed in 2017 and is comprised of four agencies: Santa Clarita Valley Water Agency, City of Santa Clarita, County of Los Angeles Planning, and Los Angeles County Waterworks District No. 36.

Under SGMA, a critical part of the GPS development is communication with and involvement of the public and stakeholders, including private citizens, well owners, community organizations, environmental groups, tribal communities and anyone with an interest in the prudent management of groundwater resources. Participation from a variety of stakeholders will help SCV-GSA make decisions that consider varying needs and interests in the Santa Clara River Valley East Subbasin.

This document highlights opportunities for engagement, including formation of a Stakeholder Advisory Committee, and specifies the decision-making process, key messages and schedule for accomplishing communication outreach tasks.

Background on Santa Clarita Valley GSA

The Santa Clarita Valley Groundwater Sustainability Agency (SCV-GSA) is responsible for sustainably managing groundwater in the Santa Clara River Valley East Subbasin. The subbasin is primarily located in the Santa Clarita Valley. Its western limit is near the Los Angeles-Ventura County Line and its eastern limit is generally along Highway 14. It includes the neighborhoods of Castaic, Stevenson Ranch, Valencia, Newhall, Saugus and Canyon Country.

In the Santa Clarita Valley, about half of the water supply is produced by local groundwater. Sustainable groundwater management is essential to a reliable and resilient water system. Effective groundwater management will provide a buffer against drought and climate change and contribute to reliable water supplies regardless of weather patterns.

The GSA was initially governed through a Memorandum of Understanding (MOU) signed by its four member agencies in 2017. A more comprehensive Joint Powers Agreement was approved in September 2018. The Joint Powers Agreement will provide streamlined governance for the SCV-GSA by clarifying member financial contributions and administration.

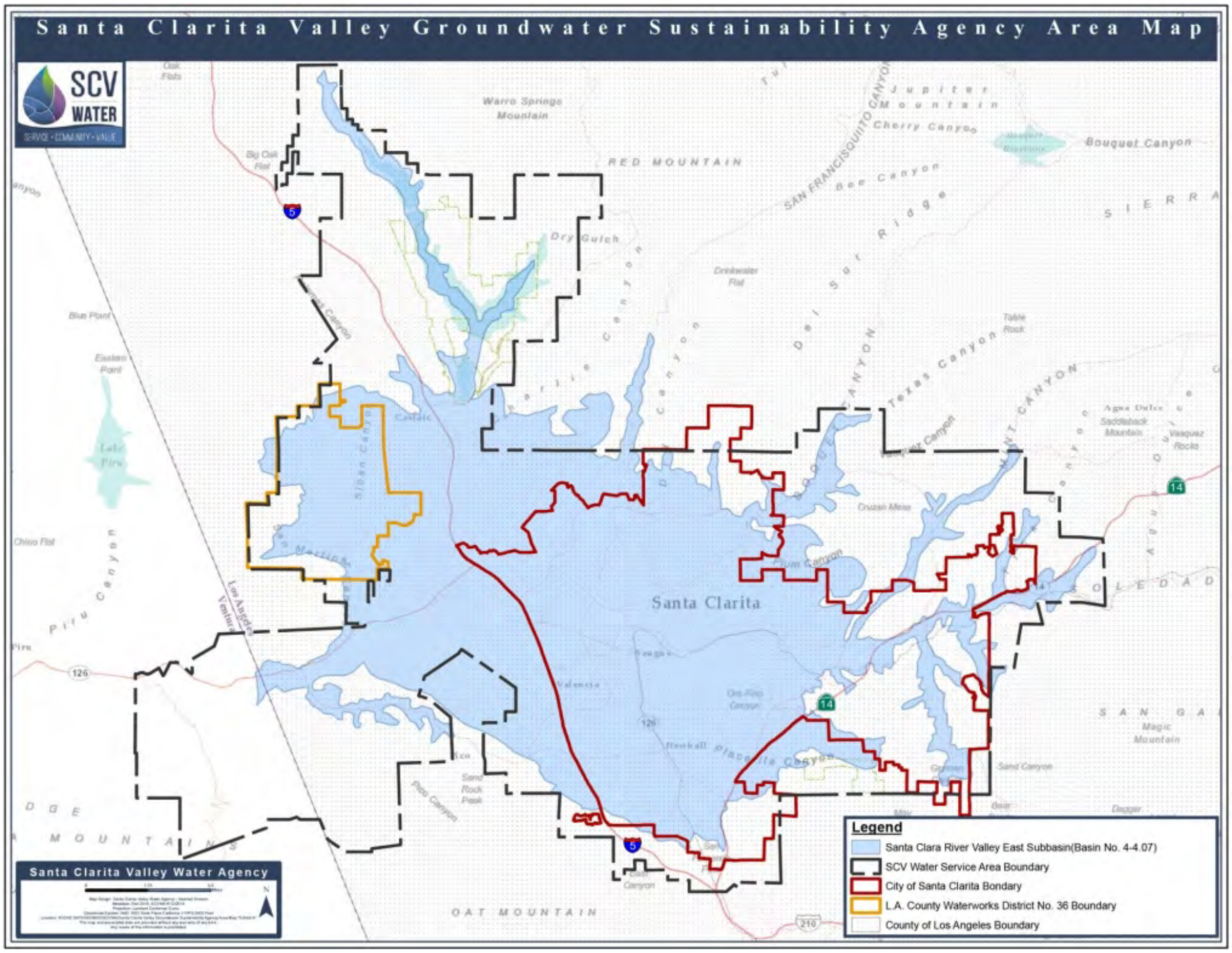
The SCV-GSA is responsible for developing a Groundwater Sustainability Plan (GSP). To do so, they may adopt rules, regulations and ordinances, conduct groundwater investigations, require registration, metering and extraction reports from individual wells, and assess fees to support creation and implementation of the GSP.

SCV-GSA Decision Making Process

The SCV-GSA is comprised of Santa Clarita Valley Water Agency, City of Santa Clarita, County of Los Angeles Planning, and Los Angeles County Waterworks District No. 36. Overall direction, funding, and approval for the groundwater sustainability planning process and work products is provided by the governing board of the SCV-GSA. The final Groundwater Sustainability Plan will be adopted by the elected governing body. Meetings of the Board of Directors will be noticed and open to the public.

Levels of Engagement & Decision Making

Figure 1: SCV-GSA Jurisdiction and Basin Boundaries



Background on Groundwater Sustainability Plans

The Sustainable Groundwater Management Act (SGMA) of 2014 is a comprehensive package of three bills (AB 1739, SB1168 and SB 1319) passed in the state of California. The SGMA provides local water agencies with a framework for sustainable management of groundwater resources, while empowering them to adopt groundwater management plans that are tailored to the resources and needs of their communities.

The SGMA requires agencies to bring groundwater basins into balanced levels of pumping and recharge through development of the GSP. The GSP will be developed by January 2022. The goal is to achieve sustainability within 20 years.

A review of long-term hydrograph data indicates the Santa Clara River Valley East Subbasin is not in overdraft. The GSP will consider various plans and management actions to ensure sustainability is maintained over the long term. The GSP will consider various groundwater supply scenarios and recharge sources that can help the GSA best manage the basin for sustainability.

Purpose of the Document

Importance of Public or Stakeholder Engagement

Public and stakeholder communication is a vital part of the GSP development process. The SCV-GSA will communicate with interested individuals and organizations (stakeholders) in order to share information and obtain input on GSP development. This will include, but is not limited to private citizens, well owners, community organizations, environmental groups, tribal communities and anyone with an interest in the prudent management of groundwater resources.

Participation from a variety of stakeholders will help SCV-GSA make decisions that consider varying needs and interests in the Santa Clara River Valley East Subbasin.

SGMA Requirements

The SGMA requires that the GSA encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin. To do so, the SGMA sets out numerous public notice requirements for both local GSAs and the state. These requirements include:

- Public notice and hearing before establishing a GSA, adopting or amending a Groundwater Sustainability Plan (GSP), or imposing or increasing a fee.
- Creation and use of an interested persons list for the subbasin or GSA.
- Participation of federally recognized Indian Tribes sharing the interest of the sustainability of the groundwater agency (if tribes choose to participate).
- Development of a written statement describing the manner in which interested parties may participate in the development and implementation of the GSP.

The SGMA requires that GSAs consider the interests of all beneficial uses and users of groundwater throughout the GSA and GSP development process. In addition, GSP Regulations (Section 354.10) require a communications section to include the following:

- An explanation of the Agency’s (GSA’s) decision-making process.
- Identification of opportunities for public engagement and a discussion of how public input and response will be used.
- A description of how the Agency (GSA) encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.

- The method the Agency (GSA) shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.

Key Messages

1. *Our mission is to sustainably manage and protect the Santa Clara River Valley East Subbasin.*
    - The Sustainable Groundwater Management Act (SGMA) of 2014 established new requirements for groundwater management across California.
    - The Santa Clarita Valley Groundwater Sustainability Agency was formed with the City of Santa Clarita, Los Angeles County, Water Works District 36 (Val Verde) and SCV Water.
    - We are working pro-actively to form a plan that will meet anticipated state requirements.
    - The SCV-GSA will develop a Groundwater Sustainability Plan (GSP) by January 2022.
    - The goal of the GSP is to achieve sustainable groundwater management within 20 years.
    - About half of the water supply in the Santa Clarita Valley comes from local groundwater.
    - Member agencies of the SCV-GSA have carefully planned and invested to ensure adequate water supplies exist to meet water demand in the Santa Clarita Valley.

2. *SCV-GSA is committed to working with stakeholders using an open and transparent communication and engagement process.*
    - The SCV-GSA will create opportunities for stakeholders to become involved in problem-solving and decision-making.
    - We will weigh a variety of perspectives, listen to each other's views and manage differences.
    - Proactive outreach and engagement with all interested parties is essential to achieving a sustainable groundwater management plan.
    - We will consider effects of the plan on all stakeholder groups, including those with water rights, public water systems, local land use planning agencies, environmental users, surface water users, federal government, tribes and disadvantaged communities.
    - A Stakeholder Advisory Committee comprised of water users and business and environmental interests will be formed to provide the GSA with insight, support and expertise on various social, cultural and economic issues.

3. *Balance – of the water flowing into and out of the system and of public input and interests – is essential for developing an effective groundwater sustainability plan.*
    - As part of our work, we will establish how much water can safely be extracted from the subbasin on an annual basis.
    - The local groundwater basin is a drought-proof water supply.
    - It is critical that over time, basin users avoid pumping out more water than can be replaced from rainfall, runoff and other sources. This condition, known as overdraft, depletes the supply and can exacerbate pollution, causing water quality issues.
    - Pumping out too much water from a basin can cause the land above to sink and wells to dry up, damage infrastructure, harm ecosystems, and lead to economic losses from an unreliable water supply.
    - Groundwater rights will be considered when allocating groundwater extraction limits under the GSP.
    - We will determine how much overdraft can be tolerated in the transition to a level of sustainable extraction while avoiding undesirable results.
    - The plan we develop will be tailored to the resources and needs of our communities.
    - We will strive to ensure the costs of groundwater pumping remain as low as possible while preserving and protecting the environment.

4. *Maintaining healthy groundwater levels is key to ensuring a sustainable future for the region.*
    - The GSA will identify any necessary programs to enhance water supply.
    - We will track compliance with the GSP and establish enforcement policies. Consequences for non-compliance may include fees, orders to stop pumping and civil penalties.
    - The plan will detail current and historical groundwater conditions in the basin, including any water quality issues that may affect the supply and beneficial uses of groundwater.
    - The GSP will consider various plans and management actions to ensure sustainability is maintained over the long term, including removal of invasive species.
    - Local groundwater costs less than imported water supplies and having it available ensures our community can grow and thrive.

Opportunities for Public Involvement and Engagement

SCV-GSA is committed to frequent, transparent communication with stakeholders and interested parties. The following opportunities outline the numerous ways SCV-GSA will work to engage the public and provide updates in a timely manner.

Meeting Opportunities

Opportunities for public comment are provided at all SCV-GSA Board meetings, advisory group meetings, Board-appointed committee meetings and workshops. Meetings are also an opportunity for stakeholders to stay informed on what is happening with the GSA and the GSP process.

Public Notices
Public notices will be sent out in compliance with SGMA requirements.

Board Meetings and Hearings
The SCV-GSA Board of Directors meets on the first Monday of January, April, July and October at 2:30 p.m. All meetings are open to the public. Meetings take place in the SCV Water Board Room located at 27234 Bouquet Canyon Road, Santa Clarita, CA 91350.

All agendas and meeting minutes from past meetings are available on the SCV-GSA website.

Public Workshops
Public meeting and workshop dates, times, locations and key information will be communicated in advance of each meeting.

Collaborative Opportunities

Stakeholder Groups

- Large Water Pumpers
- Medium Water Pumpers
- Small Water Pumpers
- Environmental Groups
- Businesses
- Residences
- Media
- SCV Water

- Los Angeles County
- L.A. County Waterworks District Number 36
- Local Cities

Stakeholder Advisory Committee
The SCV-GSA will create a Stakeholder Advisory Committee (SAC) made up of stakeholders and basin water users. Members of this group will provide meaningful insight, support and expertise from a variety of viewpoints for the SCV-GSA Board to consider.

The committee is strictly advisory and will not vote on Board items, but representatives will represent a number of social, cultural and economic backgrounds to gain the widest possible perspective.

Committee makeup
The SAC will be made up of the following groups:
2 representatives of small pumpers (2 acre-feet or less per year)
2 representatives of medium pumpers (Over 2 and up to 25 acre-feet per year)
2 representatives of large pumpers (More than 25 acre-feet per year)
2 representatives of the business community
2 representatives of environmental interests
2 members-at-large

The outreach consultant, CV Strategies, will work with SCV Water staff to identify potential committee members through local media, social media and email to the stakeholder list. It is expected that some stakeholder groups will have numerous applicants; the selected representative must reflect the greatest diversity of his or her group and be able to effectively communicate the group's opinions and feedback. The applicants within each stakeholder group will be responsible for selecting their representative to the committee.

CV Strategies will oversee facilitation of the SAC. Work includes selection of a chair person by committee members, review of topics, reporting input to the Board.

Accommodations will be made to ensure the SAC complies with the Brown Act, which may include staff assistance with agenda preparation, meeting minutes and reserving meeting space.

Communication with SCV-GSA

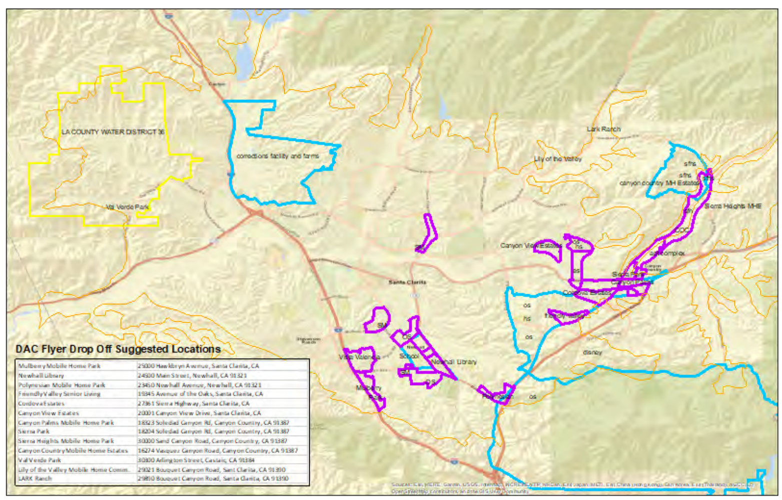
Opportunities for Tribal Communities
SCV-GSA will invite participation of federally recognized Indian Tribes sharing the interest of sustainability of the groundwater agency, as required by the SGMA, including the Fernandeño Tataviam Band of Mission Indians.

Opportunities for DAC Communities
As there are no specific Disadvantaged Communities (DACs) within the Santa Clara River Valley East Subbasin, SCV-GSA will continue its efforts to reach all stakeholders regardless of economic status, but will not be targeting a specific organization or group.

In addition to this broader outreach, a map of DACs was developed to identify areas of interest. Leveraging the map, CV Strategies crafted handouts announcing the draft plan and upcoming meetings. Handouts were left at the list of addresses below, located in or around the identified DAC areas.

DAC Handout Locations

1. Von's, 24160 Lyons Avenue
2. Newhall Library
3. Polynesian Mobile Home Park
4. Stater Bros, 26900 Sierra Hwy
5. Cordova Estates
6. Canyon View Estates
7. Canyon Palms Mobile Home Park
8. Sierra Heights Mobile Home Park
9. Canyon Country Mobile Home Estates
10. Val Verde Park
11. Lily of the Valley Mobile Home Comm.
12. LARK Ranch
13. Canyon Country Jo Anne Darcy Library
14. Bodhi Leaf, 26910 Sierra Hwy
15. Canyon Country Community Center, 18410 Sierra Hwy



Communication on Plan Implementation

The GSA intends to inform the public, including key stakeholder groups, about progress toward implementing the GSP, including monitoring results and the status of projects and actions. This information will be disseminated through several means, including the following:

- The GSA website.
- GSA Board meetings, where information will be presented, and the public will be invited to comment.
- Annual reports describing monitoring results and progress toward implementing the plan and meeting sustainability goals.
- GSP updates submitted to the California Department of Water Resources every 5 years. Basin stakeholders will be asked to review and comment on the update report.

In addition, the SCV-GSA will conduct public outreach and engagement throughout the implementation period to provide timely information to stakeholders about GSP implementation progress as well as monitored and modeled subbasin conditions.

To meet the requirements of SGMA, the GSA will communicate any potential changes in administration and management in a public process with stakeholders. The SCV-GSA website will be maintained as a communication tool for posting data, including reports, meeting information, technical updates, and data analyses. Other outreach will include: regular meetings; government-to-government communication; focused stakeholder briefings; paid and earned media coverage; press releases; periodic newsletters; and email blasts.

Additional Outreach Efforts

Media Outreach

- Press Releases
- Opinion/Editorials

Stakeholder Email List

Subscribers will continue receive news and updates about the GSA process and details about stakeholder forums. SCV-GSA will explore additional opportunities to grow the email subscription list and the type of information distributed.

Online Resources

- SCV-GSA website
- Basin border map

- Board meeting agendas and minutes

Collateral

- Fact sheets
- Infographics
- FAQS
- Videos

Conclusion

Public input is an important tool to support the work of the Santa Clarita Valley Groundwater Sustainability Agency and formation of a Groundwater Sustainability Plan for the Santa Clara River Valley East Subbasin.

This Plan will identify strategies for groundwater management that reflect local needs and conditions and prioritizes and preserves local control over water resources. The Plan will meet SGMA regulatory requirements by the January 31, 2020, deadline and provide direction for sustainable groundwater management within 20 years.

Stakeholder involvement and public outreach are critical to the successful development and implementation of the Plan. Including numerous voices and perspectives in the process will foster trust and support and ultimately result in reduced conflict and a better outcome.

By employing the strategies identified in this document, the SCV-GSA will include the public and stakeholders in formulating a plan that will ensure the long-term sustainability of locally managed groundwater resources in the Subbasin now and into the future.

For more information regarding the SCV-GSA and the GSP, please contact Kathie Martin at (661) 513-1265 or email kmartin@scvwa.org.

APPENDIX O

Summary of Public Comments and Responses on the Draft Groundwater Sustainability Plan

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ITEM NO.
3.2

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: July 6, 2020

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT Overview of SCV-GSA Groundwater Sustainability Plan Public Workshop held on June 17, 2020

SUMMARY:

The first public Groundwater Sustainability Workshop on hydrogeology was held virtually on June 17, 2020, with 68 participants. The event generated 19 questions/feedback and two feedback forms from attendees, which indicated the workshop presentation was well received. At the SAC meeting on June 24, members reviewed feedback on the presentation and the draft technical memos. They also, discussed participant questions that were asked at the workshop and how those will be developed into FAQs for the website.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
Based on input from the SAC at their June 10, 2020 meeting, the draft technical memo, presentation and collateral were developed to be less technical and more layperson-friendly.

Outreach
Extensive outreach was made prior to the workshop to draw attendance.

OUTLET	Impressions/ Engagement/Details
Facebook promo w/The Signal	9,108 reach/279 engagement
Facebook (agency profile)	1550
Instagram	7
Twitter	126
Constant Contact email	19,164 sent; 25% open rate (4,793)
GSA Website views (6/10-6/20)	566
*Press Release published:	The Signal
	SCV News
	KHTS
Print ad in The Signal	6/13 and 6/16 (17,541 circulation)
Digital ad on The Signal daily e-blast	7 days to list of 6,339 recipients

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop

<u>Workshop Feedback</u>

The public submitted the following feedback on the workshop presentation:

- Great presentation…I have read a lot of the old reports and this is a fabulous summary, very user friendly and interesting.
- I didn't understand the model being used to measure groundwater - inflow and outflow. Please explain that in more basic terms and more clearly next time.
- I think we are doing a good job. I liked the presentations. I hope some clarity and priorities based on data emerge as we go along.
- SAC members responding to questions as they are asked, in lieu of waiting for the hydrogeologists to get to the Q&A portion of the presentation.

As we saw how attendees use the chat feature in Zoom, it was the consensus of the SAC that staff should be the first line of response for simple questions that can be answered quickly in chat. For others, a standard response will be to acknowledge the question and that the presenter will respond at the end. SAC members may contribute to the conversation as they see fit. It was also decided that SAC members will identify themselves as such on their Zoom nametags by adding "-SAC" after their names.

The SAC also discussed the process for reviewing questions generated at the workshop. It was decided that the questions would be categorized into general topics such as subsidence, monitoring, infiltration, etc. for the purpose of developing FAQs to post on the SCV-GSA website. Under each topic, the question will be listed verbatim, along with the answer provided by the subject matter experts. The list will include the date the question was asked and a link to the workshop video in which they were asked and answered.

The questions from Public Workshop #1, Hydrogeological Conceptual Model, on June 17th are below:

- What does Sunshine Ranch member mean?
- What is the relationship between the aquifers and oil deposits in SCV?
- Why does the SWRCB differentiate groundwater and alluvial water and here they are called one in the same?
- Does "slower groundwater movement" in the Saugus Aquifer mean slower recharge rate?
- Where is the ag well in the Saugus that is not producing any longer?
- So, do we have some alluvium outside the bed and banks?
- What are ways that suburban environments like ours can improve infiltration of rainwater for groundwater recharge? Removal of concrete where appropriate? Use of more permeable surfaces?
- Is percolation diminished by encroachment into the floodway and floodplain?
- Why is there so much chlorine in our water, and why does everyone need a water softener?
- Is the increase in groundwater during 1992 period due to 100-year-storm?
- Are each pair of wells shown in these graphs representative of the data for all the wells?
- Do we have an estimate of the available water in the Saugus Formation?
- Wouldn't "Change in Storage" be somewhat theoretical since things are not continuously monitored (stream flow, surface infiltration, etc.)
- Are only two gauges adequate to measure subsidence all over the basin?

- Isn’t it correct to say it is regulated because we need to provide notice to customers for PFOS/PFOA?

General Groundwater Sustainability Plan Feedback
These were the comments received on the Groundwater Sustainability Plan:

- By ensuring the outputs don't exceed the inputs so groundwater levels don’t decrease, we can avoid subsidence, and the ecology of our area and other areas down the watershed from us are not affected.
- I would also like to see the agency add more monitoring stations for subsidence - two don't seem to be enough for such a large valley.
- I hope we continue to have sustainable groundwater IF the State keeps cutting back on statewide supplies. Locally I value the ability to have green areas along river and trees in our community, so it is a nice place to live.
- The presenter is saying there is no agricultural irrigation from the Saugus and Golden Oak Ranch is clearly drawing from the Saugus.

The SAC determined that Groundwater Sustainability Plan input will be taken into consideration by both the Stakeholder Advisory Committee and the SCV-GSA Board of Directors to make educated recommendations and decisions regarding the plan. Specific corrections of fact in draft technical memos will be addressed directly.

Post Workshop Response
We received two submissions through the website.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

That the SCV-GSA Board of Directors adopt the Stakeholder Advisory Committee recommendations noted above on the public workshop questions and Groundwater Sustainability Plan comments.

ITEM NO.
4.1

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: October 5, 2020

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT Overview of SCV-GSA Groundwater Sustainability Plan Public Workshop held on August 5, 2020

SUMMARY:

The public Groundwater Sustainability Workshop on local ecosystems and the groundwater/surface water connection was held virtually on August 5, 2020, with 54 participants. The event generated 18 questions/feedback and three feedback forms from attendees. In general, the workshop presentation was well received, and some feedback provided opportunities for improvement for future workshops.

At the SAC meeting on August 26, members reviewed feedback on the presentation and the draft technical memos.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
The SAC had minimal feedback at their pre-workshop meeting on July 22, 2020, and the draft technical memo, presentation and collateral were edited to reflect SAC revisions.

Outreach
Extensive outreach was made prior to the workshop to draw attendance.

OUTLET	Impressions/ Engagement/Details
Facebook promo w/The Signal	21,999 / 246
Facebook (agency profile)	257 / 7
Instagram	192 / 8
Twitter	195 / 3
Constant Contact email	18,830 sent; 26% open rate
GSA Website views (7/29 – 8/8)	282 users
*Press Release published:	The Signal
	SCV News
	KHTS
Print ad in The Signal	11,000 circulation (x2)
Digital ad on The Signal daily e-blast	594,129 impressions/263 click-throughs

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop
<u>Workshop Feedback</u>

At the recommendation of the SAC, all SAC members and SCV Water staff were identified in the public meeting virtual platform by adding their affiliation after their name.

In the debrief following the meeting, it was noted that one of the SAC's purpose is to provide detailed feedback on public workshop materials prior to the public workshop and assist the team in ensuring all materials are layperson friendly.

The following public feedback on the workshop presentation was received through an online feedback form on the workshop web page and through the online platform during the meeting:

- This was my first time attending a public presentation by the SCV Waterboard, and I joined the zoom wanting to understand the relationship between groundwater and surface water. However, from the very beginning it was very difficult to understand, and seemed more like a presentation for the people who already understood what was happening rather than for regular people to understand the water ecosystems for SCV.

- I thought displaying graphs for visual information was great. Can the presentations expand on why the graphs are collecting the data that they are collecting and what that entails for our water usage? I was also confounded by the acronyms and am curious if the Waterboard can provide a document with the definitions of those acronyms for the next time they are used.

- Is there anything that you didn't understand from today's presentation? If so, what was it? No, excellent.

- I'll let the public decide if they want more information about it, but I'd recommend that we explain it [SGMA] briefly at the start of each public workshop since it's a foundational piece of knowledge to all of this work.

The following questions were submitted by attendees during the Public Workshop #2, Local Ecosystems and the Groundwater/Surface Water Connection:

- How do we get data on those eastern wells? We now have that really good historical data from the wells near Interstate 5, but I know there used to be producing wells on the east side that are now not producing.

- How can we supplement the data collection process to get a better understanding of how the releases from Castaic Reservoir are affecting the well levels? This seems like an important piece of data to understand well for if/when we receive less surface water from the State Water Project.

- How do we get data from the eastern wells? There used to be producing wells (for the water company) and now they are not producing. I believe we asked for data and evaluation from the eastern side.

- How much will it cost to install those monitors that will improve the data collection? Is GSA planning to get them?

- Do the Bouquet reservoir releases have any effect?

- Can you please elaborate on the effect of groundwater remediation near Whittiker Bermite?

- Can you explain SGMA for the public who don't know what that means?

- I'll let the public decide if they want more information about it, but I'd recommend that we explain it briefly at the start of each public workshop since it's a foundational piece of knowledge to all of this work.

- Can you talk about what consideration was given to animal life that is dependent on the vegetation you identified as being groundwater dependent since we're talking about ecosystems?

- Will an archived version of this be online?

- You're stopping at number 7, but it's the upper watershed that we need the reporting on because it wasn't just the Newhall well field that went dry in the last drought. The center well went dry and another well up Bouquet that is a Santa Clarita Water District well went dry. So how do we get more information included in these reports? And go past number 7 and get that upper watershed reports included in this data?

- When are you going to release the water report from last year? Aren't they normally out in the Mayish timeframe?

- Is there anything that you didn't understand from today's presentation? If so, what was it? No, excellent.

- But how does all this connect to our sewage system?

- I'm wondering if SCV has grey water use policy, and where's it being implemented, and grey water being used? and what percentage of it overall in water use?

<u>General Groundwater Sustainability Plan Feedback</u>
These were the comments received on the Groundwater Sustainability Plan:

- East side of the river is NOT Always disconnected… We do get rain.

Next Steps
The staff and consultant team will review the submitted questions and identify those which should be added to the Frequently Asked Questions on the website. All questions are being archived for the record and will include a link to the location in the meeting when it was answered.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

That the SCV-GSA Board of Directors review and file the Outreach Report from the August 5, 2020 Workshop.

ITEM NO.
3.1

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: January 25, 2021

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT Overview of SCV-GSA Groundwater Sustainability Plan Public Workshop held on November 4, 2020

SUMMARY:

The public Groundwater Sustainability Workshop on Water Budgets was held virtually on November 4, 2020, with 47 participants. The event generated 14 questions/feedback and two feedback forms from attendees. In general, the workshop presentation was well received with little critique.

At the SAC meeting on November 18, members reviewed feedback on the presentation and the draft technical memos.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
The SAC provided feedback at their pre-workshop meeting on October 21, 2020, and the draft technical memo, presentation and collateral were edited to reflect SAC revisions.

Outreach
Extensive outreach was made prior to the workshop to draw attendance.

OUTLET	Impressions/ Engagement/Details
Facebook promo w/The Signal	
Facebook (agency profile)	2,393 Impressions 50 Engagements
Instagram	324 Impressions 9 Engagements
Twitter	376 Impressions 3 Engagements
Constant Contact email	Sent to 299. Open Rate 28.5%; Click rate 8%
GSA Website views (10/26-11/13)	244 Users
*Press Release published:	The Signal
	SCV News

	KHTS
Print ad in The Signal	11,000 (x2)
Digital ad on The Signal daily e-blast	99,041 impressions/48 clicks

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop
<u>Workshop Feedback</u>

With such a positive response, the debrief following the meeting was concise and offered insight for future workshops.

The following public feedback on the workshop presentation was received through an online feedback form on the workshop web page and through the online platform during the meeting:

- I enjoyed the workshop. The workshop delivered very technical material in an approachable and effective manner.

- This was a great presentation! I see that it is being recorded. Will it be available on the SCV GSA website?

The following questions were submitted by attendees during the Public Workshop #2, Local Ecosystems and the Groundwater/Surface Water Connection:

- If you have time to answer questions before I need to leave at 5pm, I'd love to know how we can expect sustainability after building those thousands of homes in Newhall Ranch. From the viewpoint of aquifers, that development truly scares me. And how will that water usage affect the neighboring farmers along 126 in Ventura County?

- Can the specific data sources you reference in the "Primary Information & Data Sources for Water Budget" slide be listed for those who want to refer to them?

- Don't we in SCV drawdown our GW (groundwater) at a faster rate than natural GW recharge?

- Have we EVER pumped 35K acre feet out of the Saugus Aquifer? CAN we pump that much, and what is the impact on the groundwater basin? I was recently reading Annual SCV Water Reports and I have never seen that we've ever pumped that much before. I really want to know what will happen to the GW Basin if we pump that much out of the Saugus Aquifer

- Is that 1.6M potable water "usable"?

- Does any of the pumping affect the soil in the basin?

- This graph makes it look like there is virtually no impact of climate change in 2030, and have we included the DWR climate change analysis to these models?

- Another effect would be that there would be less snowpack in the Sierras. Which would mean less water in the California Aqueduct.

- Does future build out (total development acres) a good analog for acreage of open space/natural habitat areas lost? How did/does the future water budget factor in loss of these open space/natural habitat areas?

- Do people get to pump groundwater out of their own yards? If so, is that a factor on the graphs shown?

- This question may be beyond the scope of this work. I'm curious if current or future pumping would reduce flow in streams that currently sustain wildlife or groundwater dependent ecosystems such as riparian vegetation and oak woodlands. Does your model account for flow to support ecosystems and wildlife while still meeting water demands?

- Building over land reduces seepage. If new developments continued, would that significantly affect the basin too?

General Groundwater Sustainability Plan Feedback

These were the comments received on the Groundwater Sustainability Plan:

- Yes. Can you please tell me if SCV-GSA is receiving public comments for the Draft Technical Report Memo? I would be happy to provide more information as to CDFW's role/responsibilities as a Trustee Agency in the context of GSP development across California. Please feel free to contact me.

- Here are questions that need to be added and addressed:
  1) What is the history of water flow on the east side of the Santa Clara River through Santa Clarita Valley?
  2) If there used to be surface water there (even minimal amounts), when did that change and why is it no longer there?
  3) Were there Groundwater Dependent Ecosystems there before (on the east side) that have disappeared and could they be restored with the proper attention?

Next Steps

The staff and consultant team will review the submitted questions and identify those which should be added to the Frequently Asked Questions on the website. All questions are be archived for the record and will include a link to the location in the meeting when it was answered.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

None.

ITEM NO.
3.1

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: March 25, 2021

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT Overview of SCV-GSA Groundwater Sustainability Plan Public Workshop held on March 10, 2021

SUMMARY:

The public Groundwater Sustainability Workshop on Sustainable Management Criteria was held virtually on March 10, 2021, with 51 participants. The event generated 6 questions/feedback and zero feedback forms from attendees. At this meeting, there were some concerns about Stakeholder Advisory Committee feedback not being included, which was addressed both quickly at the meeting and will be discussed in more detail at the March 24 Stakeholder Advisory Committee Meeting.

At the SAC meeting on March 24, members will have reviewed feedback on the presentation and the draft technical memos.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
The SAC had a series of four meetings between November and March to discuss the Sustainable Management Criteria. The first was a brainstorming workshop to discuss possible Sustainable Management Criteria. The next three were discussions of proposed Sustainable Management Criteria. After these meetings, text and graphic modifications were made to the presentation for the public workshop. The collateral received no feedback.

Outreach
Extensive outreach was made prior to the workshop to draw attendance.

OUTLET	Impressions/ Engagement/Details
Facebook promo w/The Signal	Reach: 3,432; Engagement: 189
Facebook (agency) – standard post Facebook (agency) – boosted post	233 Impressions; 12 Engagements 971 Impressions; 3 Engagements
Instagram	281 Impressions 7 Engagements

Twitter	234 Impressions 5 Engagements
Constant Contact email	3/3/21: GSA list of 308; 30% open rate 3/8/21: Water Currents Special Edition list of 18,000; 42% open rate
GSA Website views (3/01-3/14/21)	206 Users
*Press Release published:	The Signal
	SCV News
	KHTS
Print ad in The Signal	3/6 and 3/9/21: 12,500 subscribers (x2)
Digital banners on The Signal website	202,971 impressions/50 clicks

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop

The Public Workshop included commentary only from SAC members which was somewhat unexpected based on past workshops. We will look for SAC suggestions on this matter at its March 24, 2021 meeting. There were six total comments made by SAC members at the Public Workshop.

Workshop Feedback

The following questions/comments were submitted by attendees during the Public Workshop #5, Sustainable Management Criteria:

- During our committee meetings I recall discussions that these levels were set too low, but I do not see that any of our comments are reflected here. Or at least no changes were made. So are we just being told what the levels are to be, or is our input and concerns in planning process in the GSP going to be included in the final plan document? I would like to see those thresholds looked at again. Those levels were already reached in 2016 and there were impacts to GDE with oaks dying and tributaries drying up. Did anyone look at the survivability of amphibians in this region?

- Who is the peer review panel?

- If the trees are dying it’s much too late - need a trigger much sooner to prevent loss, why wait?

- So are we going to be told again what is happening or will our concerns be given any consideration?

- It's important to distinguish the difference between pumping impacts and natural conditions on the east end. The GSA is intended to address the former, not the latter.

- Are baselines open for adjustment when date becomes available from the east wells?

We’ve heard and discussed some of these comments more than one time in the past at other SAC meetings, and adjusted our future presentations accordingly and also made notations for clarifications in the future Sustainable Management Criteria documentation. We realize however that our communication on this matter back to the SAC in some cases hasn't been sufficient. We will open this issue up at the March 24, 2021 SAC meeting and convey in more detail how feedback has been considered so each SAC member is comfortable.

Next Steps
Staff and the consultant team have reviewed and addressed the questions/comments from the meeting. All questions/comments are being archived for the GSP and will be included in the final Public Comment report, accompanied by the way in which they were resolved. Depending on feedback from the SAC about the enhanced communication approach, we will continue this approach with the SAC until the GSP is completed.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

None currently, discussion and informational purposes.

ITEM NO.
3.2

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: July 12, 2021

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT Overview of SCV-GSA Groundwater Sustainability Plan - Projects and Management Actions Public Workshop held on June 2, 2021

SUMMARY:

The public Groundwater Sustainability Workshop on Projects and Management Actions was held virtually on June 2, 2021, with 34 participants. The event generated two questions/feedback and zero feedback forms from attendees. In general, the workshop presentation was well received, and staff addressed the two plan comments.

At the SAC debrief meeting on June 9, members reviewed feedback on the presentation and the draft technical memos.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
The SAC had minimal feedback at their pre-workshop meeting on May 19, 2021.

Outreach
Extensive outreach was made prior to the workshop to draw attendance.

OUTLET	Impressions/ Engagement/Details
Facebook promo w/The Signal	56,000
Facebook (agency profile)	93 reach/10 engagements
Instagram	208 impressions/2 engagements
Twitter	230 impressions/4 engagements
Constant Contact email	Twice to GSA list (308 contacts)
GSA Website views (6/1-6/16)	143 users / 557 page views
*Press Release published:	The Signal
	SCV News
	KHTS
Print ad in The Signal	12,000 print /300,000 digital readership
Digital ad on The Signal daily e-blast	250,000 impressions

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop
Workshop Feedback

At the recommendation of the SAC, all SAC members and SCV Water staff were identified in the public meeting virtual platform by adding their affiliation after their name.

The following questions were submitted by attendees during the Public Workshop: Projects and Management Actions:

- How does water input at the old Castaic school in the north constitute adding water on the east side?

General Groundwater Sustainability Plan Feedback
These were the comments received on the Groundwater Sustainability Plan:

- So, I continue to raise the flag that I think that the threshold levels are too low. How quickly can you make that change? If you are going down the road where everything is just copacetic? And then all of a sudden we hit the trigger? How quickly can you make that change?

Next Steps
The staff and consultant team will review the submitted questions and identify those which should be added to the Frequently Asked Questions on the website. All questions are being archived for the record and will include a link to the location in the meeting when it was answered.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

None.

ITEM NO.
5.1

Santa Clarita Valley
Groundwater Sustainability Agency
Board Memorandum

DATE: October 20, 2021

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT: Presentation Overview of SCV-GSA Draft Groundwater Sustainability Plan Public Workshop held on August 25, 2021

SUMMARY:

The public Groundwater Sustainability Workshop on Draft Groundwater Sustainability Plan was held virtually on August 25, 2021, with 38 participants. The event generated 10 questions/feedback and two feedback forms from attendees. In general, the workshop presentation was well received, and there was some final feedback for the staff.

At the SAC meeting on September 8, members reviewed feedback on the presentation and the Draft Groundwater Sustainability Plan.

DISCUSSION:

Stakeholder Advisory Committee Meeting Feedback
The SAC had minimal feedback at their pre-workshop meeting on August 3, 2021 but provided Draft GSP feedback through the online form provided and the GSP, presentation and collateral were edited to reflect SAC revisions.

Outreach
Extensive outreach for both the Public Workshop and the Draft GSP release date was made prior to the workshop to draw attendance and community feedback.

*The press release was sent to a distribution list of about 40 names, including local and regional media, SCV Chamber, VIA, water industry publications and more.

Public Workshop
<u>Workshop Feedback</u>

The following public feedback on the workshop presentation was received through an online feedback form on the workshop web page and through the online platform during the meeting:

Response 1 (September 17, 2021):

Do you now feel you have a better understanding of our regional geology? Yes

What are the primary considerations for responsible groundwater use and sustainability of our local groundwater resources? Landscape water usage

What do you see as the highest priority groundwater sustainability issue facing the agency? New housing projects

Do you have any other feedback or questions you would like to provide to us at this time? HOAs need to significantly reduce their landscape water usage. There should be a limit on the number of new swimming pools.

Response 2 (September 18, 2021):

Do you now feel you have a better understanding of our regional geology? Yes

What are the primary considerations for responsible groundwater use and sustainability of our local groundwater resources? Someone in city government has to have the guts to tell Sacramento that we will NOT build any more housing.

What do you see as the highest priority groundwater sustainability issue facing the agency? Housing

<u>Workshop Questions</u>
The following questions were submitted by attendees during the Public Workshop on the Draft GSP:

- Does subsidence from oil and gas extraction affect the groundwater levels in any way?
- What if there is no water to import because of drought conditions and everyone in the state is vying for the same paper water?
- Can you please clarify what would be considered "significant" in "significant degradation" with respect to undesirable results for ISWs?
- Have you been following the latest IPCC reports that are reporting the climate change is occurring at a more rapid rate - what is our plan B?
- Under the slide "Considerations When Triggers Are Reached", how will survivability be assessed with respect to this question: Will the vegetation and sensitive species survive the temporary loss of access to groundwater?
- As the imported water supply is likely to see future restrictions due to climate change & drought, are city planning team members considering curtailing additional home building permits to limit ground water draw down? (This would be a preemptive action.)

<u>General Groundwater Sustainability Plan Feedback</u>
These were the comments received on the Groundwater Sustainability Plan:

- Well, first, I want to state that I think that we have the water levels set too low. I think setting them at the historic lows is dangerous, because you're not allowing for any cushion.
- I think at this point, further water system connections are not advised - there should be a planning division group authorized to review to approve or not approve new connections. This is the only proper way to limit further municipal user draw down. Water level

monitoring / followed by management reaction will be too late to make changes after the long-term ground water levels decline.

- Great Job to everyone who created the plan!

- Thank you for the work and comments everyone!

Next Steps
All questions and comments are be archived for the record and will be included in the final feedback report.

FINANCIAL CONSIDERATIONS:

None.

RECOMMENDATION:

None.

ITEM NO.
4.2

Santa Clarita Valley Groundwater Sustainability Agency Board Memorandum

DATE: November 23, 2021

TO: SCV-GSA Board of Directors

FROM: SCV-GSA Staff

SUBJECT: Draft Responses to Public Comments of the SCV-GSA Draft Groundwater Sustainability Plan (GSP)

SUMMARY:

Preparation of the Groundwater Sustainability Plan (GSP) for the Santa Clara River East Subbasin is nearing completion. The final steps include consideration of public comments, additional outreach and public engagement efforts, a public workshop and adoption currently scheduled for January 3, 2022. This report summarizes the current status of these items.

DISCUSSION:

Response to Public Comments

The public draft GSP was distributed for a 60-day public comment period, ending October 15, 2021. A presentation of the Draft GSP was then provided to the Board October 20, 2021, when staff also summarized public comments received to date. While Staff provided some initial high-level responses, it recognized the need to undertake a thorough analysis in order to prepare potential modifications to the plan as well as prepare responses to those comments. The attachment shows the results of that analysis.

Ongoing Opportunities to Provide Input

While the 60-day public comment period on the GSP closed, additional opportunities remains for outreach and public engagement. Opportunities include but are not limited to, new special outreach to Disadvantaged Communities (DACs), and ongoing public outreach for GSA Board meetings.

Outreach efforts for today's meeting, as well as the public hearing scheduled for January 3, 2022, include the following:

- Social media posts (Facebook, Instagram and Twitter)
- Emails to the GSA contact list as well as the greater Agency distribution list (about 20,000 names)
- Update to the SCV-GSA website
- Digital and print ads with The Signal
- Printed handout delivered to businesses or communities within identified DACs.

FINANCIAL CONSIDERATIONS:

None at this time.

RECOMMENDATION:

That the Board of Directors consider the material provided by staff in this report and provide staff direction in preparation of the final draft to be considered for adoption at the January 3, 2022 Board meeting.

Attachment:
Draft Table of Public Comments and Proposed Responses

TNC et al. Comment Letter

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Identification of Key Beneficial Uses and Users	Disadvantaged Communities and Drinking Water Users	The GSP fails to identify and map the locations of DACs, and describe the size of each DAC population within the subbasin.	Describe and map the locations of DACs and provide the size of each DAC population. The DWR DAC mapping tool can be used for this purpose.	A map was prepared showing the DAC areas that are reflected in the DWR DAC mapping on-line tool compared to the subbasin area. The majority of the DAC areas lie completely within the subbasin with some others crossing the basin boundary. The map also shows the location of each DAC relative to the service area boundaries/locations for the two municipal water suppliers (SCV Water and LACWD). Text has been added to Section 3.4.2 of the GSP, along with a new map (Figure 3-6), to address this topic.
TNC et al.	Identification of Key Beneficial Uses and Users	Disadvantaged Communities and Drinking Water Users	The GSP provides a map of domestic well density in Figure 3-6, but fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the subbasin.	Include a map showing domestic well locations and average well depth across the subbasin.	Comment Noted. A new map has been added that shows the average well depth at various locations in the Basin.
TNC et al.	Identification of Key Beneficial Uses and Users	Disadvantaged Communities and Drinking Water Users	The GSP fails to identify the population dependent on groundwater as their source of drinking water in the subbasin. Specifics are not provided on how much each DAC community relies on a particular water supply (e.g., what percentage is supplied by groundwater).	Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems).	There are two unmapped DACs that the GSA knows of that are not listed on the DWR mapping tool website. These include the LARC Ranch and Lily of the Valley Mobile Home Park along Bouquet Canyon Road. GSA member agency, Santa Clarita Valley Water Agency, is currently working with the State and others to replace the private well water supply at these locations with an alternate municipal supply from SCV Water. Once these projects are completed, it is anticipated that all DAC areas within the subbasin will be serviced by SCV Water's municipal supply and that no DAC will rely on groundwater. Text has been added to Section 3.4.2 discussing this information.
TNC et al.	Identification of Key Beneficial Uses and Users	Interconnected Surface Waters	The GSP does not provide an overall map showing the interconnected and disconnected reaches.	In addition to the maps showing gaining and losing reaches, provide an additional map that shows interconnected and disconnected reaches. State clearly in the text that losing reaches do not equate to disconnected reaches.	Section 5.2 of the GSP discusses an evaluation of the interconnection between groundwater and surface water, including a discussion of where the river is gaining and loosing and where it is disconnected from the groundwater system. Details regarding the interconnection are also discussed in Section 5.3 and in Table 5-4.
TNC et al.	Identification of Key Beneficial Uses and Users	Groundwater Dependent Ecosystems	The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset) and other sources. However, we found that mapped features in the NC dataset were improperly disregarded. NC dataset polygons were incorrectly removed in areas adjacent to irrigated fields or in floodplains due to the presence of surface water. However, this removal criteria is flawed since GDEs, in addition to groundwater, can rely on multiple water sources – including flood flows or shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields – simultaneously and at different temporal/spatial scales. NC dataset polygons adjacent to irrigated land or in floodplains can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on this factor.	Use depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.	As described in Section 5.3, the TNC GDE identification method was used to identify potential GDEs in the watershed, including the steps of removing non GDE polygons from the dataset. The GSP appropriately reviewed and field verified GDE polygons. Some habitat inventoried in the public databases identify vegetation near golf courses and other man-made features where vegetation is supported by surface runoff rather than groundwater. These areas were field verified and removed from the GDE inventory. Upland vegetation and arroyo wash scrub were also removed. Furthermore, the GSP provides an extensive record of groundwater depth fluctuations over a prolonged hydrologic period. Depth to groundwater varies throughout the watershed seasonally and annually, and applying a universal baseline depth does not provide a reliable or accurate picture of where and when vegetation is supported by groundwater. Rather, the GSP uses field verified vegetation mapping to recognize where GDEs actually exist. This method is consistent with the TNC Guidance, and includes a map of "Potential GDEs" as recommended in the comment. When a 30-foot depth to groundwater filter is applied, some polygons are removed from the "potential GDE" map.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Identification of Key Beneficial Uses and Users	Groundwater Dependent Ecosystems	To analyze GDEs based on groundwater levels, the GSP states that (p. 5-95) "data is taken conservatively from modeled groundwater depths throughout the Basin in the late dry season (September) during a wet year (2011)." We recommend using groundwater data from multiple seasons and water year types to determine the range of depth to groundwater around NC dataset polygons.	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 digital elevation model (DEM) to estimate depth-to-groundwater contours across the landscape.	Depth to groundwater dynamically changes seasonally and annually responding to precipitation patterns. The GSP includes water level elevation contour maps and water level hydrographs that were used to identify GDEs. Groundwater elevations vary significantly depending on season and year type. Groundwater levels consistently decline through the summer months, so using the late October results is conservative when assessing lowest groundwater levels. Similarly, use of a wet year for estimating groundwater levels relative to potential GDEs provides for a conservatively high groundwater level and ensures that GDEs are not removed from the inventory due to periods of low groundwater levels. The high groundwater elevation contours were compared to ground surface elevations to determine where groundwater is or has been within 30 feet of ground surface. These areas were then compared to the potential GDE mapping to generate the GDE distribution map shown on Figure 5-60.
TNC et al.	Identification of Key Beneficial Uses and Users	Groundwater Dependent Ecosystems	Table 5-6 presents the locations and the historical low groundwater levels of GDE monitoring wells (GDE-A through GDE-E). However, on Figure 7-14 (Section 7.3.8.2), wells GDE-A through GDE-E are labeled "New Observation Well (to be constructed)".	Clear up the conflicting information in the GSP about GDE monitoring wells (GDE-A through GDE-E). Table 5-6 presents the locations and the historical low groundwater levels of these wells. However, Figure 7-14 (Section 7.3.8.2) labels wells GDE-A through GDE-E as "New Observation Well (to be constructed)".	Monitoring wells GDE-A through GDE-E had not been constructed at the time the draft went out. They are being constructed at the present time. The historical water levels shown for these well locations are predicted water levels for the historical period using the calibrated groundwater flow model. We used these predicted levels to select interim triggers and minimum thresholds and plan to revise them after we have collected sufficient water level data from the new wells. This will be accomplished by correlating the actual measured water levels with what the model predicts. We may modify the trigger levels once we have completed this correlation. The GSP describes this plan.
TNC et al.	Identification of Key Beneficial Uses and Users	Native Vegetation and Managed Wetlands	Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin.	State whether or not there are managed wetlands in the subbasin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.	The GSP identifies all the habitat in the watershed that is sustained or could be sustained by groundwater and there are no managed wetlands in the basin.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Engaging Stakeholders	Stakeholder Engagement during GSP Development	The opportunities for public involvement and engagement are described in very general terms. They include public notices, opportunities for public comments provided at GSA board meetings and hearings, and attendance at public workshops. There is no specific outreach described for DACs or domestic well owners, or a plan for public engagement during the GSP's implementation phase. The Communications & Engagement Plan does not include outreach and engagement that is specifically directed to environmental stakeholders during the GSP's development or implementation phases.	Include a more detailed and robust Communications & Engagement Plan that describes active and targeted outreach to engage DACs, domestic well owners, and environmental 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.	As outlined in the CEP, the Department of Water Resources Disadvantaged Community Mapping Tool was used to search for Disadvantaged Communities (DACs) in the basin, and it identified certain areas in the basin as meeting the definition of a DAC. Efforts are under way via the Proposition 1 Disadvantaged Community Involvement Program, locally led by the Upper Santa Clara River Integrated Regional Water Management Planning (USCR IRWM) group, to reach out to DACs in the basin. Though the outreach is not specific to the SCV-GSA, member agencies of the SCV-GSA are members of the USCR IRWM and use its stakeholder meetings to provide updates on the GSP development. The USCR IRWM also attends meetings of the Lower Santa Clara River IRWM (in Ventura County), and provides updates to its stakeholders on GSP development too. As described in the draft GSP, and further with text clarifications and mapping, the state mapped DAC communities overlie the municipal water system and, in some cases, open space or pasture. Two non-stated mapped DACs were identified in Bouquet Canyon that have had ongoing supply issues with their private wells, and a GSA member agency (SCV Water) is working with the state and others to bring in water supply to these locations. The GSA is not aware of State-mapped DAC impacts from lack of available groundwater as users (except for open space and pasture/farm) have a connection to safe potable water. Additional communication to state-mapped DACs has been made, as well as to non-state-mapped DACs to advise them of GSP development and Board meetings. During GSP implementation, additional DAC outreach will be conducted. Additionally, for the process of final review and adoption of the Draft GSP, printed information was delivered to businesses and communities located within the identified DACs. Section 11 of the GSP will be revised to include outreach for the plan implementation phase, and will further describe these efforts. Text also has been added to Section 3.4.2 of the GSP to discuss the locations of DACs.
TNC et al.	Considering Beneficial Uses and Users When Establishing SMCs and Analyzing Impacts on Beneficial Uses and Users	Disadvantaged Communities and Drinking Water Users	For chronic lowering of groundwater levels, the GSP does not analyze direct and indirect impacts on DACS or drinking water users when defining undesirable results, or evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders.	Describe direct and indirect impacts on DACs and drinking water users when defining undesirable results for chronic lowering of groundwater levels. Consider and evaluate the impacts of minimum thresholds and measurable objectives on DACs and drinking water users within the subbasin. Further describe the impact of reaching or passing the minimum threshold for these users. For example, provide the number of domestic wells that would be de-watered at the minimum threshold.	The GSP does not contain a specific discussion on undesirable results from chronic lowering of water level to DACs, or private well operators in general, because the GSPs evaluation of chronic lowering of water levels identifies that chronic lowering of water levels have not occurred historically, nor are chronic lowering of water levels foreseen in future groundwater model simulations that consider climate change. As stated elsewhere in this response, the GSA has found DACs, such as in key neighborhoods, receive municipal water supply, as opposed to water supply through individual domestic wells. A GSA member agency has initiated work to bring a water line up to two locations in Bouquet Canyon to provide an alternate water supply to two communities.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Considering Beneficial Uses and Users When Establishing SMCs and Analyzing Impacts on Beneficial Uses and Users	Disadvantaged Communities and Drinking Water Users	The GSP states (p. 8-30): "Minimum thresholds pertaining to salts and nutrients measured in groundwater are as follows: concentrations of TDS, chloride, nitrate, and sulfate that exceed WQOs and basin-wide assimilative capacity described in the 2016 SNMP in 20 percent of wells monitored in each management zone." The GSP states that no minimum thresholds have been established for contaminants because state regulatory agencies, including LARWQCB and DTSC, have the responsibility and authority to regulate and direct actions that address contamination. However, in addition to coordinating with water quality regulatory programs, SMCs should be established for all Constituents of Concern (COC) in the subbasin impacted by groundwater use and/or management. Naturally occurring COCs can be exacerbated as a result of groundwater use or groundwater management within the subbasin. For degraded water quality, the GSP only includes a very general discussion of impacts to DACs or drinking water users when defining undesirable results and evaluating the cumulative or indirect impacts of proposed minimum thresholds.	Describe direct and indirect impacts on DACs and drinking water users 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." Set minimum thresholds and measurable objectives for water quality constituents within the subbasin including naturally occurring constituents that can be exacerbated as a result of groundwater use or groundwater management. Ensure they align with drinking water standards. Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on DACs and drinking water users.	Domestic wells in the basin were identified based on DWR records (refer to Figure 3-6). LARC Ranch and Lily of the Valley Mobile Home Park are within identified DAC areas and presently utilize private wells. There are other private drinking water wells in many of the side canyons. The GSP recognizes a data gap in private well water quality (see Section 7); accordingly, during GSP implementation, efforts are planned to conduct outreach to private well owners to seek owner volunteers to allow water quality samples to be collected from their wells (as discussed in Section 11 of the GSP). The GSA would fund the laboratory analyses. Further, the GSP identifies that if monitoring data identifies MCL exceedances at private wells, an evaluation by the GSA would then take place. The evaluation may lead to coordination with regulatory agencies, and/or support in provision of alternate water supplies.
TNC et al.	Considering Beneficial Uses and Users When Establishing SMCs and Analyzing Impacts on Beneficial Uses and Users	Groundwater Dependent Ecosystems and Interconnected Surface Waters	The GSP states (p. 5-97): "The existing GDEs have been sustained through a recent drought (2012–2016) that resulted in historically low groundwater levels. Table 5-6 summarizes the historical lows recorded in several representative locations along the river corridor. Figure 5-61 identifies these locations. When groundwater levels are above these recorded temporary historical lows, it can be inferred that GDEs are not significantly and unreasonably affected." However, no evidence of GDE impacts during the 2012-2016 drought were provided. By assuming that GDEs can be sustained on historic low groundwater levels (or lower) and the subbasin 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.	When defining undesirable results for chronic lowering of groundwater levels, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates, alterations in fish spawning/rearing/migration) 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 in the subbasin. Defining undesirable results is the crucial first step before the minimum thresholds can be determined. When establishing SMC for the basin, please consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs should include "impacts on groundwater dependent ecosystems".	The GSP provides detailed description of the potential adverse effects of surface water depletion on GDEs. Appendix E of the GSP includes a technical memorandum outlining considerations of effects to GDEs, consistent with SGMA requirements. The GSP specifically and fully addresses potential effects to GDEs and outlines a robust monitoring program that includes action triggers and management actions to ensure adverse effects to GDEs are avoided.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Considering Beneficial Uses and Users When Establishing SMCs and Analyzing Impacts on Beneficial Uses and Users	Groundwater Dependent Ecosystems and Interconnected Surface Waters	Similarly, the GSP sets the minimum threshold for depletion of interconnected surface water as the surface water depletion caused by groundwater extraction as measured by groundwater levels falling below the lowest predicted future groundwater elevation measured at GDE-area monitoring wells. However, the true impacts to ecosystems under this scenario are not fully discussed in the GSP. The GSP does not explain how the chosen minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin, such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).	When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached. The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts to environmental beneficial users of surface and groundwater 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.	The GSP provides a comprehensive inventory of habitat types within the entire watershed that are dependent on groundwater. This includes instream aquatic habitats supporting fishes and amphibians. The GSP characterizes the dry summers and prolonged dry periods that are common historically in southern California. The eastern portion of the watershed is characterized by dry washes and arroyo-type vegetation. The GSP appropriately characterizes the semi-arid climate and inventories GDEs as the existing vegetation that is connected to groundwater (continually saturated zone) at any point. The GSP is not responsible for creating habitat in areas where natural hydrology could not sustain it. The GSP outlines a monitoring plan and trigger levels to ensure that management actions are implemented to prevent pumping-related impacts. As part of the process for establishing minimum thresholds for Interconnected Surface Water, trigger levels have been established above minimum thresholds that are intended to be protective of GDEs. If water levels approach trigger levels established at GDE monitoring wells, the GSP calls for conducting an evaluation of conditions to determine if impacts are likely and of so, implementation of management actions to protect GDEs if the water level trend is being driven by groundwater use.
TNC et al.	Climate Change	None	The GSP does incorporate climate change into the projected water budget using DWR change factors for 2030 and 2070. However, the GSP does 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 the inclusion of climate change into key inputs (e.g., precipitation and evaporation) of the projected water budget. However, climate change was not incorporated into surface water flow inputs. 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 and projected climate change effects on surface water flow volumes, 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.	Integrate climate change, including extremely wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions. Incorporate surface water flow inputs that are adjusted for climate change to the projected water budget. Incorporate climate change scenarios into projects and management actions.	Central tendency climate change factors provided by DWR were used for the projected future water budgets in accordance with DWR guidance. The SCVGSA may choose to evaluate more extreme climate conditions in the future. It is anticipated that the effects of climate change and extended drought will be described in each annual report and evaluated as part of the GSP update process every five years. The GSA will use this information to determine whether additional management actions are warranted if undesirable results are observed. The management actions and potential projects are intended to respond to undesirable results caused by groundwater use. If climate change causes groundwater use to cause undesirable results, the GSA may choose one of many projects and management actions described in the GSP to address the issue.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
TNC et al.	Data Gaps	None	The consideration of beneficial users when establishing monitoring networks is insufficient, due to lack of specific plans to increase the Representative Monitoring Sites (RMSs) in the monitoring network that represent water quality conditions and shallow groundwater elevations near DACs and domestic wells in the subbasin. Figure 7-10 (Representative Monitoring Well Network for the Alluvial Aquifer) shows that no monitoring wells are located across portions of the subbasin near DACs and domestic wells (see maps provided in Attachment E). The representative monitoring network fails to represent groundwater conditions for DACs in the subbasin near the town of Newhall. Beneficial users of groundwater may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network.	Provide maps that overlay current and proposed monitoring well locations with the locations of DACs and domestic wells to clearly identify potentially impacted areas. Increase the number of RMSs in the shallow aquifer across the subbasin as needed to adequately monitor all groundwater condition indicators. Prioritize proximity to DACs and drinking water users when identifying new RMSs.	The GSP includes implementation actions to expand the monitoring network to include domestic wells. As described in revisions to Section 3.4.2 of the GSP and elsewhere in this response to comments, significant work identifying DACs utilizing private wells has been conducted, and two non-state mapped DACs have been identified as needing an alternative water supply. A GSA member agency, SCV Water is working with the State and communities to bring in an alternate supply. The GSP has completed significant work in identifying DACs reliant on groundwater. During GSP implementation, outreach to DAC areas will be made again to determine if domestic wells are utilized, if so the GSA will seek volunteers to assist in the domestic well monitoring program in GSP implementation.
TNC et al.	Addressing Beneficial Users in Projects and Management Actions	None	The consideration of beneficial users when developing projects and management actions is insufficient, due to the failure to completely identify benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, and drinking water users. 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.	For DACs and domestic well owners, include 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. The GSP discusses managed aquifer recharge projects. Note that recharge ponds, reservoirs, and facilities for managed aquifer 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". Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.	The GSP describes a program to enroll private well operators in a program to collect water analyses from their wells at GSA expense. This will include specific outreach to known DACs utilizing private wells. As stated in the GSP, if private well monitoring data indicates MCL exceedance for contaminants is observed, the GSA will work with well operators and others to evaluate the cause. Further, the GSA will coordinate with State Regulatory Agencies as needed to understand the issue, and the GSA would also work with affected well owners to look at options for alternate water supplies. For these reasons, we believe that a drinking water well impact mitigation program is unnecessary. The GSP management actions already include climate change effects. In addition, any recharge project implemented in the future will consider multiple benefits.
TNC et al.	Consideration of Beneficial Uses and Users in GSP Development	None	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.	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.	Section 350.4 of the Regulations cites the human right to water as a general principle to consider in a GSP. The GSA interprets the human right to water as encompassing drinking water needs, especially for disadvantaged communities, and environmental beneficial uses and users. As discussed elsewhere in this response, the GSA has identified and engaged Disadvantaged Communities. These communities are largely served by municipal supply and not domestic wells. And as stated in the preceding response, the GSP provides for water quality monitoring for domestic wells, which may lead to evaluations and management actions in the future. Finally, the GSP provides for protection of environmental uses and users by establishing Sustainable Management Criteria for depletion of surface water and Groundwater-Dependent Ecosystems.

CDFW Comment Letter

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
CDFW	Monitoring Plan	Monitoring networks	SGMA regulations require monitoring networks to be developed to promote the collection of data sets with enough quality, frequency, and spatial distribution to characterize groundwater and related surface water conditions in the groundwater basin and to evaluate changing conditions that occur through implementation of the GSP (23 CCR § 354.34(b)). The Department is concerned that 1) the GSA may continue to use monitoring wells that do not provide meaningful data, and 2) the GSA may not replace monitoring wells that are abandoned because that well may not provide meaningful data (among other possible reasons). Relying on wells that do not provide meaningful data could result in an ineffective monitoring network. Also, not replacing wells that are decommissioned could result in the incremental loss of monitoring wells over time, reduction in density of monitoring sites, and loss of representative monitoring stations across the Basin to capture a range of GDE and ISW characteristics. In both instances, this could undermine the GSA's monitoring network. Specifically, this may affect GSA's ability to assess the effects of GSP implementation on GDEs and ISWs and avoid significant and unreasonable undesirable results on GDEs and ISWs resulting from groundwater extraction.	The Department recommends the GSA maintain a sufficient minimum number and density of monitoring wells that will inform evaluation of groundwater management impacts over time. This would provide effective monitoring of sustainability indicators related to groundwater extraction. The GSP should provide a minimum number and density of representative monitoring wells within the Basin, each Study Reach, and GDE area. The GSP should provide adequate scientific rationale for the chosen number and density of monitoring wells. Monitoring wells should be provided at a sufficient density required to demonstrate short-term, seasonal, and long-term trends on a scale meaningful to fish and wildlife and groundwater dependent habitats. The Department recommends the GSA replace wells that do not provide meaningful data and in general, any wells that may be decommissioned, in order maintain an effective monitoring network. The GSP should provide information, general guidelines, and standards as to how the GSA would decide that a well should be abandoned or decommissioned (e.g., a well that does not provide meaningful data). The GSP should also identify when and how the GSA proposes to replace those wells to maintain the minimum number and density of representative monitoring wells within the Basin, each Study Reach, and GDE area.	Section 7.3 discusses the monitoring program requirements and adequacy of the monitoring program including distribution of monitoring wells and recommendations for improving the monitoring program. This monitoring program review will be conducted on an ongoing basis. If it is determined that any monitoring well included in the program is not providing meaningful data, replacement wells will be identified and included in the program. Special GDE monitoring wells are being installed in each reach of the identified GDE area.
CDFW	Monitoring Plan	Monitoring networks	According to Table 8.6 on page 8-45, monitoring wells NLF-W5, GDE-A, and NLF-E may not be within a GDE area. The Department is concerned that installing monitoring wells where wells may not be within a GDE area could be ineffective for the GSA to assess the effects of GSP implementation on GDEs and ISWs over time. Furthermore, locating wells outside of GDEs could be ineffective for the GSA to adequately avoid significant and unreasonable undesirable results on GDEs and ISWs resulting from groundwater extraction.	The Department recommends the GSA install monitoring wells at locations that would be effective to assess the effects of GSP implementation on GDEs and ISWs. Also, the GSP should propose alternative locations for wells NLF-W5, GDE-A, and NLF-E given that these three wells may not be within a GDE area.	Special GDE monitoring wells are being installed in each reach of the identified GDE area. All of the proposed and existing GDE monitoring wells are within or very close to the GDE area as shown in Figure 7-14.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
CDFW	Sustainable Management Criteria	Groundwater Dependent Ecosystems	Section 8.11.1 describes conditions that could lead to undesirable results with respect to GDEs and ISWs. In the February 2021 draft Technical Memo for Sustainable Management Criteria (Memo), the Memo states that the following condition may lead to an undesirable result: "reduction in the quantity of treated wastewater being discharged to the river that reduces river flow and recharge to the Alluvial Aquifer and Saugus Formation." Causes of groundwater conditions that could lead to undesirable results should be described in a GSP (23 CCR § 354.26(b)(1)). A reduction in wastewater discharge from the Saugus and Valencia wastewater reclamation plants (WRPs) was not included in the GSP under Section 8.11.1 as a condition that could lead to undesirable results. A reduction in wastewater discharge could lead to undesirable results on groundwater conditions and GDEs considering that wastewater discharge contributes to the groundwater recharge of the Alluvial Aquifer and supports riparian vegetation1. A reduction in discharge from those WRPs combined with groundwater pumping could result in significant impacts and unreasonable undesirable results on GDEs.	The Department recommends that Section 8.11.1 of the GSP indicate that undesirable results may occur from a reduction in wastewater discharge. Identifying this future project will help the GSA to identify adaptive management actions to avoid undesirable results. If the GSP omits this future project as a potential cause to a condition that could lead to undesirable results, the Department recommends the GSP provide a rationale for why the GSA has decided to omit wastewater discharge from WRPs as a condition that could lead to undesirable results.	We agree that a reduction of the quantity of treated wastewater being discharged to the river could reduce river flow and recharge to the alluvial aquifer and Saugus Formation. Any significant reduction could potentially result in undesirable results. Section 8.11.1 will be revised accordingly. The GSA has no authority over WRP discharges and is not responsible for effects caused by WRP discharge reductions. However, if WRP reductions reduce groundwater levels in areas that support GDEs, the GSP's groundwater monitoring network would detect the change relative to trigger levels established at GDE monitoring wells so that the GSA can determine if this change results in undesirable results. If groundwater levels drop to historic lows influenced by groundwater pumping, the GSP would evaluate the effects and impose management actions needed to sustain GDEs.
CDFW	Projects and Management Actions	Groundwater Dependent Ecosystems	Section 9.5.5 describes evaluation and reporting processes to determine whether lowered groundwater levels and surface water depletion are a result of pumping that could result in a significant and unreasonable effect on GDEs. While the Department concurs with the actions described in the evaluation and reporting processes, the Department is concerned that those processes without a reasonable timetable could result in a delayed determination that GDE action triggers have been reached. Moreover, those processes without a reasonable timetable could result in a delayed implementation of management actions to avoid significant and unreasonable undesirable results on GDEs and ISWs.	The Department recommends that the GSA, to the extent feasible, provide a reasonable timetable for initiation and completion for achieving each of the following processes: data and information collection; evaluation report; presentation to GSA Board; and implementation of management actions if GDE action triggers are reached.	We concur that the evaluation and management actions must be timely. This concern will be discussed at the Nov. 23 GSA Board meeting. Modifications to the text that address the timing issue will be made in Section 9.5.5.
CDFW	Plan Area	Figure 3-3	The Department holds over 800 acres of conservation easements within the Santa Clara River Valley East Groundwater Subbasin/Santa Clarita Watershed. These 800 acres are located east of the I-5 bridge. The Department also holds Conservation Easements or other recording instruments west of the I-5 bridge.	The Department recommends the GSA contact the Department to obtain this information to be included into the final GSP. For example, all Department-owned conservation easements and/or recording instruments should be reflected in Figure 3-3 showing federal, State, and county jurisdictions/land ownership in the Basin.	The GSP has established a monitoring program to assess effects of pumping on GDEs, irrespective of ownership or easement overlays. The inclusion of a land ownership map would not alter the responsibilities of the GSA in areas that support GDEs; however, we do not object to showing CDFW conservation easements, which will be shown on Figure 3-3.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
CDFW	Executive Summary	Figure ES-2	The Executive Summary includes Figure ES-2 Distribution and Types of GDEs Mapped in the Basin on page ES-7. The Department recommends this figure be clarified in two aspects. First, upon review of the Executive Summary only, the text boxes on the figure might obscure potential GDEs. Second, it is unclear if the figure is pointing to only two areas of higher elevation that have potential GDEs or if all GDEs in areas of higher elevation are potential GDEs.	The Department recommends moving the text boxes outside of the Basin boundary. In addition, the Department recommends clarifying which areas of higher elevation are potential GDEs or if all areas of higher elevation are potential GDEs. These suggested changes should be made throughout the document where appropriate.	The figure text boxes are now positioned to show the potential upland GDE areas.
CDFW	Projects and Management Actions	Groundwater Dependent Ecosystems	Section 9.5.1.1 Installation of Piezometers within the GDE Area on page 9-4 states, "As described in Section 7, GDE monitoring sites are needed within the GDE area (see Figure 8-2 in Section 8) to allow the GSA to monitor groundwater levels and assess whether groundwater pumping has or will cause impacts to GDEs related to lowered groundwater levels and depleted surface water. Eight GDE monitoring sites have been tentatively identified." Figure 8-2 shows historical summer monthly streamflow volume at stream gages instead of a figure that should show GDE monitoring sites.	The Department recommends checking whether the statement should refer to Figure 8-2 and if not, provide the correct figure reference.	This figure reference will be corrected.
CDFW	General	None	The GSA may need to revise the GSP before it is finalized and adopted by the GSA.	The Department recommends the GSA provide a red-lined version of the final GSP to understand the changes made between the draft GSP and final GSP. Alternatively, the Department recommends the GSA provide a summary of changes made and comments addressed by the GSA in preparation of a final GSP.	This comment and response log will be made available to the public and submitted with the final GSP.
CDFW	General	Public Trust Doctrine	The Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters is also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. (Environmental Law Foundation v. State Water Resources Control Board (2018), 26 Cal. App. 5th 844; National Audubon Society v. Superior Court (1983), 33 Cal. 3d 419.) The GSA has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible." (National Audubon Society, supra, 33 Cal. 3d at 446.) Accordingly, groundwater plans should consider potential impacts to and appropriate protections for ISWs and their tributaries, and ISWs that support fisheries, including the level of groundwater contribution to those waters.	The Basin's riparian habitat supports several special status avian species including the least Bell's vireo (Vireo belli pusillus) and southwestern willow fly catcher (Empidonax traillii extimus). The aquatic habitat also supports several special status fish species including unarmored three-spined stickleback (Gasterosteus aculeatus williamsoni) and Santa Ana sucker (Catostomus santaanae). Pertaining to the protection of these species and their habitat, the Department is providing comments regarding GDE monitoring and implementation of management actions to avoid a significant and unreasonable effect to GDEs and ISWs.	The GSP supports the public trust uses in the Basin by adopting Sustainable Management Criteria for depletion of interconnected surface waters and GDEs. The GSP acknowledges that GDEs may support each of the species identified in the comment. The GSP considers potentially significant and unreasonable effects to these resources resulting from groundwater pumping. As a result, the GSP commits the GSA to implementing a monitoring plan including management actions connected to trigger levels.

Friends of the Santa Clara River (FSCR) Comment Letter

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
FSCR	Sustainable Management Criteria	Chronic lowering of groundwater levels	"The context for the sustainability goal is the recognition that no undesirable effects have occurred in the Basin to date." (Page 8-6) We disagree with this statement. Perhaps it is intended to mean that the wells recovered after a dry period. However, as you are aware, locally and statewide we have not seen recovery of ground water. DWR and others estimate we would need 140% of precipitation to recover lost storage and groundwater. With the extreme reduction in precipitation in the upper basin, wells have not recovered except where they have been shut off due to PFAS or Perchlorate pollution. Pumping at lower levels of the Saugus Aquifer substantially increases hardness and other water quality issues that were not previously monitored (see data gaps in section 9) causing expensive plumbing and other issues to the general public. These affects have already been experienced in previous droughts and now in the current drought. Visually, one can see the drying out and loss of riparian habitat as water levels retreat below the vadose zone in the main stem of the Santa Clara River especially in the upper watershed area. This is a negative, unreasonable and undesirable effect. Degradation of air quality from blowing dust as moisture is eliminated from the soil has and is already occurring at current levels of pumping.	Reset the ground water trigger levels to the 2011 levels as a precaution against future findings and the results from investigations of the substantial data gaps in the current Plan (as indicated throughout Chapter 9).	The extended state-wide drought and expanded groundwater production has resulted in overdraft conditions in a number of basins statewide. This is not the case in this basin. Monitoring conducted over many years and modeling of possible future conditions in the Basin show that undesirable results, including overdraft are unlikely in this basin. Refer to Section 6, Water Budget, for more discussion. The GSP establishes trigger levels where they had not existed before with the express intent of protecting GDEs as public trust resources. Identifying trigger levels at 2011 levels is unnecessary to prevent undesirable results, since GDEs would not be adversely affected during wet years. GDEs are most vulnerable during the late summer period of drought years. The GSP would implement management actions such as reduced pumping to prevent acute as well as chronic stress to GDEs during these periods.
FSCR	Sustainable Management Criteria	Groundwater dependent ecosystems	Even ephemeral flows in the eastern area (which your agency excluded from the study area, stating there were no GDEs in this area) and springs have disappeared during extreme pumping periods. We disagree with the failure to include this portion of the river in GDE analysis because several endangered species inhabit this section of the river and it is a major wildlife corridor. The plan also fails to mention tree die off that occurred in upland areas such as the die off of oaks in the Valley Oak Savannah (west of I-5 between McBean Pky and Valencia Blvd. in Stevenson Ranch)	Evaluate the upper water shed of the Santa Clara River, (east of Bouquet Creek) and the River's tributaries as GDEs and include the Valley Oaks Savannah as a GDE. Without these included the minimum thresholds, measurable objectives and undesirable results on beneficial users and uses remain incomplete.	The GSP inventories GDEs throughout the watershed including east of Bouquet Creek and its tributaries. The GSP's minimum thresholds, measurable objectives and consideration of undesirable results all apply to areas supporting GDEs anywhere in the watershed. The eastern portion of the watershed is naturally dry due to geological conditions. Some GDEs exist in the upper canyons that are sustained by shallow groundwater replenished by winter precipitation or perched water that is at higher elevation than the aquifers present in the center of the Basin. These areas are not connected to the Alluvial Aquifer and are not impacted by pumping. The GSP concludes that GDEs in the upper watershed are sustained by soil moisture, seepage from upper formations, and shallow groundwater present during winter months. In the far upper tributary valleys, GDEs survive on groundwater that rapidly decreases with the dry season, replenished by winter rains in a hydrologic cycle that is disconnected from Alluvial aquifer pumping downstream. The GSP correctly inventories the vegetation types in these areas including areas supporting Valley Oaks Savannah. To address comments received during the preparation of the GSP, the monitoring plan includes additional evaluation in some of these upland areas, to verify that groundwater pumping is not affecting these important resources.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
FSCR	Sustainable Management Criteria	Chronic lowering of groundwater levels	The Basin Operating Plan described in Section 6 contemplates groundwater levels lower than historical levels during dry years, to accommodate future buildout, conjunctive use operating strategies, and climate change (p. 8-4)It appears from this statement that the agency intends to inflict these lower levels and undesirable impacts permanently on the natural and human community to accommodate massive and unsustainable building in the SCV by finding there will be no impact. This supposition seems to be promoted in the following ways:By failure to admit the existence of undesirable impactsBy stating that a drop in water levels occur only due to a drought and are not a result of pumping, a supposition that is not borne out by examining records of agency wells removed from service due to pollution which experienced a marked rise in water levels during the last year despite the lowest recorded rainfall ever.By using only certain wells (Table 5-6) instead of analyzing a wide number of wells throughout the basin as was done by the downstream United Water Conservation DistrictBy excluding areas where undesirable impacts are occurring from the study areaBy setting the base ground water level too low – (using the lowest historical drought level as the base level)By not adequately assessing the Public TrustBy ignoring Climate Change		Development of the GSP utilized all available data from all wells and did not rely solely on historical reports. Climate change was also evaluated in detail. The GSP does recognize the potential for undesirable effects. However, the GSP concludes that the basin does not now and likely will not in the future experience chronic groundwater declines. Rather, groundwater levels have historically recovered after periods of drought. The GSP outlines a monitoring program to ensure that if groundwater level trends indicate triggers will be reached, or if they are reached, an evaluation of potential effects to GDEs from pumping will be conducted. Future climate variability will be documented with monitoring data. Management actions are identified to protect public trust resources. Implementation of the GSP will improve data collection and assign responsibilities to protect resources.
FSCR	Sustainable Management Criteria	Interconnected surface water	The River and ground water basins are a connected system. Setting the groundwater levels at historical lows, thus planning to allow these levels to occur for an extended length of time and to even exceed these levels without triggering a reduction in ground water pumping is not acceptable. We note that lower water levels impact surface water and groundwater interactions and could lead to impacts to downstream aquatic species, particularly critical Southern California steelhead habitat and recovery actions established by NMFS in the 2012 Southern California Steelhead Recovery Plan. The Fillmore and Piru Plans used 2011 levels, not the drought year levels as used in the Upper Santa Clara Plan. While these are separate plans, the river remains a connected system on which human and nature rely.	We urge that the base ground water levels be increased by using a more normal year such as the 2011 year that was used by downstream Plans. From a cooperative management point of view between the basins, 2011 levels provide a more coordinated/collaborative basis for Watershed management, and are more precautionary. This will help ease negotiations and targets across the plans under the cooperative agreements required under SGMA.	The Trigger levels are set at, or above historic lows as described in the GSP. The comment misrepresents the approach to use Trigger levels. As described in the GSP, evaluations of GDE conditions will begin before, or when GDE triggers are reached to determine if groundwater pumping may create undesirable results. If groundwater pumping may create undesirable results, management actions will be performed in a timely manner to raise groundwater elevations. Over time these trigger levels will be evaluated with additional study, including field study, and revised as warranted. Groundwater levels fluctuate seasonally and annually. The GDEs that exist in the watershed are sustained through these fluctuations. The GSP's management actions include reduced pumping if needed to sustain GDEs. The GSP recognizes that groundwater levels are linked to GDEs, and that pumping may affect GDEs. As a result, trigger levels have been established where they had not existed before with the express intent of protecting GDEs as public trust resources. This is a major step forward in managing the basin while considering effects to GDEs. Monitoring groundwater levels with respect to pumping will provide better management of the GDEs. Historic low groundwater levels generally correspond to drought years. Identifying trigger levels at 2011 levels is unnecessary to prevent undesirable results, since GDEs would not be adversely affected during wet years. GDEs are most vulnerable during the late summer period of drought years. The GSP would implement management actions such as reduced pumping to avoid undesirable results to GDEs if needed.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
FSCR	Sustainable Management Criteria	Interconnected surface water	The Public Trust Doctrine imposes an obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. Accordingly, groundwater plans should consider potential impacts to and appropriate protections for interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters. In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, groundwater dependent ecosystems, and interconnected surface waters. Availability of surface flow, riparian vegetation and riparian canopy cover for instream fish and wildlife migration is an important part of ensuring species viability.	The major tributaries of the Santa Clara River, including Castaic Creek, San Francisquito Creek, Placerita Creek, the South Fork and the Upper Watershed main stem of the Santa Clara River (east of Bouquet Creek) should have been included in GDE analysis.	The GSP supports the public trust uses in the Basin by adopting Sustainable Management Criteria for depletion of interconnected surface waters and GDEs. The GSP inventories all GDEs in the watershed including those mentioned, considers effects of pumping, and establishes a monitoring program with Triggers and Management Actions to ensure GDEs are not adversely affected by groundwater pumping. The GSP identifies all GDEs in the watershed irrespective of land ownership, including all GDEs in each of the creeks listed in the comment.
FSCR	Management Actions and Projects	Data gaps	Lack of information about groundwater levels in the GDE area, elevation control of well heads and river bottom, domestic well water quality, and subsidence benchmarks puts into doubt the choice to use the historical low levels as a trigger.	The decision to use historical low levels as a trigger should be re-evaluated and set higher as a precaution to allow for prediction errors.	The GSP monitoring plan will track groundwater level trends at various points along the river corridor, collecting data that will be available to forecast trends and warn of potential historic low levels. In locations approaching historic low groundwater levels, the GSA may evaluate implementing management actions to avoid undesirable effects in a timely manner. The threshold triggers are set at historic lows since undesirable effects would not be anticipated at or above those levels in most areas. The GSP establishes an interim trigger above historic lows in specific areas that are particularly sensitive and known to sustain sensitive aquatic species. These trigger levels provide sufficient time to implement management actions at that location prior to the occurrence of undesirable results. The GSP evaluates the resiliency of each river segment through ongoing monitoring of water levels and using satellite imagery (e.g., EVI) and observations by a biologist. The plan provides triggers suitable to each segment, ultimately ensuring resiliency of the entire GDE network within the watershed. Trigger levels have been established where they had not existed before with the express intent of protecting GDEs as public trust resources. This is a major step forward in managing the basin while considering effects to GDEs.
FSCR	Management Actions and Projects	Subsidence	9.5.4.3 We are wondering how the Agency set minimum levels for subsidence when it admits earlier in the Plan that no monitoring for subsidence had previously been conducted.		Minimum thresholds have been set based on a) land surface elevation data provided by satellite imagery (e.g., InSAR), b) ground surface elevation monitoring performed by LA County at benchmarks established in the basin, and c) results from a subsidence evaluation performed by LSCE. These data sources will continue to be monitored. In addition, ground surface elevation monitoring will also be conducted by SCV Water at critical infrastructure locations.
FSCR	Management Actions and Projects	Data gaps	There are no firm timelines as to when data gaps will be addressed and data will be publicly available.	Provide a timeline as to when data gaps will be addressed.	Work to address data gaps will be initiated upon submittal of the GSP to DWR. Installation of GDE monitoring wells has already been initiated. The status of efforts to address data gaps will be reported annually in the annual report submitted to DWR (and made available to the public).

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Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
FSCR	Management Actions and Projects	State Water Project water	While most of the list of actions to be taken in the event reduced pumping is required are reasonable, we believe Action #4 should be eliminated or modified. (4. Bring in additional State Water Project water or other imported banked water to make up for reduced groundwater supply.) It is unlikely that excess state water would be available in a statewide drought as has occurred this year, is predicted for next year and may continue to occur in the future. Further, the SCV water Agency UWMP has stated that it would reduce the use of SWP water in the future.	This action should be modified to state that water from the Agency's banked storage would be used, to the extent available.	No response needed
FSCR	Management Actions and Projects	Funding	There is no discussion as to how implementation of the plan will be funded.		Section 10 of the GSP includes a discussion of funding options.
FSCR	Public Notice and Communications	Disadvantaged communities	We do not see any indication of inclusion of disadvantaged communities in the Plan process as required by SGMA. Posting information on the Agency website is helpful, but Plan commenters should also be informed by email when updates or additional information is posted.	Focused mailings should be done in DAC's in promote better engagement and support involvement. Improve outreach to DAC's to ensure human right to water considerations, as well as safe and affordable drinking water.	As outlined in the Community Engagement Plan, the Department of Water Resources Disadvantaged Community Mapping Tool was used to search for Disadvantaged Communities (DACs) in the basin, and it identified certain areas in the basin as meeting the definition of a DAC. Efforts are under way via the Proposition 1 Disadvantaged Community Involvement Program, locally led by the Upper Santa Clara River Integrated Regional Water Management Planning (USCR IRWM) group, to reach out to DACs in the basin. Though the outreach is not specific to the SCV-GSA, member agencies of the SCV-GSA are members of the USCR IRWM and use its stakeholder meetings to provide updates on the GSP development. The USCR IRWM also attends meetings of the Lower Santa Clara River IRWM (in Ventura County), and provides updates to its stakeholders on GSP development too. For all workshops and outreach throughout the development of the GSA, information was provided by email, distributed via social media, covered by the local paper and advertised locally. Additionally, for the process of final review and adoption of the Draft GSP, printed information was delivered to businesses and communities located within the identified DACs. Section 11 of the GSP includes a discussion of outreach during the plan implementation phase.
FSCR	General	None	Climate change considerations remain lacking, especially in light of mega drought trends, and future conditions and allocation from both the Colorado River and Delta.		Central tendency climate change factors provided by DWR were used for the projected future water budgets in accordance with DWR guidance. The SCVGSA may choose to evaluate more extreme climate conditions in the future. It is anticipated that the effects of climate change and extended drought will be described in each annual report and evaluated as part of the GSP update process every five years. The GSA will use this information to determine if Sustainable Management Criteria, management actions or projects need revision.

SCOPE Comment Letter

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
SCOPE	Projects and Management Actions	Data gaps	First, the Plan describe many "data gaps" throughout the document and particularly in Chapter 9. Yet the Plan sets the ground water trigger level to begin action at the lowest historic drought ground water level and the Plan gears the GDE level at only two feet above the historic low. The justification for this low trigger level appears to be that there have been no undesirable impacts to date, a statement with which we disagree (discussion to follow below). This leads us to wonder if the Agency's failure to see impacts might be influenced by SCV Water Agency (who controls the GSP planning through a majority of Board members on the GSA Board and financing), in an effort to continue or augment its current pumping regime.	We recommend that the trigger level be set higher, preferably at the 2011 level, which was a more normal year. This would also allow better coordination with downstream users and be more protective of small pumpers and of GDEs.	The GSP recognizes that groundwater levels are linked to GDEs, and that pumping may affect GDEs. GDEs in the basin have adapted to the range of surface water and groundwater levels in the basin that have historically occurred as a result of climate and pumping effects. As a result, trigger levels have been established at historical low water levels that GDEs have experienced in the past. Triggers were established as a criterion where they had not existed before with the express intent of protecting GDEs as public trust resources. This is a major step forward in managing the basin while considering effects to GDEs. Monitoring groundwater levels with respect to pumping will provide better management of the GDEs. Historic low groundwater levels generally correspond to drought years. Identifying trigger levels at 2011 levels is unnecessary to prevent undesirable results, since GDEs would not be adversely affected during wet years. GDEs are most vulnerable during the late summer period of drought years. The GSP would implement management actions such as reduced pumping to avoid undesirable results to GDEs during these periods.
SCOPE	Projects and Management Actions	Subsidence	Using the historic low as a baseline seems imprudent, especially after admitting a lack of data in areas from subsidence, to water quality, and ground water levels in GDE areas. The Plan includes statements such as this one regarding subsidence: 9.5.4.3 Subsidence "While significant and unreasonable subsidence caused from the whole of these activities has not been observed, groundwater pumping may temporarily cause groundwater level declines of up to 150 feet in the future. It is believed [? the Plan admits there has been no investigation. What is the basis for this belief?] the geologic framework in this Basin has limited susceptibility to subsidence resulting from groundwater extraction, but there are data gaps."	Reset the ground water trigger levels to the 2011 levels as a precaution against future findings and the results from investigations of the substantial data gaps in the current Plan (as indicated throughout Chapter 9).	The GSP relies on best available science and includes discussions of uncertainty and how data gaps will be addressed over time to reduce uncertainty. The monitoring plan is intended to provide a basis for evaluating whether undesirable results are likely. The monitoring plan will be improved over time. Management actions are listed that may be implemented if it is determined that pumping is causing undesirable results. Identifying GDE trigger levels at 2011 levels is unnecessary to prevent undesirable results, particularly since that was a wet year.
SCOPE	Sustainable Management Criteria	Data gaps	Data gaps may also have been caused by the consultant's decision to use only specific wells rather than compiling data from all or a majority of wells as was done in the downstream United Conservation District Plan. No private well owner information was collected or included in the Plan, even though these wells and the people dependant on them, (who are often located in the upper reaches of tributaries), may be the most affected by a drop in the ground water levels. This is a data gap not discussed in the Plan.		Development of the GSP utilized all available data from all wells and did not rely solely on historical reports. Private landowner data was included in the study and they are part of the monitoring program. A lack of private well data in some of the tributaries was identified as a data gap and a management action has been established in the implementation plan to obtain water level and water quality data from well owners who wish to participate in the program.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
SCOPE	Projects and Management Actions	Data gaps	There is no stated or apparent timeline for completion of research to fill these data gaps even though they are essential for evaluating ground water level triggers that would avoid undesirable outcomes. It appears therefore that the agency intends to wait, possibly as long as the five-year update. This is not acceptable. GDEs may be irreparably harmed, especially aquatic species in those areas, by a delay in information.	Provide a timeline as to when data gaps will be addressed. In light of the delay in obtaining research data, we recommend that the ground water level trigger be set at the 2011 water level as a precaution until data for all areas is obtained.	Work to address data gaps will be initiated upon submittal of the GSP to DWR. Installation of GDE monitoring wells has already been initiated. The status of efforts to address data gaps will be reported annually in the annual report submitted to DWR (and made available to the public). We concur that the evaluation and management actions must be timely. This concern will be discussed at the Nov. 23 GSA Board meeting. Modifications to the text that address the timing issue will be made in Section 9.5.5.
SCOPE	Undesirable Outcomes	Sustainability goal	The Plan seeks to legitimize is use of the historic drought level low as its baseline with the statement: "The context for the sustainability goal is the recognition that no undesirable effects have occurred in the Basin to date." (Page 8-6) While according to the well data used in the Plan, wells have recovered after a drought, other indicators of undesirable impacts have been substantial. Further, locally and statewide we have not seen recovery of ground water levels. DWR and others estimate we would need 140% of precipitation to recover lost storage and ground water. We disagree with the above statement and assert that there are many undesirable impacts which the Agency has failed to acknowledge. These undesirable impacts include:Pumping at lower levels of the Saugus Aquifer substantially increases hardness and other water quality parameters that were not previously monitored (see data gaps in section 9). This causes expensive plumbing problems and other issues for the general public. These affects have already been experienced in previous droughts and now in the current drought.The drying out and loss of riparian habitat as water levels retreat below the vadose zone in the main stem of the Santa Clara River especially in the upper watershed just west and further east of Bouquet bridge. This is a negative, unreasonable, and undesirable effect.Vegetation die-off in the eastern portion of the study area east of Bouquet Creek, loss of year-round instream flow in San Francisquito Creek and various previously year round springsDegradation of air quality from blowing dust as moisture is eliminated from the soil is already occurring at current levels of pumping.Tree die off that occurred in upland areas such as the die off of oaks in the Valley Oak Savannah (west of I-5 between McBean Pky and Valencia Blvd. in Stevenson Ranch)	Evaluate the upper water shed of the Santa Clara River, (east of Bouquet Creek) and the River's tributaries as GDEs and include the Valley Oaks Savannah as a GDE. Without these included the minimum thresholds, measurable objectives and undesirable results on beneficial users and uses remain incomplete.	The GSP does consider all of the tributaries and habitats when identifying GDEs and potential undesirable results. The GSP provides a robust assessment of resources and potential effects. The upper watershed creeks and canyons are included in this assessment. The GSP concludes that GDEs in the upper watershed are sustained by soil moisture, seepage from upper formations, and shallow groundwater present during winter months. In the far upper tributary valleys, GDEs survive on groundwater that rapidly decreases with the dry season, replenished by winter rains in a hydrologic cycle that is disconnected from Alluvial aquifer pumping downstream. The GSP correctly inventories the vegetation types in these areas including areas supporting Valley Oaks Savannah. To address comments received during the preparation of the GSP, the monitoring plan includes some of these upland areas, to verify that groundwater pumping is not affecting these important resources.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
SCOPE	Sustainable Management Criteria	Chronic lowering of groundwater levels	While the Plan erroneously claims that no undesirable impacts have occurred (please see our objections above), and admits substantial data gaps as previously stated, it contemplates even lower future water levels in its efforts to accommodate massive and unsustainable building in the SCV by finding there will be no impact. In addition to claiming there were no impacts from pumping at these levels, the Plan implies that water level drops were caused by drought (a data gap to be addressed in the future), not their own pumping. This theory is not borne out by their own well records where agency wells removed from service in 2020 due to PFAS pollution experienced a marked rise in water levels even during this last year that saw the lowest rainfall on record in the SCV. Since ground water extraction is already lowering water levels and causing undesirable effects, further lowering it to create hardened demand (housing) and not addressing a reduction in pumping to account for Climate Change will not resolve the issues, but only make them worse. The substantial pumping modeled for the existing Basin Plan Yield (table on page 6-29) cannot be supported when undesirable impacts are already occurring at present with a much-reduced pumping regime.	The actions to address this unsustainable pumping as described in Chapter 9 should be implemented immediately.	A comprehensive evaluation was performed using the updated calibrated groundwater model to assess changes in groundwater conditions and conditions in the GDE areas resulting from future land use changes and increases in pumping demand at full build out in accordance with the operating plan described in the 2021 UWMP. Climate change was also considered. This work and the results are presented in detail in Section 6, Water Budget. The validity of the groundwater model for evaluating groundwater and surface water conditions in the Basin and sustainability of the resource was reviewed by an independent peer review panel of experts. That report is presented in Appendix H. Definitions for what is considered an undesirable result and whether they have been observed has been discussed in several stakeholder advisory committee meetings and GSA Board meetings. While not everyone is expected to agree, the GSP reflects the scientific data and observations made in the basin and the opinions of the vast majority of the Basin stakeholders who provided input on these matters.
SCOPE	General	Public trust	We concur with and restate the position of the Friends of the Santa Clara River that the Public Trust Doctrine imposes an obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. Availability of surface flow, riparian vegetation and riparian canopy cover for instream fish and wildlife migration is an important part of ensuring species viability.	Accordingly, groundwater plans should consider potential impacts to and appropriate protections for interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters. In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, groundwater dependent ecosystems, and interconnected surface waters. The major tributaries of the Santa Clara River, including Castaic Creek, San Francisquito Creek, Placerita Creek, the South Fork and the Upper Watershed main stem of the SantaClara River (east of Bouquet Creek) should have been included in GDE analysis.	Please see responses to this comment made by FSCR. The GSP inventories all GDEs in the watershed including those mentioned, considers effects of pumping, and establishes a monitoring program with Action Triggers and Management Actions to ensure GDEs are not adversely affected by groundwater pumping. The GSP identifies all GDEs in the watershed irrespective of land ownership, including all GDEs in each of the creeks listed in the comment. This is consistent with DWR requirements and the Public Trust Doctrine. The GSP does recognize the potential for undesirable effects. However, the GSP concludes that the basin does not now and likely will not in the future experience chronic groundwater declines. Rather, groundwater levels have historically recovered after periods of drought. The GSP outlines a monitoring program to ensure groundwater levels do not drop below historic levels in the GDE areas. Future climate variability will be documented with monitoring data. Management actions are identified to protect public trust resources. Implementation of the GSP will improve data collection and assign responsibilities to protect resources.

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
SCOPE	Public outreach	Disadvantaged communities	Disadvantaged communities don't seem to be included in the outreach process as required by SIGMA.	We appreciate the Agency's efforts to provide some Spanish language materials but believe feedback on the Plan would be more complete with more inclusion of this group. Improve outreach to DAC's to ensure human right to water considerations, as well as safe and affordable drinking water.	As outlined in the Community Engagement Plan, the Department of Water Resources Disadvantaged Community Mapping Tool was used to search for Disadvantaged Communities (DACs) in the basin, and it identified certain areas in the basin as meeting the definition of a DAC. Efforts are under way via the Proposition 1 Disadvantaged Community Involvement Program, locally led by the Upper Santa Clara River Integrated Regional Water Management Planning (USCR IRWM) group, to reach out to DACs in the basin. Though the outreach is not specific to the SCV-GSA, member agencies of the SCV-GSA are members of the USCR IRWM and use its stakeholder meetings to provide updates on the GSP development. The USCR IRWM also attends meetings of the Lower Santa Clara River IRWM (in Ventura County), and provides updates to its stakeholders on GSP development too. For all workshops and outreach throughout the development of the GSA, information was provided by email, distributed via social media, covered by the local paper and advertised locally. Additionally, for the process of final review and adoption of the Draft GSP, printed information was delivered to businesses and communities located within the identified DACs. Section 11 of the GSP has been revised to include outreach for the plan implementation phase, and will further describe these efforts.
SCOPE	General	None	Climate change considerations remain lacking, especially in light of mega drought trends, and future conditions and allocation from both the Colorado River and Delta.		Please see previous response to the same comment from FSCR.

Comments on the Public Draft GSP Submitted via the Comment Portal

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
Roger A. Haring, Citizen of Santa Clarita Valley	Management Actions and Projects	p. 9-4	In regards to "9.5.1.3 Domestic Well Water Quality" type projects to ensure protection of the water quality for Domestic/Private Well Water: This is a critical project for all private (domestic) well owners in the East Sub-Basin Aquifer region of the Santa Clarita Valley. It should be a priority for all private well owners to ensure that "their water quality" is not altered, influenced. or degraded by local ground water management protocols (i.e. Water Banking, Over-Draft Pumping, Extended Drought Conditions, and/or Anthropomorphic Damages to Surface Waters, etc.). This is especially important for those private well owners that are on the main tributaries to the upper Santa Clara River Valley. Over the recent decades, many of the private / domestic well water qualtiy in the East Sub-Basin Aquifer region have been "significantly changed" due to numerous factors (i.e. "restoration efforts" in upper watershed post wildfire events, "prolong drought conditions," "anthropomorphic damages to surface waters," etc.) There must be PROACTIVE INTERVENTIONS taken to arrest, restore, and enhance the domestic well water quality issues, which has been allowed to degrade over time. Without proper management, implemented protocols, or higher standards for "water quality" in the upper watershed private / domestic wells, the continued degradation of the East Sub-Basin Aquifer water quality will continue to erode.		We concur that protecting private domestic well owners is a priority. The GSP has taken into consideration domestic wells in its analysis but acknowledges that data are lacking for domestic wells, particularly in tributary areas. To address this data gap, Section 9 of the GSP includes a plan to obtain water level and water quality data from domestic well owners that wish to participate in the program. The GSA will respond to water quality issues that are identified by considering if they are a result of groundwater use, GSA actions, or other factors. The GSA has committed to work with landowners affected by contamination and will coordinate with state regulatory agencies (e.g., regional water quality control board and DTSC) who have authority over these matters.
Tom Dudley, University of California, Santa Barbara	Management Actions and Projects	9.6.2	I strongly support the goal of removing invasive species, like Arundo and tamarisk, which use excessive water resources, offer poor habitat to protected species, and frequently promote wildfire ignitions and expansion. SCVWA has recently entered into a contract with the "Restoration Science Team" to develop plans for watershed-wide Arundo removal, and it would be critical to integrate invasive species management and riparian restoration into that newly established program.		We concur and have included support for removal of invasive species as a project and management action described in Section 9 of the GSP.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
Stacy Fortner, Member, SCV-GSA Stakeholder Advisory Committee	Groundwater Levels	GDEs	I am a current member of SCV-GSA Stakeholders Advisory Committee and I have been very vocal that I believe the groundwater levels are set too low at the historic low levels. In the past these areas have seen GDE impacts during drought years also due to over pumping. The plan also fails to mention tree die off that occurred areas such as the oaks in the Valley Oak Savannah (west of I-5 between McBean Pky and Valencia Blvd) I feel like my concerns to adjust the groundwater levels were ignored and leaves me with the impression that there is no intention of mitigating the negative and undesirable impacts, and the agency intends to continue the support suburban sprawl. I have voiced concerns during SAC meetings that areas where the most undesirable impacts are observed are completely excluded from the study. I have mentioned in several meetings that I have doubts that drought has been the reason our well levels have dropped. I firmly believe the ground water in our aquifer is being over pumped. I spoke up at a SAC meeting in order to show that while we are currently in a drought, our well levels are at a healthy level as reported in the SCV Water Agency Engineering Committee handouts. We currently have several wells closed due to contamination, and no pumping is occurring in those wells – the well levels are up. Once the pumping begins, those wells levels will drop, so it makes sense that drought is NOT the reason those well levels dropping.	I would like to see the ground water trigger levels to the 2011 levels. Setting at historic lows is reckless and dangerous to the surrounding GDEs I would like to include the East portion of the upper water shed of the Santa Clara River, and the River's tributaries as GDEs Also include the Valley Oaks Savannah as a GDE. These need to be included in the minimum thresholds, measurable objectives and undesirable results.	This is a valid concern and was discussed several times at Stakeholder Advisory Committee (SAC) meetings. The GDE areas are supported by a combination of surface water, including WRP releases, and groundwater. Groundwater levels fluctuate significantly in many locations in the GDE area seasonally and from year to year due to changing rainfall, WRP discharges, and pumping. The existing habitat has adapted to these fluctuations and remains vigorous, even after the peak of the 2012-2017 drought. While some stress and limited die off occurred during that period, the vegetation has regrown. An enhanced vegetation analysis (EVI) was recently conducted that confirms this conclusion. For these reasons, the decision was made to utilize the historical water level low as the basis for setting GDE triggers. The SAV also voted to accept this approach. Monitoring of groundwater levels, river flow, and GDE health is included in the monitoring plan. If groundwater levels approach the GDE trigger levels that have been established, an evaluation will be performed and management actions taken if undesirable results and impacts to GDEs are likely to occur from groundwater pumping. Identifying trigger levels at 2011 levels is unnecessary to prevent undesirable results, since GDEs would not be adversely affected during wet years. GDEs are most vulnerable during the late summer period of drought years. The GSP would implement management actions such as reduced pumping to prevent acute as well as chronic stress to GDEs during these periods. The GSP correctly inventories the vegetation types in the eastern portion of the watershed including areas supporting Valley Oaks Savannah. To address comments received during the preparation of the GSP, the monitoring plan includes some of these upland areas, to verify that groundwater pumping is not affecting these important resources.
Stacy Fortner, Member, SCV-GSA Stakeholder Advisory Committee	Public Trust		In 2018 the California Court of Appeal held that the public trust doctrine must be also be considered, and public trust resources protected—in any decision governing withdrawals of groundwater that is hydrologically connected to public trust surface waters. Public Trust has not been considered in any meaningful way.		We concur that the public trust doctrine is important and should be considered in the GSP. We believe that we have adequately met the requirements of this doctrine as presented in the GSP and discussed in responses to similar comments. In particular, the setting of Sustainable Management Criteria for interconnected surface waters and GDEs protects public trust uses.
Stacy Fortner, Member, SCV-GSA Stakeholder Advisory Committee	Climate Change		I also feel that climate change is not adequately addressed in this plan. Climate change section is weak considering new info released in latest PPIC reports.		See previous responses.
Stacy Fortner, Member, SCV-GSA Stakeholder Advisory Committee	Data Gaps		Data Gaps need to be addressed		See previous responses regarding data gaps.

Public Draft Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan Public Comments and Responses

Commenter	Category	Subcategory	Issue Identified	Recommendation	Response
Stacy Fortner, Member, SCV-GSA Stakeholder Advisory Committee	Public Engagement		Public Comments from various Public Workshops are difficult to find. Needs to be more accessible. The form provided to submit comment online is ridiculously cumbersome for the general public. I mean could you have made any more confusing and complicated for anyone outside the agency.		We are sorry that you experienced this frustration. We will work to continually improve the feedback process because we believe it is very important.

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State of California – Natural Resources Agency
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

October 14, 2021

Via Electronic Mail

Mr. Rick Viergutz
Principal Water Resources Planner
Santa Clarita Valley Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350
rviergutz@scvwa.org

Subject: California Department of Fish and Wildlife Comments on the Santa Clara River Valley East Groundwater Subbasin Draft Groundwater Sustainability Plan

Dear Mr. Viergutz:

The California Department of Fish and Wildlife (Department) appreciates the opportunity to provide comments on the Santa Clarita Valley Groundwater Sustainability Agency (GSA) Santa Clara River Valley East Groundwater Subbasin (Basin) Draft Groundwater Sustainability Plan (GSP) prepared pursuant to the Sustainable Groundwater Management Act (SGMA). The Basin is designated as high priority under SGMA and must be managed under a GSP by January 31, 2022.

The Department is writing to support ecosystem preservation and enhancement in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science. As trustee agency for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802).

Development and implementation of GSPs under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems, species, and public trust resources depend on groundwater and interconnected surface waters (ISWs), including ecosystems on Department-owned and managed lands within SGMA-regulated basins.

SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to GSPs:

- GSPs must **consider impacts to groundwater dependent ecosystems** (GDEs) (Water Code § 10727.4(l); see also 23 CCR § 354.16(g));
- GSPs must consider the interests of all beneficial uses and users of groundwater, including environmental users of groundwater (Water Code § 10723.2) and GSPs must **identify and consider potential effects on all beneficial uses and users of**

groundwater (23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3));

- GSPs must **establish sustainable management criteria that avoid undesirable results** within 20 years of the applicable statutory deadline, including **depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water** (23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b)) and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters (23 CCR § 354.34(c)(6)(D)); and,
- GSPs must **account for groundwater extraction for all water use sectors,** including managed wetlands, managed recharge, and native vegetation (23 CCR §§ 351(al) and 354.18(b)(3)).

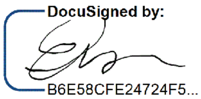
Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters is also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d 419.) The GSA has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible." (*National Audubon Society*, *supra*, 33 Cal. 3d at 446.) Accordingly, groundwater plans should consider potential impacts to and appropriate protections for ISWs and their tributaries, and ISWs that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, GDEs, and ISWs.

The Basin supports both riparian and aquatic habitat. The Basin's riparian habitat supports several special status avian species including the least Bell's vireo (*Vireo belli pusillus*) and southwestern willow fly catcher (*Empidonax traillii extimus*). The aquatic habitat also supports several special status fish species including unarmored three-spined stickleback (*Gasterosteus aculeatus williamsoni*) and Santa Ana sucker (*Catostomus santaanae*). Pertaining to the protection of these species and their habitat, the Department is providing comments regarding GDE monitoring and implementation of management actions to avoid a significant and unreasonable effect to GDEs and ISWs. The Department is providing additional comments and recommendations as notated in Attachment A. Editorial comments or other suggestions are included for the GSA's consideration during development of a final GSP.

If you have any questions related to the Department's comments and/or recommendations on the Santa Clara River Valley East Groundwater Subbasin GSP, please contact Ruby Kwan-Davis at Ruby.Kwan-Davis@wildlife.ca.gov or (561) 619-2230.

Sincerely,



Erinn Wilson-Olgin
Environmental Program Manager I
South Coast Region

Enclosure(s): Attachment A

ec: California Department of Fish and Wildlife

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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

Attachment A

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE COMMENTS ON THE SANTA CLARA RIVER VALLEY EAST GROUNDWATER SUBBASIN DRAFT GROUNDWATER SUSTAINABILITY PLAN

COMMENTS AND RECOMMENDATIONS

The Department's comments are as follows:

1. **Comment #1** – The GSP Monitoring Plan is described under sections ES-4.3 and 7.3.7. The GSP Monitoring Plan proposes to monitor groundwater level at 10 locations. The GSP Monitoring Plan states, "*In monitoring wells that provide meaningful data, identify an action trigger for each well based on historical low groundwater levels (data or estimate). Identify an intermediate action trigger above historical low in areas where sensitive aquatic species reside (e.g., I-5 Bridge)*."

   a. Issue: SGMA regulations require monitoring networks to be developed to promote the collection of data sets with enough quality, frequency, and spatial distribution to characterize groundwater and related surface water conditions in the groundwater basin and to evaluate changing conditions that occur through implementation of the GSP (23 CCR § 354.34(b)). The Department is concerned that 1) the GSA may continue to use monitoring wells that do not provide meaningful data, and 2) the GSA may not replace monitoring wells that are abandoned because that well may not provide meaningful data (among other possible reasons). Relying on wells that do not provide meaningful data could result in an ineffective monitoring network. Also, not replacing wells that are decommissioned could result in the incremental loss of monitoring wells over time, reduction in density of monitoring sites, and loss of representative monitoring stations across the Basin to capture a range of GDE and ISW characteristics. In both instances, this could undermine the GSA's monitoring network. Specifically, this may affect GSA's ability to assess the effects of GSP implementation on GDEs and ISWs and avoid significant and unreasonable undesirable results on GDEs and ISWs resulting from groundwater extraction.

   b. Recommendation #1(a): The Department recommends the GSA maintain a sufficient minimum number and density of monitoring wells that will inform evaluation of groundwater management impacts over time. This would provide effective monitoring of sustainability indicators related to groundwater extraction. The GSP should provide a minimum number and density of representative monitoring wells within the Basin, each Study Reach, and GDE area. The GSP should provide adequate scientific rationale for the chosen number and density of monitoring wells. Monitoring wells should be provided at a sufficient density required to demonstrate short-term, seasonal, and long-term trends on a scale meaningful to fish and wildlife and groundwater dependent habitats.

c. Recommendation #1(b): The Department recommends the GSA replace wells that do not provide meaningful data and in general, any wells that may be decommissioned, in order maintain an effective monitoring network. The GSP should provide information, general guidelines, and standards as to how the GSA would decide that a well should be abandoned or decommissioned (e.g., a well that does not provide meaningful data). The GSP should also identify when and how the GSA proposes to replace those wells to maintain the minimum number and density of representative monitoring wells within the Basin, each Study Reach, and GDE area.

2. **Comment #2** – According to Table 8.6 on page 8-45, monitoring wells NLF-W5, GDE-A, and NLF-E may not be within a GDE area.

   a. Issue: The Department is concerned that installing monitoring wells where wells may not be within a GDE area could be ineffective for the GSA to assess the effects of GSP implementation on GDEs and ISWs over time. Furthermore, locating wells outside of GDEs could be ineffective for the GSA to adequately avoid significant and unreasonable undesirable results on GDEs and ISWs resulting from groundwater extraction.

   b. Recommendation #2: The Department recommends the GSA install monitoring wells at locations that would be effective to assess the effects of GSP implementation on GDEs and ISWs. Also, the GSP should propose alternative locations for wells NLF-W5, GDE-A, and NLF-E given that these three wells may not be within a GDE area.

3. **Comment #3** – Section 8.11.1 describes conditions that could lead to undesirable results with respect to GDEs and ISWs. In the February 2021 draft *Technical Memo for Sustainable Management Criteria* (Memo), the Memo states that the following condition may lead to an undesirable result: "*reduction in the quantity of treated wastewater being discharged to the river that reduces river flow and recharge to the Alluvial Aquifer and Saugus Formation*."

   a. Issue: Causes of groundwater conditions that could lead to undesirable results should be described in a GSP (23 CCR § 354.26(b)(1)). A reduction in wastewater discharge from the Saugus and Valencia wastewater reclamation plants (WRPs) was not included in the GSP under Section 8.11.1 as a condition that could lead to undesirable results. A reduction in wastewater discharge could lead to undesirable results on groundwater conditions and GDEs considering that wastewater discharge contributes to the groundwater recharge of the Alluvial

Aquifer and supports riparian vegetation[1]. A reduction in discharge from those WRPs combined with groundwater pumping could result in significant impacts and unreasonable undesirable results on GDEs.

b. Recommendation #3: The Department recommends that Section 8.11.1 of the GSP indicate that undesirable results may occur from a reduction in wastewater discharge. Identifying this future project will help the GSA to identify adaptive management actions to avoid undesirable results. If the GSP omits this future project as a potential cause to a condition that could lead to undesirable results, the Department recommends the GSP provide a rationale for why the GSA has decided to omit wastewater discharge from WRPs as a condition that could lead to undesirable results.

4. **Comment #4** – Section 9.5.5 describes evaluation and reporting processes to determine whether lowered groundwater levels and surface water depletion are a result of pumping that could result in a significant and unreasonable effect on GDEs.

a. Issue: While the Department concurs with the actions described in the evaluation and reporting processes, the Department is concerned that those processes without a reasonable timetable could result in a delayed determination that GDE action triggers have been reached. Moreover, those processes without a reasonable timetable could result in a delayed implementation of management actions to avoid significant and unreasonable undesirable results on GDEs and ISWs.

b. Recommendation #4: The Department recommends that the GSA, to the extent feasible, provide a reasonable timetable for initiation and completion for achieving each of the following processes: data and information collection; evaluation report; presentation to GSA Board; and implementation of management actions if GDE action triggers are reached.

ADDITIONAL COMMENTS

Comment # 5: The Department holds over 800 acres of conservation easements within the Santa Clara River Valley East Groundwater Subbasin/Santa Clarita Watershed. These 800 acres are located east of the I-5 bridge. The Department also holds Conservation Easements or other recording instruments west of the I-5 bridge.

Recommendation #5: The Department recommends the GSA contact the Department to obtain this information to be included into the final GSP. For example, all Department-

[1] According to the GSP, the Alluvial Aquifer along the main stem of the Santa Clara River is also replenished from discharge of treated wastewater from the Saugus and Valencia WRPs. According to Table 5-4, discharge from the Saugus WRP supports riparian vegetation within the Santa Clara River reach from Bouquet Canyon to the I-5 bridge. Also, the dense riparian forest and perennial aquatic habitat existing from the Santa Clara River reach from the I-5 bridge to one mile downstream of the Valencia WRP point of discharge is in part supported by discharges from the Valencia WRP.

owned conservation easements and/or recording instruments should be reflected in Figure 3-3 showing federal, State, and county jurisdictions/land ownership in the Basin.

Comment #6: The Executive Summary includes Figure ES-2 *Distribution and Types of GDEs Mapped in the Basin* on page ES-7. The Department recommends this figure be clarified in two aspects. First, upon review of the Executive Summary only, the text boxes on the figure might obscure potential GDEs. Second, it is unclear if the figure is pointing to only two areas of higher elevation that have potential GDEs or if all GDEs in areas of higher elevation are potential GDEs.

Recommendation #6: The Department recommends moving the text boxes outside of the Basin boundary. In addition, the Department recommends clarifying which areas of higher elevation are potential GDEs or if all areas of higher elevation are potential GDEs. These suggested changes should be made throughout the document where appropriate.

Comment #7: Section 9.5.1.1 *Installation of Piezometers within the GDE Area* on page 9-4 states, "*As described in Section 7, GDE monitoring sites are needed within the GDE area (see Figure 8-2 in Section 8) to allow the GSA to monitor groundwater levels and assess whether groundwater pumping has or will cause impacts to GDEs related to lowered groundwater levels and depleted surface water. Eight GDE monitoring sites have been tentatively identified.*" Figure 8-2 shows historical summer monthly streamflow volume at stream gages instead of a figure that should show GDE monitoring sites.

Recommendation #7: The Department recommends checking whether the statement should refer to Figure 8-2 and if not, provide the correct figure reference.

Comment #8: The GSA may need to revise the GSP before it is finalized and adopted by the GSA.

Recommendation #8: The Department recommends the GSA provide a red-lined version of the final GSP to understand the changes made between the daft GSP and final GSP. Alternatively, the Department recommends the GSA provide a summary of changes made and comments addressed by the GSA in preparation of a final GSP.

CONCLUSION

The Department appreciates the opportunity to comment on the draft GSP. The Department also appreciates the ongoing coordination and collaboration with the GSA. The Department recommends the GSA address the comments above to avoid a potential 'incomplete' or 'inadequate' GSP determination per SGMA Regulations, as assessed by the Department of Water Resources, for the following reasons derived from regulatory criteria for GSP evaluation:

1. The GSP identifies reasonable measures and schedules to eliminate data gaps (23 CCR § 355.4(b)(2)). The efficacy of measures to eliminate data gaps could be improved by addressing the Department's concerns regarding the GSP Monitoring Plan (See Comment #1, 2).

2. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones

presented in the GSP are reasonable and supported by the best available information and best available science (23 CCR § 355.4(b)(1)). However, the Department has identified a potential shortcoming in the GSP's findings pertaining to conditions that could lead to undesirable results with regards to GDEs/ISWs (See Comment #3).

3. The projects and management actions presented in the GSP are feasible and/or likely to prevent undesirable results and ensure that the Basin is operated within its sustainable yield (23 CCR § 355.4(b)(5)). The likelihood of those projects and management actions to prevent undesirable results could be improved. Improvements could be made by addressing the Department's concerns regarding the GSA's proposed evaluation and reporting processes (See Comment #4).

Friends of the Santa Clara River
PO Box 7719 Ventura, California 93006 (805) 320-2265
www.fscr.org

10-14-21

Santa Clarita Valley GSA
27234 Bouquet Canyon Rd
Santa Clarita, CA 91350
Via email to: Eunie Kang, GSA Board Secretary, ekang@scvwa.org, lcogan@gsiws.com , lparisi@gsiws.com

Re: Comments on the Santa Clara River Valley East Groundwater Subbasin Draft Groundwater Sustainability Plan

Please enter into the Administrative record

Dear Sirs:

Thank you for the opportunity to comment on the Santa Clara River Valley East Groundwater Subbasin Draft Groundwater Sustainability Plan. We are unable to use your submittal form since it precludes uploading a pdf or backup documentation and makes circulation to our members difficult. While such a format may be sufficient for simple general public comments or for your work group team, it is not a practical means for receiving detailed comments from local organizations. We suggest that you provide an email contact in the future where comments may be sent to enable meaningful public comment and engagement.

Chronic lowering of groundwater levels

"The context for the sustainability goal is the recognition that no undesirable effects have occurred in the Basin to date." (Page 8-6)
We disagree with this statement. Perhaps it is intended to mean that the wells recovered after a dry period. However, as you are aware, locally and statewide we have not seen recovery of ground water. DWR and others estimate we would need 140% of precipitation to recover lost storage and ground water[1]. With the extreme reduction in precipitation in the upper basin, wells have not recovered except where they have been shut off due to PFAS or Perchlorate pollution.

Pumping at lower levels of the Saugus Aquifer substantially increases hardness and other water quality issues that were not previously monitored (see data gaps in section 9) causing expensive plumbing and other issues to the general public. These affects have already been experienced in previous droughts and now in the current drought.

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[1] **"This is how much rain California needs to get out of the drought" Sept. 20th 2021,** https://www.sfgate.com/weather/article/How-much-rain-California-need-end-drought-16497191.php
"Drought expected to persist in much of the Western US through 2022 and beyond, according to NOAA report", Sept. 30th, 2021 https://abcnews.go.com/US/drought-expected-persist-western-us-2022-noaa-report/story?id=80309340

Visually, one can see the drying out and loss of riparian habitat as water levels retreat below the vadose zone in the main stem of the Santa Clara River especially in the upper watershed area. This is a negative, unreasonable and undesirable effect.

Degradation of air quality from blowing dust as moisture is eliminated from the soil has and is already occurring at current levels of pumping.

Even ephemeral flows in the eastern area (which your agency excluded from the study area, stating there were no GDEs in this area) and springs have disappeared during extreme pumping periods. We disagree with the failure to include this portion of the river in GDE analysis because several endangered species inhabit this section of the river and it is a major wildlife corridor[2].

The plan also fails to mention tree die off that occurred in upland areas such as the die off of oaks in the Valley Oak Savannah (west of I-5 between McBean Pky and Valencia Blvd. in Stevenson Ranch)

"But the *Groundwater Management Plan, Santa Clara River Valley Groundwater Basin, East Subbasin, Los Angeles County, California* (Basin Operating Plan) described in Section 6 contemplates groundwater levels lower than historical levels during dry years, **to accommodate future buildout, conjunctive use operating strategies, and climate change (LSCE, 2003).** (emphasis added) (p. 8-4)

It appears from this statement that the agency intends to inflict these lower levels and undesirable impacts permanently on the natural and human community to accommodate massive and unsustainable building in the SCV by finding there will be no impact. This supposition seems to be promoted in the following ways:

- By failure to admit the existence of undesirable impacts
- By excluding areas where undesirable impacts are occurring from the study area
- By using only certain wells (Table 5-6) instead of analyzing a wide number of wells throughout the basin as was done by the downstream United Water Conservation District
- By stating that a drop in water levels occur only due to a drought and are not a result of pumping, a supposition that is not borne out by examining records of agency wells removed from service due to pollution[3] which experienced a marked rise in water levels during the last year despite the lowest recorded rainfall ever.
- By setting the base ground water level too low – (using the lowest historical drought level as the base level[4])
- By not adequately assessing the Public Trust[5] (See Appendix A)
- By ignoring Climate Change

[2] See **Wildlands of the Santa Clara River Watershed,** a project of the South Coast (SC) Wildlands, and in cooperation with other groups such as The Nature Conservancy, US Forest Service, and Coastal Conservancy, http://www.scwildlands.org/reports/wildlandsofthescrwatershed.pdf, included by reference

[3] https://yourscvwater.com/your-water/#wellproductionlevels, see particularly well levels for U4, U5, Q2, T7, Clark, Valley Center and others where pumping was discontinued in 2020 due to PFAS pollution and where water levels rose substantially in spite of severely diminished rainfall. We note that United Conservation District's modeling also showed that pumping did impact water levels.

[4] Pages ES-17 through ES-19

[5] The Plan mentions in several places that the surface and ground water is interconnected (e.g.9-21), yet Public Trust Rights and the effect of pumping on surface flows was never mentioned. We attach the letter submitted to DWR by James Wheaton (Environmental Law Foundation) regarding the need to evaluate public trust rights as Appendix A

The River and ground water basins are a connected system. Setting the groundwater levels at historical lows, thus planning to allow these levels to occur for an extended length of time and to even exceed these levels without triggering a reduction in ground water pumping is not acceptable. We note that lower water levels impact surface water and groundwater interactions and could lead to impacts to downstream aquatic species, particularly critical Southern California steelhead habitat and recovery actions established by NMFS in the 2012 Southern California Steelhead Recovery Plan.

We note that one reason the first iteration of the Newhall Ranch Specific Plan was set aside in 2000 was that it predicted a 10 foot drop in ground water levels, meaning downstream users and environmental needs would be receiving substantially less water. This caused a loud and swift reaction in the form of protests and lawsuits. It appears such a drop in ground water levels is contemplated again by the Agency.

The Fillmore and Piru Plans used 2011 levels, not the drought year levels as used in the Upper Santa Clara Plan. While these are separate plans, the river remains a connected system on which human and nature rely. We urge that the base ground water levels be increased by using a more normal year such as the 2011 year that was used by downstream Plans. From a cooperative management point of view between the basins, 2011 levels provide a more coordinated/collaborative basis for Watershed management, and are more precautionary. This will help ease negotiations and targets across the plans under the cooperative agreements required under SGMA.

The Plan's Obligation to Address the Public Trust

The Public Trust Doctrine imposes an obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d419). (See also Appendix A)

Accordingly, groundwater plans should consider potential impacts to and appropriate protections for interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters. In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, groundwater dependent ecosystems, and interconnected surface waters.

Availability of surface flow, riparian vegetation and riparian canopy cover for instream fish and wildlife migration is an important part of ensuring species viability. Therefore, the major tributaries of the Santa Clara River, including Castaic Creek, San Francisquito Creek, Placerita Creek, the South Fork and the Upper Watershed main stem of the Santa Clara River (east of Bouquet Creek) should have been included in GDE analysis.

Management Actions and Projects

Among other things, this chapter discloses major data gaps and lack of information that would seem to make the plan incomplete in certain areas.

For instance:

"Data gaps exist in the Basin, including groundwater levels within the GDE area, elevation control of well heads and river bottom, domestic well water quality, and subsidence benchmarks. Addressing data gaps will improve the understanding of the Basin and reduce uncertainty regarding decision making. (page 9-1)."

This lack of information puts into doubt the choice to use the historical low levels as a trigger. That decision should be re-evaluated and set higher as a precaution to allow for prediction errors.
"9.5.4.3 Subsidence - Minimum thresholds for subsidence have been established to avoid damage to critical infrastructure and land uses. As noted in Section 5, subsidence can be caused by activities stemming from groundwater pumping, tectonics, and oil and gas production. Each of these takes place in the Basin. While significant and unreasonable subsidence caused from the whole of these activities has not been observed, groundwater pumping may temporarily cause groundwater level declines of up to 150 feet in the future. It is believed the geologic framework in this Basin has limited susceptibility to subsidence resulting from groundwater extraction, but there are data gaps."

We are wondering how the Agency set minimum levels for subsidence when it admits earlier in the Plan that no monitoring for subsidence had previously been conducted. "Prior to development of this GSP, land subsidence data had not been compiled and evaluated to assess the effects of groundwater extraction on land surface elevations." (Page 9-7)

There are no firm timelines as to when data gaps will be addressed and data will be publicly available.

Actions
While most of the list of actions to be taken in the event reduced pumping is required are reasonable, we believe Action #4 should be eliminated or modified.
4. Bring in additional State Water Project water or other imported banked water to make up for reduced groundwater supply.
It is unlikely that excess state water would be available in a statewide drought as has occurred this year, is predicted for next year and may continue to occur in the future. Further, the SCV water Agency UWMP has stated that it would reduce the use of SWP water in the future. This action should be modified to state that water from the Agency's banked storage would be used, to the extent available.

There is no discussion as to how implementation of the plan will be funded.

Public Notice and Communications
We do not see any indication of inclusion of disadvantaged communities in the Plan process as required by SIGMA. Posting information on the Agency website is helpful, but Plan commenters should also be informed by email when updates or additional information is posted. Focused mailings should be done in DAC's in promote better engagement and support involvement.

Conclusion
We urge the Agency to:

- Reset the ground water trigger levels to the 2011 levels as a precaution against future findings and the results from investigations of the substantial data gaps in the current Plan (as indicated throughout Chapter 9).
- Evaluate the upper water shed of the Santa Clara River, (east of Bouquet Creek) and the River's tributaries as GDEs and include the Valley Oaks Savannah as a GDE. Without these included the minimum thresholds, measurable objectives and undesirable results on beneficial users and uses remain incomplete.
- Improve outreach to DAC's to ensure human right to water considerations, as well as safe and affordable drinking water.
- Climate change considerations remain lacking, especially in light of mega drought trends, and future conditions and allocation from both the Colorado River and Delta.
- Provide a timeline as to when data gaps will be addressed.

Thank you in advance for your consideration of these concerns.

Sincerely,

James M. Danza
Chair, Friends of the Santa Clara River

FRIENDS OF
THE SANTA CLARA RIVER

Appendix A

ENVIRONMENTAL LAW FOUNDATION
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James Wheaton, President · wheaton@envirolaw.org

June 3, 2020

Via Electronic Submission to the DWR SGMA Portal

Karla Nemeth, Director
California Department of Water Resources
P. O. Box 942836, Room 1115-1
Sacramento, CA 94236-0001

Re: DWR's Legal Obligation to Consider the Public Trust in Groundwater Sustainability Plan Decisions[1]

Dear Director Nemeth:

Summary

As you and the Department are doubtless aware, a California Court of Appeal held in late 2018 that the public trust doctrine must be considered—and public trust resources protected—in any decision governing withdrawals of groundwater that is hydrologically connected to public trust surface waters. (*Environmental Law Foundation v. State Water Resources Control Board* (2018) 26 Cal.App.5th 844 (*ELF*).) We write to urge the Department not to fail to do so in reviewing the Groundwater Sustainability Plans (GSPs) submitted by local Groundwater Sustainability Agencies (GSAs) that have been and will be submitted under the Sustainable Groundwater Management Act (SGMA).[2]

In short, if a GSP identifies any surface water affected by groundwater withdrawals, the GSP must go further than SGMA. DWR, in performing its review under SGMA, must in these circumstances use heightened standards of review, as required by the public trust doctrine, in three important ways:

1. It must go beyond SGMA's sixth definition of "undesirable result," which is "depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water."[3] While

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[1] The Environmental Law Foundation submits these comments as general comments applicable to DWR's review of all submitted GSPs.

[2] Wat. Code § 10720 et seq.

[3] *Id*. § 10721, subd. (x)(6).

avoidance of "*unreasonable* adverse impacts" may be enough under SGMA, it is not enough for the public trust doctrine, which commands protection for public trust resources "whenever feasible."

2. That same definition references only "beneficial uses of the surface water" (presumably as defined in the relevant Basin Plan). There is no certainty, however, that the Basin Plan's enumeration of the beneficial uses is coextensive with all of the public trust uses of the public trust resource.

3. SGMA expressly permits the delay until 2025 for GSPs where the only "undesirable result" is depletion of surface waters and harm to beneficial uses.[4] The public trust doctrine contains no such delay, and the analysis must be done now.

Thankfully, the language of SGMA and the regulations for implementing it already contain several steps which can be reviewed without substantial modification to ensure that DWR and the GSAs meet their public trust obligations in accepting, rejecting, or deeming incomplete a submitted GSP. We do not see that what we are asking—which the law requires—will upset the current processes already begun. Failure by DWR to do so, however, will risk many if not most GSPs' facing judicial review, rejection, and the unfortunate delay in the protection of groundwater and surface waters that we all hope for and that SGMA was intended to deliver.

We stand ready to work with you and your staff to avoid that unpleasant and unnecessary outcome.

Factual Background and Specific Actions

Approximately 46 GSPs were submitted by GSAs to DWR in January 2020, and DWR will soon undertake its review of each plan pursuant to SGMA. But in addition to the requirements that SGMA and the GSP regulations[5] impose on DWR to consider the interactivity between surface waters and groundwater, the public trust doctrine independently imposes separate and somewhat broader obligations upon DWR. Simply put, under the public trust doctrine, DWR must consider the potential adverse effect of groundwater pumping on all public trust uses of interconnected surface waters, and minimize them entirely where feasible, in its decisions regarding submitted GSPs.

Therefore, as it evaluates each submitted GSP, where the GSP identifies any interconnected surface waters with the groundwater basin in question, and consistent with

[4] *Id*. § 10720.7, subd. (a).

[5] Cal. Code Regs., tit. 23, § 355.2, subd. (e)(1)-(3).

ELF and the public trust doctrine, DWR should:

1.Ā Identify any public trust resources within each basin;

2.Ā Identify all public trust uses within each basin;

3.Ā Identify and quantify any adverse impact from groundwater extractions on public trust resources and uses; and

4.Ā Protect those public trust resources and uses "whenever feasible."

Legal Background

SGMA and GSP Regulations

Both SGMA and the GSP regulations already require GSAs and DWR to consider the interactivity between surface waters and groundwater extractions in its decision regarding a submitted GSP.

The fundamental purpose of a GSP is to achieve a basin's sustainability goal,[6] which is the "implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield."[7] A basin's "sustainable yield" is "the maximum quantity of water . . . that can be withdrawn annually from a groundwater supply without causing an undesirable result."[8] "Undesirable result" No. 6 is "depletions of interconnected surface water that have significant and *unreasonable* adverse impacts on *beneficial uses* of the surface water."[9] Thus, a GSP must avoid depletions of interconnected surface waters having significant and unreasonable adverse impacts on the beneficial uses of the surface water in a basin.

Each GSP must include a water budget—"an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored."[10] Further, SGMA requires consideration of the interests of all beneficial uses and users of groundwater, including "surface water users, if there is a hydrologic

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[6] Wat. Code § 10727, subd. (a).

[7] *Id*. § 10721, subd. (u).

[8] *Id*. subd. (w).

[9] *Id*. subd. (x)(6), emphasis added.

[10] *Id*. subd. (y).

connection between surface and groundwater bodies."[11] GSPs must also identify "groundwater dependent ecosystems,"[12] which are "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface."[13] Finally, GSPs must identify minimum thresholds for depletions of interconnected surface water. Minimum thresholds are "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."[14]

Thus, both SGMA and the GSP regulations already require DWR to consider the interactivity between groundwater pumping and interconnected surface water. As discussed in the next section, however, SGMA is not the sole layer of responsibility and review for such plans. The public trust continues to live with full force and effect alongside and in addition to SGMA in protecting public trust surface waters.

Environmental Law Foundation v. State Water Resources Control Board

In *ELF*, the eventual issue[15] was whether the State Water Resources Control Board (State Board) and the County of Siskiyou have common law fiduciary duties as trustees of public trust resources to consider the potential adverse impact of groundwater extractions on the Scott River—an unquestioned public trust resource—when issuing well permits and, if so, whether SGMA eliminates or "subsumes" that duty.[16] The *ELF* decision held that: (1) the public trust doctrine applies to the extraction of groundwater to the extent that the extraction adversely impacts a navigable waterway; and (2) SGMA neither supplants nor effectively incorporates the common law public trust doctrine, nor abrogates a state or local agency's affirmative public trust duty.[17]

The public trust doctrine imposes on such agencies an "affirmative duty . . . to act

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[11] *Id*. § 10732.2, subd. (f).

[12] *Id*. § 10727.4, subd. (*l*).

[13] Cal. Code Regs., tit. 23, § 351, subd. (m).

[14] *Id*. § 354.28, subd. (c)(6).

[15] The case developed over ten years of litigation and multiple trips to appellate courts, as the County kept changing its opposition to applying the public trust doctrine to groundwater withdrawals. In its final effort to inter the doctrine for groundwater, the County advanced the argument that whether or not the doctrine applied to some surface waters, it had been entirely superseded or "subsumed" by the passage of SGMA and the state fulfilled whatever public trust obligations it might have by implementing SGMA. As discussed, the trial court and Court of Appeal soundly rejected that argument.

[16] See *ELF*, *supra*, 26 Cal.App.5th at 851.

[17] See *id*. at 856-57.

on behalf of the people to protect their interest in navigable water."[18] The doctrine is expansive and flexible—public trust uses include not only navigation, commerce, and fishing, but also hunting, bathing and swimming.[19] Further, "an increasingly important public use is the preservation of trust lands "in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area."[20]

The *ELF* court held that the State Board's public trust obligation is independent of, and not limited by, its authority to oversee permitting.[21] Relying on *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419 (*National Audubon*), the court held that state agencies have "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible."[22] Further, the court stated that "*SGMA does not . . . replace or fulfill public trust duties*, or scuttle decades of decisions upholding, defending, and expanding the public trust doctrine."[23]

Therefore, however SGMA is implemented, it does not supplant a state agency's affirmative and independent obligations to consider the public trust doctrine in decisions regarding the planning and allocation of water resources and to protect public trust uses whenever feasible.

DWR Should Consider the Public Trust in Its SGMA Decisions

The affirmative and independent obligation to consider the public trust applies to DWR's decisions regarding submitted GSPs. DWR has a legal duty not only to consider the potential "unreasonable" adverse impacts of groundwater extractions on "beneficial uses" of surface waters but also "to protect public trust uses whenever feasible."[24] The

[18] *Id*. at 857.

[19] *Ibid.*

[20] *Ibid.* (quoting *San Francisco Baykeeper, Inc. v. State Lands Com*. (2015) 242 Cal.App.4th 202, 234).

[21] *Id*. at 862.

[22] *ELF*, *supra*, 26 Cal.App.5th at 865.

[23] *Ibid.*, emphasis added.

[24] *Ibid.*

ELF decision explicitly held that this affirmative duty is *not* supplanted by SGMA.[25]

We encourage DWR to act in a manner consistent with its legal obligation to consider the public trust in GSP decisions. The difference between the public trust doctrine and SGMA can be best understood by looking at the SGMA definition of what constitutes an "undesirable result" as it involves surface water. As quoted above, that "undesirable result" is "depletions of interconnected surface water that have significant and *unreasonable* adverse impacts on *beneficial uses* of the surface water."[26]

First, SGMA does not prohibit all adverse impacts to the surface water, only "*unreasonable* adverse impacts." The public trust has no such limitation. "Unreasonable" impacts are not the same as those that are not "feasible." There may be a host of entirely feasible protections that could be instituted that some might nonetheless feel are "unreasonable." The lack of any definition or standard in SGMA or the implementing regulations for what is or is not "unreasonable" leaves enormous uncertainty and opportunities for mischief by GSAs. Fortunately, the public trust doctrine does away with that undefined and ambiguous term. DWR can then, with confidence, reject or deem incomplete any GSP that accepts adverse impacts to surface waters that are identified as public trust waters.

Second, SGMA limits the review of adverse effects only to "beneficial uses." The public trust doctrine protects more than beneficial uses. As noted above, public trust uses are broad, expansive, and subject to change. Thus, any GSP that identifies any impact on surface waters must consider and minimize harm to *any* public trust use, not merely those identified as beneficial uses.

Third, SGMA permits delay of any GSP for a basin which has an adverse impact on surface flows until 2025.[27] The public trust doctrine imposes its duties and obligations on DWR now. It admits of no delay. Indeed, the public trust doctrine is sufficiently robust that it can require review of past decisions, approvals, and permits where new facts or uses emerge.[28] That is one of the central holdings of *National Audubon*.

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[25] See *id*. at 866-67.

[26] Wat. Code § 10721, subd. (x)(6), emphasis added.

[27] *Id*. § 10735.8, subd. (h). This section is somewhat ambiguous on whether the delayed submission is permitted where the only adverse impact is depletion of surface waters, or would also permit delay of any analysis of that impact where there are other adverse impacts, or might permit delay of any GSP as long as one of the impacts is to surface flows. Thankfully, the public trust doctrine contains no delay and hence no ambiguity.

[28] *National Audubon*, *supra*, 33 Cal.3d at 447.

Therefore, we advise that where the GSP identifies any interconnected surface water to the groundwater basin, DWR perform an additional level of analysis alongside the already extant SGMA analysis metrics.

For any such basin the GSP must include: (1) identification of whether affected surface waters are public trust resources; (2) identification of all public trust uses within those resources; (3) identification and analysis of potential adverse impacts of groundwater extractions on not only beneficial uses but all public trust resources and uses; and (4) protection of public trust uses not merely when the adverse impact is "unreasonable" but "whenever feasible."

These are discussed in detail below.

1. Identifying Any Public Trust Resources

If the GSP identifies an affected surface water the first step is for DWR to identify whether the surface water is a public trust resource.[29] The public trust doctrine mandates that "the title which a State holds to land under navigable waters is . . . held in trust for the people of the State."[30] In *ELF*, the Scott River was a navigable waterway and so constituted a public trust resource.[31] Thus, to satisfy its public trust duty, DWR must ensure that it has identified whether any affected surface water is a public trust water when making its decision regarding a submitted GSP.

2. Identifying Any Public Trust Uses

The second step is to identify any public trust uses within the groundwater basin for each public trust resource identified in the first step. Obviously many of these could also be "beneficial uses" but the analysis does not end there. Public trust uses can also include but are not limited to navigation, commerce, fishing, hunting, bathing, and swimming, as well as preserving natural spaces to "serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area."[32] As

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[29] Generally speaking, that determination is made if the surface water is navigable by any watercraft for any or all of the year. (See also *Illinois Central Railroad Co. v. State of Illinois* (1892) 146 U.S. 387, 436 ("[T]he [public trust] doctrine is founded upon the necessity of preserving to the public the use of navigable waters . . . .)"; *ELF*, *supra*, 26 Cal.App.5th at 857-58.)

[30] *ELF*, *supra*, 26 Cal.App.5th at 856-57 (quoting *Long Sault Development Co. v. Call* (1916) 242 U.S. 272, 278-79).

[31] *Id*. at 853.

[32] *Id*. at 857.

explained in *ELF*, "the range of public trust uses is broad" as well as "flexible, accommodating changing public needs."[33] Due to the flexibility of the doctrine, DWR should accommodate for the possibility of a use becoming recognized as a public trust use in the future. DWR should ensure that it has identified *all* public trust uses in each basin when making its decisions regarding a submitted GSP.

3. Identifying and Analyzing Potential Adverse Impacts of Groundwater Extractions on All Public Trusts Resources and Uses

The third step that DWR should undertake is to identify potential adverse impacts of groundwater extractions on the identified public trust resources and uses. As held in *ELF*, "the public trust doctrine applies if extraction of groundwater adversely impacts a navigable waterway to which the public trust doctrine does apply."[34] DWR must analyze all potential harm from groundwater pumping to the identified public trust resources and uses within each basin, and not merely those that could, under SGMA, be deemed "unreasonable."[35] This encompasses analyzing all instances where groundwater extractions "allegedly harm[] a navigable waterway" and "thereby violate[] the public

[33] *Ibid*. (quoting *San Francisco Baykeeper*, *supra*, 242 Cal. App. 4th at 233).

[34] *Id*. at 859 ("[T]he determinative fact is the impact of the activity on the public trust resource.").

[35] As a starting point, the following is a nonexhaustive list, formulated using the Groundwater Basin Boundary Assessment Tool and the list of legislatively declared navigable waterways in Harbors and Navigation Code sections 101 through 106, of groundwater basins with possible connections to navigable waterways and therefore public trust resources: Alexander Valley—Alexander Area, Cloverdale Area; Arroyo del Hambre Valley; Big Valley; Branscomb Town Area; Burns Valley; Calzona Valley; Clear Lake Cache Formation; Coastal Plain of Orange County; Covelo Round Valley; Eden Valley; Eel River Valley; Eureka Plain; Fort Bragg Terrace Area; Fort Ross Terrace Deposits; Garberville Town Area; Gravelly Valley; Happy Camp Town Area; Hettenshaw Valley; High Valley; Hyampom Valley; Larabee Valley; Laytonville Valley; Little Lake Valley; Lower Klamath River Valley; Lower Laytonville Valley; Lower Russian River Valley; Napa-Sonoma Valley; Napa-Sonoma Lowlands; Novato Valley; Pepperwood Town Area; Petaluma Valley; Potter Valley; Redding Area—Anderson, Bowman, Enterprise, Millville, South Battle Creek; Ross Valley; Sacramento Valley—Antelope, Bend, Butte, Colusa, Corning, Dye Creek, East Contra Costa, Los Molinos, North American, North Yuba, Redbluff, Solano, South American, South Yuba, Sutter, Vina, Wyndotte Creek, Yolo; Salinas Valley—Carrizo Plain, Forebay Aquifer, Paso Robles Area, Upper Valley Aquifer, 180/400 ft Aquifer; San Joaquin Valley—Chowchilla, Delta-Mendota, Eastern San Joaquin, Madera, Modesto, Tracy, Trulock; San Rafael Valley; Sand Point Area; Sanel Valley; Santa Clara Valley—East Bay Plain, Gilroy-Hollister Valley, Llagas Area, Niles Cone, San Mateo Plain, Santa Clara; Santa Rosa Valley—Healdsburg Area; Scotts Valley; Seiad Valley; Sherwood Valley; Suisun-Fairfield Valley; Ukiah Valley; Upper Lake Valley; Weott Town Area; Williams Valley; Wilson Grove Formation Highlands. Of course, any basin containing groundwater interconnected with navigable waters is subject to the public trust doctrine, whether it appears in this list or not. (See *ELF*, *supra*, 26 Cal.App.5th at 859-60.)

trust."[36] This step should be incorporated into the GSP regulations as the third public trust criteria. DWR should ensure it has identified and analyzed all potential adverse impacts of groundwater extractions on the public trust resources and uses during its GSP decision-making.

4. Analyzing How to Protect Public Trust Uses "Whenever Feasible"

The fourth step that DWR should include is to analyze the feasibility of protecting the identified public trust uses from the identified potential harms due to groundwater extractions. As held in *ELF* and *National Audubon*, "the state has an affirmative duty to . . . protect public trust uses whenever feasible."[37] Thus, DWR must analyze the feasibility of protecting public trust uses before making its decision regarding a GSP. However, not only must DWR analyze feasibility, DWR is legally obligated to protect the identified public trust uses within each basin "whenever feasible." If it is feasible for DWR to protect public trust uses in its decisions regarding GSPs, then DWR must do so—even if the depletions of interconnected surface water are not determined by DWR to have "significant and unreasonable adverse impacts" on its beneficial uses.[38]

Entirely independently of its review of submitted GSPs, the SGMA process is delayed until 2025 for any SGMA-based state board interim plan intended to remedy a condition where the groundwater extractions result in significant depletions of interconnected surface waters in probationary basins.[39] There is, however, no waiting period under the public trust doctrine. DWR has the authority—and the obligation—to act *now*. While SGMA bars any interim plan to remedy significant depletions of surface waters for five years, the public trust doctrine requires immediate, affirmative action by DWR.

Thus, DWR should determine whether any GSA is not in place or is delaying submission of a GSP to the 2025 deadline on the basis that an identified undesirable result is impaired surface flows. The public trust doctrine was not supplanted or incorporated into SGMA, and it is not suspended by SGMA's internal deadlines. If DWR intends to takes its public trust obligations seriously in the SGMA process, it must make this determination now.

Thankfully, these duties fit neatly into the already extant procedures and standards

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[36] *Id*. at 859-60.

[37] *Id*. at 862 (quoting *National Audubon, supra,* 33 Cal.3d at 446-47).

[38] Wat. Code § 10721, subd. (x)(6).

[39] *Id*. § 10735.8, subd. (h). The ambiguity in SGMA as to which plans are subject to delay is noted above.

for DWR under SGMA to review submitted GSPs. We believe that these additional steps and standards required by the public trust doctrine enhance SGMA without requiring new regulations or additional burdens on DWR. It simply requires a somewhat more robust analysis if public trust surface waters are implicated by the GSP.

Conclusion

DWR must consider the public trust doctrine in its decisions to approve, deem incomplete, or reject the submitted GSPs. The Environmental Law Foundation encourages DWR to formally incorporate the above considerations into its GSP reviews.

If it would assist DWR in fulfilling its public trust duties while it undertakes the GSP decision-making process, the Environmental Law Foundation is happy to provide further legal analysis and discussion, whether in written follow-up comments or in meetings with DWR staff. The Environmental Law Foundation hopes to see DWR embrace its affirmative duty to consider the effect of groundwater extractions on public trust resources in its SGMA decisions and to protect public trust uses whenever feasible. The health of our waters and communities depends on DWR's full and careful consideration of each GSP's impact on the public trust.

Sincerely,

James Wheaton
Environmental Law Foundation

SCOPE

Santa Clarita Organization for Planning and the Environment

TO PROMOTE, PROTECT AND PRESERVE THE ENVIRONMENT, ECOLOGY
AND QUALITY OF LIFE IN THE SANTA CLARITA VALLEY

POST OFFICE BOX 1182, SANTA CLARITA, CA 91386
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10-14-21

Santa Clarita Valley GSA
27234 Bouquet Canyon Rd
Santa Clarita, CA 91350

Submitted Via email to: ekang@scvwa.org, lcogan@gsiws.com , lparisi@gsiws.com
(unable to use your online form as it does not accept uploads)

Re: Comments on the Santa Clara River Valley East Groundwater Subbasin Draft Groundwater Sustainability Plan

Please enter into the Administrative record

Dear Honorable Board members and Plan Consultants:

SCOPE members have attended public workshops on this plan and/or reviewed videos of workshops. Many of our members have been actively involved in water issues in this Valley for many years due to concerns for the viability of the Santa Clara River and our water resource sustainability, both for the public and for the environment.

It was with some hope for future sustainability that we invested our time and energy into the SIGMA process. It is with continued hope for the sustainability of our water resources that we provide these comments expressing our concerns with this plan.

Data Gaps

First, the Plan describe many "data gaps" throughout the document and particularly in Chapter 9[1]. Yet the Plan sets the ground water trigger level to begin action at the lowest historic drought ground water level and the Plan gears the GDE level at only two feet above the historic low[2]. The justification for this low trigger level appears to be that there have been no undesirable impacts to date, a statement with which we disagree (discussion to follow below). This leads us to wonder if the Agency's failure to see impacts might be influenced by SCV Water Agency (who controls the GSP planning through a majority of Board members on the GSA Board and financing), in an effort to continue or augment its current pumping regime.

[1] "Data gaps exist in the Basin, including groundwater levels within the GDE area, elevation control of well heads and river bottom, domestic well water quality, and subsidence benchmarks. Addressing data gaps will improve the understanding of the Basin and reduce uncertainty regarding decision making. (pg 9-1)."

[2] Pages ES-17 through ES-19

Using the historic low as a baseline seems imprudent, especially after admitting a lack of data in areas from subsidence[3], to water quality, and ground water levels in GDE areas. The Plan includes statements such as this one regarding subsidence:

> *9.5.4.3 Subsidence - Minimum thresholds for subsidence have been established to avoid damage to critical infrastructure and land uses. As noted in Section 5, subsidence can be caused by activities stemming from groundwater pumping, tectonics, and oil and gas production. Each of these takes place in the Basin. While significant and unreasonable subsidence caused from the whole of these activities has not been observed,* ***groundwater pumping may temporarily cause groundwater level declines of up to 150 feet in the future.*** *It is believed* [? the Plan admits there has been no investigation. What is the basis for this belief?] *the geologic framework in this Basin has limited susceptibility to subsidence resulting from groundwater extraction, but there are data gaps.*

Data gaps may also have been caused by the consultant's decision to use only specific wells[4] rather than compiling data from all or a majority of wells as was done in the downstream United Conservation District Plan. No private well owner information was collected or included in the Plan, even though these wells and the people dependant on them, (who are often located in the upper reaches of tributaries), may be the most affected by a drop in the ground water levels. This is a data gap not discussed in the Plan.

The very purpose of SIGMA is to avoid undesirable outcomes. Those outcomes, including inability of private well owners to obtain water, may <u>*not*</u> be avoidable if trigger levels are set so low that corrective action comes too late and is inadequate.

- We recommend that the trigger level be set higher, preferably at the 2011 level, which was a more normal year. This would also allow better coordination with downstream users and be more protective of small pumpers and of GDEs.

<u>Timeline for Completing Research to Address Data Gaps</u>

There is no stated or apparent timeline for completion of research to fill these data gaps even though they are essential for evaluating ground water level triggers that would avoid undesirable outcomes. It appears therefore that the agency intends to wait, possibly as long as the five-year update. This is not acceptable. GDEs may be irreparably harmed, especially aquatic species in those areas, by a delay in information.

- In light of the delay in obtaining research data, we recommend that the ground water level trigger be set at the 2011 water level as a precaution until data for all areas is obtained.

<u>No Undesirable Outcomes to Date?</u>

The Plan seeks to legitimize is use of the historic drought level low as its baseline with the statement:

> "The context for the sustainability goal is the recognition that no undesirable effects have occurred in the Basin to date." (Page 8-6)

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[3] "Prior to development of this GSP, land subsidence data had not been compiled and evaluated to assess the effects of groundwater extraction on land surface elevations." (Page 9-7)

[4] See Table 5-6, 5-7 We note that the area below the Valencia treatment plant is incorrectly marked on Table 5-7. The treatment plant is actually located much further east next to I-5, not in the indicated location NLF wells B6, B10, C4, C5 are located downstream of the treatment plant where ground water levels are influenced by the permanent release of large amounts treated effluent water.

While according to the well data used in the Plan, wells have recovered after a drought, other indicators of undesirable impacts have been substantial. Further, locally and statewide we have not seen recovery of ground water levels. DWR and others estimate we would need 140% of precipitation to recover lost storage and ground water[5]. We disagree with the above statement and assert that there are many undesirable impacts which the Agency has failed to acknowledge.

These undesirable impacts include:

- Pumping at lower levels of the Saugus Aquifer substantially increases hardness and other water quality parameters that were not previously monitored (see data gaps in section 9). This causes expensive plumbing problems and other issues for the general public. These affects have already been experienced in previous droughts and now in the current drought.
- The drying out and loss of riparian habitat as water levels retreat below the vadose zone in the main stem of the Santa Clara River especially in the upper watershed just west and further east of Bouquet bridge. This is a negative, unreasonable, and undesirable effect.
- Vegetation die-off in the eastern portion of the study area east of Bouquet Creek, loss of year-round instream flow in San Francisquito Creek and various previously year round springs
- Degradation of air quality from blowing dust as moisture is eliminated from the soil is already occurring at current levels of pumping.
- Tree die off that occurred in upland areas such as the die off of oaks in the Valley Oak Savannah (west of I-5 between McBean Pky and Valencia Blvd. in Stevenson Ranch)

Chronic lowering of groundwater levels

While the Plan erroneously claims that no undesirable impacts have occurred (please see our objections above), and admits substantial data gaps as previously stated, it contemplates even lower future water levels in its efforts to accommodate massive and unsustainable building in the SCV by finding there will be no impact.

> *"But the Groundwater Management Plan, Santa Clara River Valley Groundwater Basin, East Subbasin, Los Angeles County, California (Basin Operating Plan) described in Section 6 contemplates groundwater levels lower than historical levels during dry years,* to accommodate **future buildout**, conjunctive use operating strategies, and **climate change** (LSCE, 2003). *(p. 8-4)*

In addition to claiming there were no impacts from pumping at these levels, the Plan implies that water level drops were caused by drought (a data gap to be addressed in the future), not their own pumping. This theory is not borne out by their own well records where agency wells removed from service in 2020 due to PFAS pollution experienced a marked rise in water levels[6] even during this last year that saw the lowest rainfall on record in the SCV.

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[5] **"This is how much rain California needs to get out of the drought" Sept. 30th 2021,** https://www.sfgate.com/weather/article/How-much-rain-California-need-end-drought-16497191.php

[6] https://yourscvwater.com/your-water/#wellproductionlevels, see particularly well levels for U4, U5, Q2, T7, Clark, Valley Center and others where pumping was discontinued in 2020 due to PFAS pollution and where water levels rose substantially in spite of severely diminished rainfall. We note that United

Again, the purpose of SIGMA is to identify and avoid unacceptable outcomes. Since ground water extraction is already lowering water levels and causing undesirable effects, further lowering it to create hardened demand (housing) and not addressing a reduction in pumping to account for Climate Change will not resolve the issues, but only make them worse. The substantial pumping modeled for the existing Basin Plan Yield (table on page 6-29) cannot be supported when undesirable impacts are already occurring at present with a much-reduced pumping regime. The actions to address this unsustainable pumping as described in Chapter 9 should be implemented immediately.

The Plan Does Not Fulfill its Obligation to Address the Public Trust

We concur with and restate the position of the Friends of the Santa Clara River that the Public Trust Doctrine imposes an obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d419).

Accordingly, groundwater plans should consider potential impacts to and appropriate protections for interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters. In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, groundwater dependent ecosystems, and interconnected surface waters.

Availability of surface flow, riparian vegetation and riparian canopy cover for instream fish and wildlife migration is an important part of ensuring species viability. Therefore, the major tributaries of the Santa Clara River, including Castaic Creek, San Francisquito Creek, Placerita Creek, the South Fork and the Upper Watershed main stem of the Santa Clara River (east of Bouquet Creek) should have been included in GDE analysis.

Public Outreach

Disadvantaged communities don't seem to be included in the outreach process as required by SIGMA. We appreciate the Agency's efforts to provide some Spanish language materials but believe feedback on the Plan would be more complete with more inclusion of this group.

Conclusion

We join with the Friends of the Santa Clara River in urging the Agency to:

- Reset the ground water trigger levels to the 2011 levels as a precaution against future findings and the results from investigations of the substantial data gaps in the current Plan (as indicated throughout Chapter 9).
- Evaluate the upper water shed of the Santa Clara River, (east of Bouquet Creek) and the river's tributaries as GDEs and include the Valley Oaks Savannah as a

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Conservation District's modeling also showed that pumping did impact water levels. We include these well records into these comments by reference.

GDE. Without these included the minimum thresholds, measurable objectives and undesirable results on beneficial users and uses remain incomplete.

- Improve outreach to DAC's to ensure human right to water considerations, as well as safe and affordable drinking water.
- Climate change considerations remain lacking, especially in light of mega drought trends, and future conditions and allocation from both the Colorado River and Delta.
- Provide a timeline as to when data gaps will be addressed.

Thank you in advance for addressing these issues.

Sincerely,

Lloyd Carder, II
Board member

October 15, 2021

Santa Clarita Valley GSA
27234 Bouquet Canyon Road
Santa Clarita, CA 91350
Submitted via email: lparisi@gsiws.com; lcogan@gsiws.com

Re: Public Comment Letter for Santa Clara River Valley East Subbasin Draft GSP

Dear Laura Parisi,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Santa Clara River Valley East Subbasin 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, drinking water users, 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 Clara River Valley East Subbasin 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"
Attachment E	Maps of representative monitoring sites in relation to key beneficial users

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 Clara River Valley East Subbasin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

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

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **insufficient**. We note the following deficiencies with the identification of these key beneficial users.

- The GSP fails to identify and map the locations of DACs, and describe the size of each DAC population within the subbasin.
- The GSP provides a map of domestic well density in Figure 3-6, but fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the subbasin.
- The GSP fails to identify the population dependent on groundwater as their source of drinking water in the subbasin. Specifics are not provided on how much each DAC community relies on a particular water supply (e.g., what percentage is supplied by groundwater).

These missing elements are required for the GSA to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions.

RECOMMENDATIONS

- Describe and map the locations of DACs and provide the size of each DAC population. The DWR DAC mapping tool[1] can be used for this purpose.
- Include a map showing domestic well locations and average well depth across the subbasin.
- Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems).

[1] The DWR DAC mapping tool is available online at: https://gis.water.ca.gov/app/dacs/

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISW) is **sufficient**. We commend the GSA for their comprehensive analysis of ISWs in the subbasin. The plan used groundwater well hydrographs, river thalweg elevation data, and precipitation data to assess six individual reaches of the Santa Clara River to describe characteristics of each. The GSP presents three separate maps that indicate the nature of surface water and groundwater exchanges along the Santa Clara River during wet, normal, and dry climatic conditions. The terms potentially gaining and potentially losing are used to describe each of the six reaches for each of the three climatic conditions.

The GSP states (p. 5-54): *"The river is interconnected directly with the Alluvial Aquifer, primarily in the western and central portions of the Basin. The river also has an indirect connection with the Saugus Formation in the western portion of the Basin, which is an area where the Saugus Formation is discharging its water into the Alluvial Aquifer, and thereby providing an upwards driving force for groundwater to discharge into the Santa Clara River in certain localized reaches west of I-5 at certain times."* The GSP does not provide an overall map showing the interconnected and disconnected reaches. Note the regulations [23 CCR §351(o)] define ISW as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted". "At any point" has both a spatial and temporal component. Even short durations of interconnections of groundwater and surface water can be crucial for surface water flow and supporting environmental users of groundwater and surface water.

RECOMMENDATION
• In addition to the maps showing gaining and losing reaches, provide an additional map that shows interconnected and disconnected reaches. State clearly in the text that losing reaches do not equate to disconnected reaches.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset) and other sources. However, we found that mapped features in the NC dataset were improperly disregarded. NC dataset polygons were incorrectly removed in areas adjacent to irrigated fields or in floodplains due to the presence of surface water. However, this removal criteria is flawed since GDEs, in addition to groundwater, can rely on multiple water sources – including flood flows or shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields – simultaneously and at different temporal/spatial scales. NC dataset polygons adjacent to irrigated land or in floodplains can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on this factor.

To analyze GDEs based on groundwater levels, the GSP states that (p. 5-95) *"data is taken conservatively from modeled groundwater depths throughout the Basin in the late dry season (September) during a wet year (2011)."* We recommend using groundwater data from multiple seasons and water year types to determine the range of depth to groundwater around NC dataset polygons. Other groundwater data used to assess GDEs is not clearly presented. Table 5-6 presents the locations and the historical low groundwater levels of GDE monitoring wells (GDE-A through GDE-E). However, on Figure 7-14 (Section 7.3.8.2), wells GDE-A through GDE-E are labeled "New Observation Well (to be constructed)".

We commend the GSA for including an inventory of flora and fauna species and habitat types in the subbasin's GDEs. Table 5-4 presents a general description of each segment of the Santa Clara River, including GDEs and flora species. Table 5-5 presents a summary of the potential GDEs, including vegetation classification. Special status fauna are discussed in riparian habitat (5.3.1.3) and aquatic habitat (5.3.1.4).

RECOMMENDATIONS
● 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 digital elevation model (DEM) to estimate depth-to-groundwater contours across the landscape. ● Clear up the conflicting information in the GSP about GDE monitoring wells (GDE-A through GDE-E). Table 5-6 presents the locations and the historical low groundwater levels of these wells. However, Figure 7-14 (Section 7.3.8.2) labels wells GDE-A through GDE-E as "New Observation Well (to be constructed)". ● 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[2,3] to be included in the water budget. The integration of native vegetation into the water budget is **sufficient**. We commend the GSA for including the groundwater demands of this ecosystem in the historical, current and projected water budgets. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin.

RECOMMENDATION
● State whether or not there are managed wetlands in the subbasin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

[2] "'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)]

[3] "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]

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[4] is not fully met by the description in the Communications & Engagement Plan (Appendix N). 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 public notices, opportunities for public comments provided at GSA board meetings and hearings, and attendance at public workshops. There is no specific outreach described for DACs or domestic well owners, or a plan for public engagement during the GSP's implementation phase.
- The Communications & Engagement Plan does not include outreach and engagement that is specifically directed to environmental stakeholders during the GSP's development or implementation phases.

RECOMMENDATION
• Include a more detailed and robust Communications & Engagement Plan that describes active and targeted outreach to engage DACs, domestic well owners, and environmental 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.

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]

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[4] "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)]

[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)]

Disadvantaged Communities and Drinking Water Users
For chronic lowering of groundwater levels, the GSP does not analyze direct and indirect impacts on DACS or drinking water users when defining undesirable results, or evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders.

For degraded water quality, the GSP identifies the following as natural constituents of concern (COCs): nitrate, total dissolved solids (TDS), chloride, and sulfate. The GSP identifies the following as anthropogenic COCs: perchlorate, trichloroethylene (TCE), tetrachloroethylene (PCE), chloroform, 1,1-dichloroethene, dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), and per- and polyfluoroalkyl substances (PFAS).

The GSP states (p. 8-30): *"Minimum thresholds pertaining to salts and nutrients measured in groundwater are as follows: concentrations of TDS, chloride, nitrate, and sulfate that exceed WQOs and basin-wide assimilative capacity described in the 2016 SNMP in 20 percent of wells monitored in each management zone."* The GSP states that no minimum thresholds have been established for contaminants because state regulatory agencies, including LARWQCB and DTSC, have the responsibility and authority to regulate and direct actions that address contamination. However, in addition to coordinating with water quality regulatory programs, SMC should be established for all COCs in the subbasin impacted by groundwater use and/or management. Naturally occurring COCs can be exacerbated as a result of groundwater use or groundwater management within the subbasin.

For degraded water quality, the GSP only includes a very general discussion of impacts to DACs or drinking water users when defining undesirable results and evaluating the cumulative or indirect impacts of proposed minimum thresholds.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on DACs and drinking water users when defining undesirable results for chronic lowering of groundwater levels.
- Consider and evaluate the impacts of minimum thresholds and measurable objectives on DACs and drinking water users within the subbasin. Further describe the impact of reaching or 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 drinking water users 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."
- Set minimum thresholds and measurable objectives for water quality constituents within the subbasin including naturally occurring constituents that can be exacerbated as a result of groundwater use or groundwater management. Ensure they align with drinking water standards[8].

[8] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on DACs and drinking water users.

<u>Groundwater Dependent Ecosystems and Interconnected Surface Waters</u>

The GSP sets minimum thresholds for chronic lowering of groundwater levels as the lowest groundwater elevation from the 95-year future-conditions model or lowest historically observed groundwater elevation in the modern era (i.e., since 1980), whichever is lower. The GSP states (p. 5-97): *"The existing GDEs have been sustained through a recent drought (2012–2016) that resulted in historically low groundwater levels. Table 5-6 summarizes the historical lows recorded in several representative locations along the river corridor. Figure 5-61 identifies these locations. When groundwater levels are above these recorded temporary historical lows, it can be inferred that GDEs are not significantly and unreasonably affected."* However, no evidence of GDE impacts during the 2012-2016 drought were provided. By assuming that GDEs can be sustained on historic low groundwater levels (or lower) and the subbasin 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 adverse impacts (such as widespread tree mortality or loss of critical habitat for steelhead) can exceed what had occurred prior to 2015.

Similarly, the GSP sets the minimum threshold for depletion of interconnected surface water as the surface water depletion caused by groundwater extraction as measured by groundwater levels falling below the lowest predicted future groundwater elevation measured at GDE-area monitoring wells. However, the true impacts to ecosystems under this scenario are not fully discussed in the GSP. The GSP does not explain how the chosen minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin, such as increased mortality and inability to perform key life processes (e.g., reproduction, migration). In fact, the GSP states (p. 8-43): *"Because the minimum thresholds are based on future predicted water levels and are lower than historical levels, a data gap exists regarding the actual response of GDEs to a groundwater elevation that is at or below the historical low water level but above the minimum threshold for interconnected surface water."*

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, alterations in fish spawning/rearing/migration) 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 subbasin. Defining undesirable results is the crucial first step before the minimum thresholds[10] can be determined.

- When establishing SMC for the basin, please consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs should include "impacts on groundwater dependent ecosystems".

- When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached[11]. The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts to environmental beneficial users of surface and groundwater 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 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 DWR change factors for 2030 and 2070. However, the GSP does 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 the inclusion of climate change into key inputs (e.g., precipitation and evaporation) of the projected water budget. However, climate change was not incorporated into surface water flow inputs. 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

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

and projected climate change effects on surface water flow volumes, 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 climate change, including extremely wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions. • Incorporate surface water flow inputs that are adjusted for climate change to the projected water budget. • 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 specific plans to increase the Representative Monitoring Sites (RMSs) in the monitoring network that represent water quality conditions and shallow groundwater elevations near DACs and domestic wells in the subbasin.

Figure 7-10 (Representative Monitoring Well Network for the Alluvial Aquifer) shows that no monitoring wells are located across portions of the subbasin near DACs and domestic wells (see maps provided in Attachment E). The representative monitoring network fails to represent groundwater conditions for DACs in the subbasin near the town of Newhall. Beneficial users of groundwater may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network[14].

The GSP provides comprehensive discussion of data gaps for GDEs and ISWs in Section 7.3.7 (Interconnected Surface Water GDE Monitoring Network) and Section 9.5.1.1 (Installation of Piezometers within the GDE Area). The GSP discusses plans for GDE-related biological monitoring in Section 7.3.7.3 (GDE Monitoring) and Section 9.5.1.5 (Upland GDE Verification and Assessment).

RECOMMENDATIONS
• Provide maps that overlay current and proposed monitoring well locations with the locations of DACs and domestic wells to clearly identify potentially impacted areas. Increase the number of RMSs in the shallow aquifer across the subbasin as needed to adequately monitor all groundwater condition indicators. Prioritize proximity to DACs and drinking water users when identifying new RMSs.

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

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, and drinking water users. 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.

RECOMMENDATIONS

- For DACs and domestic well owners, include 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.

- The GSP discusses managed aquifer recharge projects. Note that recharge ponds, reservoirs, and facilities for managed aquifer 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"[15].

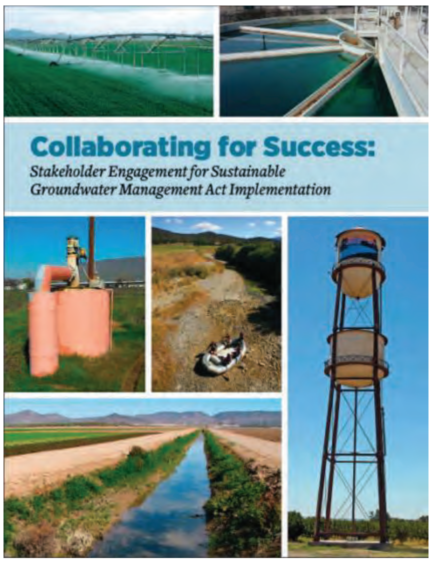
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[15] 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



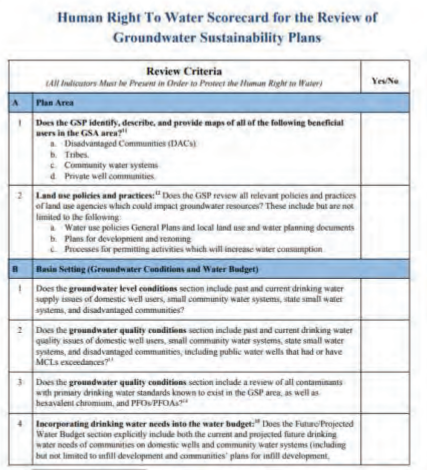
Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement 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

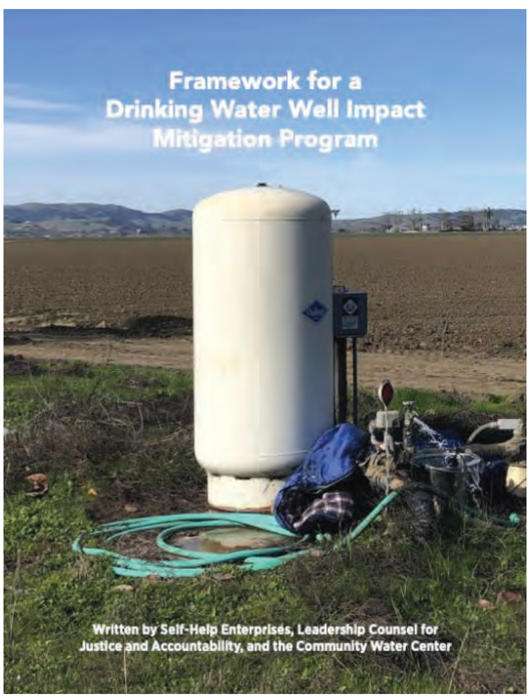


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	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.	

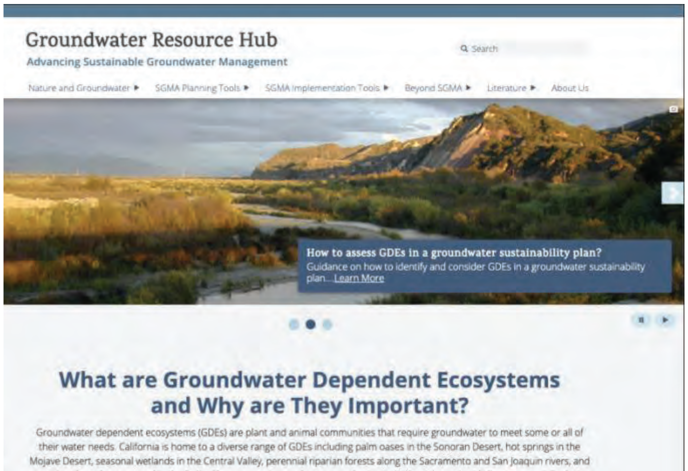
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in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

Drinking Water Well Impact Mitigation Framework



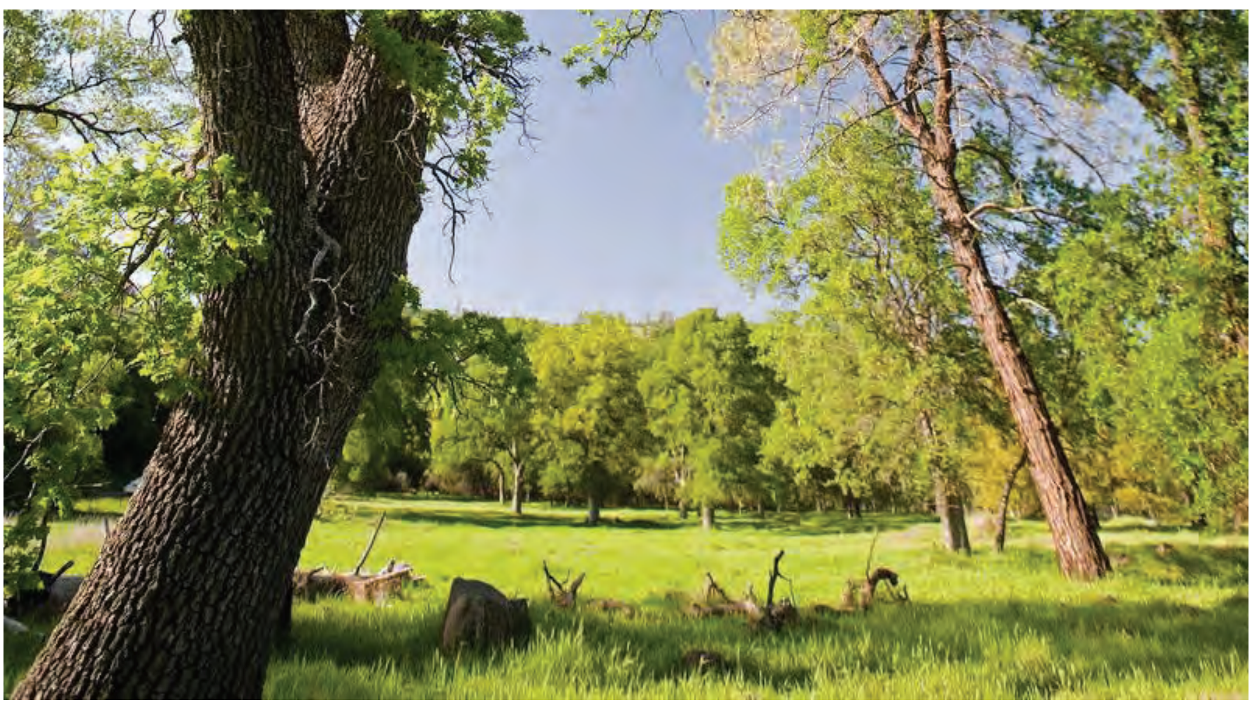
The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure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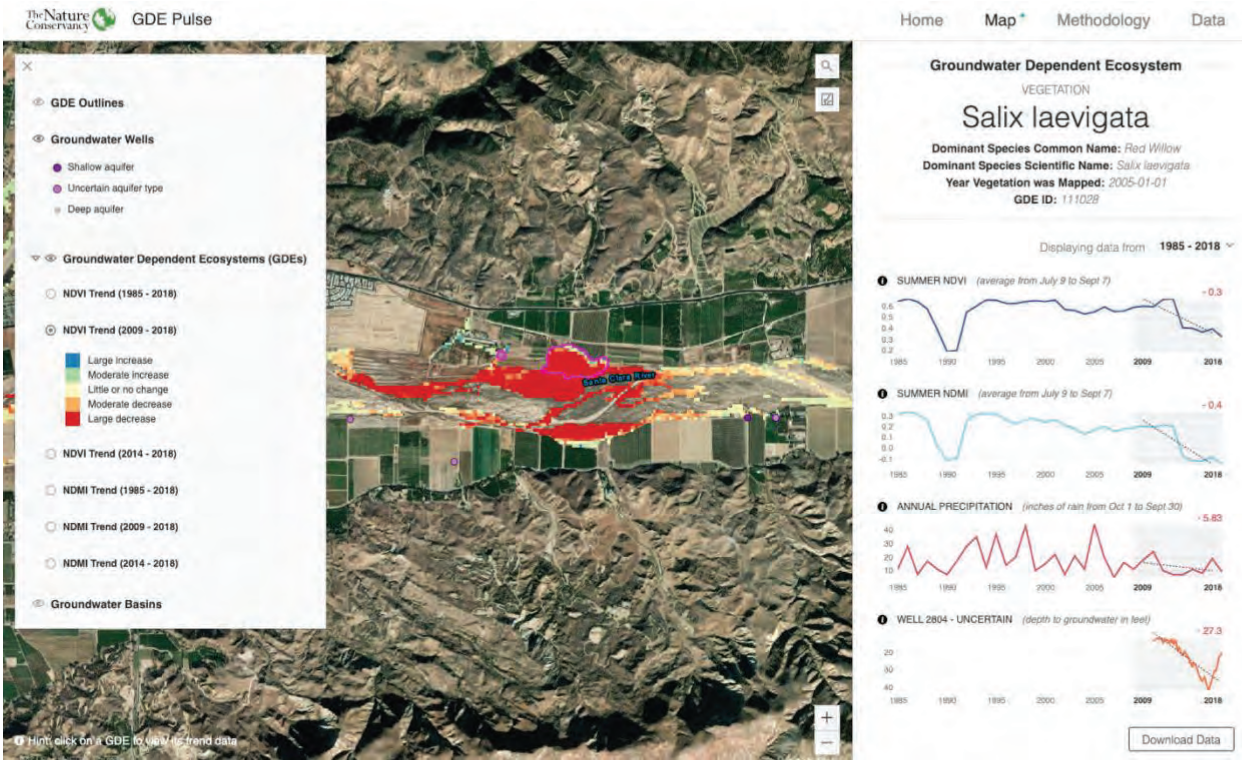
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

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.

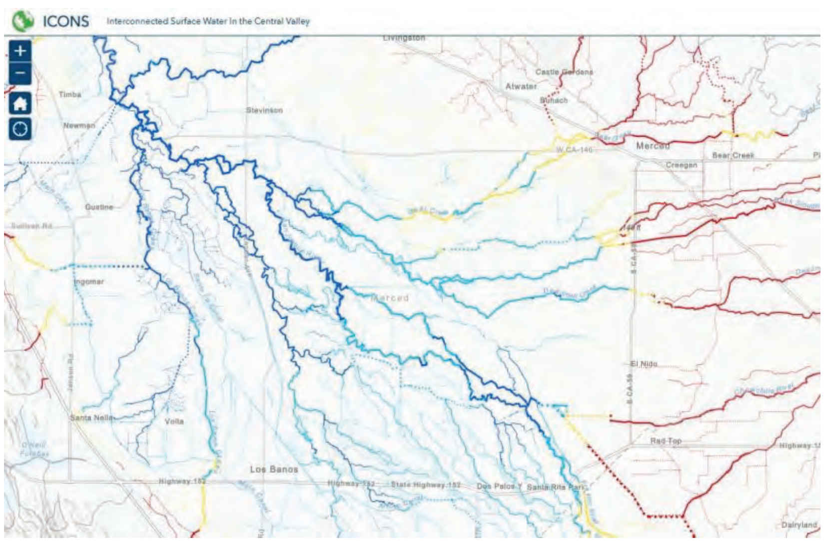
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water 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 Clara River Valley - Santa Clara River Valley East 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 Clara River Valley - Santa Clara River Valley East Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife’s BIOS[2] as well as on The Nature Conservancy’s science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
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 platyrhynchos	Mallard			
Anas strepera	Gadwall			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			

[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

Aythya americana	Redhead		Special Concern	BSSC - Third priority
Aythya collaris	Ring-necked Duck			
Aythya marila	Greater Scaup			
Aythya valisineria	Canvasback		Special	
Botaurus lentiginosus	American Bittern			
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Cistothorus palustris palustris	Marsh Wren			
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Mergus serrator	Red-breasted Merganser			
Numenius phaeopus	Whimbrel			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oreothlypis luciae	Lucy's Warbler		Special Concern	BSSC - Third priority
Oxyura jamaicensis	Ruddy Duck			
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Piranga rubra	Summer Tanager		Special Concern	BSSC - First priority
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Rallus limicola	Virginia Rail			

Recurvirostra americana	American Avocet			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Setophaga petechia brewsteri	A Yellow Warbler	Bird of Conservation Concern	Special Concern	
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Vireo bellii	Bell's Vireo			
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
CRUSTACEANS				
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Threatened	Special	IUCN - Vulnerable
Cambaridae fam.	Cambaridae fam.			
Cyprididae fam.	Cyprididae fam.			
Hyalella spp.	Hyalella spp.			
FISH				
Catostomus santaanae	Santa Ana sucker	Threatened	Special Concern	Endangered - Moyle 2013
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	Endangered	Endangered	Endangered - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Anaxyrus californicus	Arroyo Toad	Endangered	Special Concern	ARSSC
Pseudacris cadaverina	California Treefrog			ARSSC
Rana 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
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
Taricha torosa	Coast Range Newt		Special Concern	ARSSC
INSECTS & OTHER INVERTS				
Abedus breviceps				Not on any status lists
Abedus spp.	Abedus spp.			
Aeshnidae fam.	Aeshnidae fam.			

Agapetus arcita	A Caddisfly			
Agapetus spp.	Agapetus spp.			
Alotanypus spp.	Alotanypus spp.			
Ambrysus spp.	Ambrysus spp.			
Ameletus spp.	Ameletus spp.			
Anax junius	Common Green Darner			
Anopheles spp.	Anopheles spp.			
Apedilum spp.	Apedilum spp.			
Argia agrioides	California Dancer			
Argia lugens	Sooty Dancer			
Argia sedula	Blue-ringed Dancer			
Argia spp.	Argia spp.			
Argia vivida	Vivid Dancer			
Baetis adonis	A Mayfly			
Baetis spp.	Baetis spp.			
Baetis tricaudatus	A Mayfly			
Belostomatidae fam.	Belostomatidae fam.			
Brechmorhoga mendax	Pale-faced Clubskimmer			
Brillia flavifrons				Not on any status lists
Brillia spp.	Brillia spp.			
Callibaetis spp.	Callibaetis spp.			
Centroptilum spp.	Centroptilum spp.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Coenagrionidae fam.	Coenagrionidae fam.			
Corisella spp.	Corisella spp.			
Corixidae fam.	Corixidae fam.			
Cricotopus annulator				Not on any status lists
Cricotopus bicinctus				Not on any status lists
Cricotopus spp.	Cricotopus spp.			
Cricotopus trifascia				Not on any status lists
Cryptochironomus spp.	Cryptochironomus spp.			
Culoptila spp.	Culoptila spp.			
Dicrotendipes spp.	Dicrotendipes spp.			
Dytiscidae fam.	Dytiscidae fam.			
Enallagma praevarum	Arroyo Bluet			
Enallagma spp.	Enallagma spp.			
Endochironomus spp.	Endochironomus spp.			
Enochrus carinatus				Not on any status lists

Enochrus spp.	Enochrus spp.			
Epeorus spp.	Epeorus spp.			
Ephemerella spp.	Ephemerella spp.			
Ephydridae fam.	Ephydridae fam.			
Eukiefferiella claripennis				Not on any status lists
Eukiefferiella spp.	Eukiefferiella spp.			
Fallceon quilleri	A Mayfly			
Fallceon spp.	Fallceon spp.			
Gomphidae fam.	Gomphidae fam.			
Gumaga griseola	A Bushtailed Caddisfly			
Gumaga spp.	Gumaga spp.			
Hetaerina americana	American Rubyspot			
Heterlimnius spp.	Heterlimnius spp.			
Holorusia hespera				Not on any status lists
Hydrobius fuscipes				Not on any status lists
Hydrophilidae fam.	Hydrophilidae fam.			
Hydropsyche alternans				Not on any status lists
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila ajax	A Caddisfly			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Ischnura denticollis	Black-fronted Forktail			
Ischnura spp.	Ischnura spp.			
Isoperla spp.	Isoperla spp.			
Labrundinia maculata				Not on any status lists
Labrundinia spp.	Labrundinia spp.			
Laccobius spp.	Laccobius spp.			
Lepidostoma acarolum				Not on any status lists
Lepidostoma spp.	Lepidostoma spp.			
Libellulidae fam.	Libellulidae fam.			
Limnophyes spp.	Limnophyes spp.			
Malenka bifurcata				Not on any status lists
Malenka spp.	Malenka spp.			
Micrasema arizonica				Not on any status lists
Micrasema spp.	Micrasema spp.			
Microcylloepus spp.	Microcylloepus spp.			
Micropsectra nigripila				Not on any status lists

Micropsectra spp.	Micropsectra spp.			
Microtendipes spp.	Microtendipes spp.			
Mideopsis spp.	Mideopsis spp.			
Nanocladius spp.	Nanocladius spp.			
Nectopsyche spp.	Nectopsyche spp.			
Nemouridae fam.	Nemouridae fam.			
Ochrotrichia alexanderi	A Caddisfly			
Ochrotrichia spp.	Ochrotrichia spp.			
Ochthebius spp.	Ochthebius spp.			
Optioservus spp.	Optioservus spp.			
Orthocladius appersoni				Not on any status lists
Orthocladius spp.	Orthocladius spp.			
Paltothemis lineatipes	Red Rock Skimmer			
Parachironomus abortivus				Not on any status lists
Parachironomus spp.	Parachironomus spp.			
Paracladopelma alphaeus				Not on any status lists
Paracladopelma spp.	Paracladopelma spp.			
Parametriocnemus lundbeckii				Not on any status lists
Parametriocnemus spp.	Parametriocnemus spp.			
Paraphaenocladius spp.	Paraphaenocladius spp.			
Paratanytarsus spp.	Paratanytarsus spp.			
Peltodytes callosus				Not on any status lists
Peltodytes spp.	Peltodytes spp.			
Pentaneura inconspicua				Not on any status lists
Pentaneura spp.	Pentaneura spp.			
Petrophila spp.	Petrophila spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Polypedilum spp.	Polypedilum spp.			
Postelichus spp.	Postelichus spp.			
Procladius spp.	Procladius spp.			
Progomphus borealis	Gray Sanddragon			
Pseudochironomus spp.	Pseudochironomus spp.			
Pseudosmittia spp.	Pseudosmittia spp.			
Psychodidae fam.	Psychodidae fam.			
Rheotanytarsus hamatus				Not on any status lists
Rheotanytarsus spp.	Rheotanytarsus spp.			

Rhionaeschna multicolor	Blue-eyed Darner			
Sanfilippodytes spp.	Sanfilippodytes spp.			
Serratella micheneri	A Mayfly			
Simuliidae fam.	Simuliidae fam.			
Simulium anduzei				Not on any status lists
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Sperchon stellata				Not on any status lists
Stictotarsus spp.	Stictotarsus spp.			
Sympetrum corruptum	Variegated Meadowhawk			
Tanytarsus angulatus				Not on any status lists
Tanytarsus spp.	Tanytarsus spp.			
Telebasis salva	Desert Firetail			
Thalassotrechus barbarae				Not on any status lists
Thienemannimyia spp.	Thienemannimyia spp.			
Tipulidae fam.	Tipulidae fam.			
Tribelos spp.	Tribelos spp.			
Tricorythodes spp.	Tricorythodes spp.			
Tropisternus ellipticus				Not on any status lists
Tropisternus salsamentus				Not on any status lists
Tropisternus spp.	Tropisternus spp.			
Tvetenia spp.	Tvetenia spp.			
Veliidae fam.	Veliidae fam.			
Wormaldia anilla	A Caddisfly			
Wormaldia spp.	Wormaldia spp.			
MOLLUSKS				
Ferrissia spp.	Ferrissia spp.			
Helisoma spp.	Helisoma spp.			
Lymnaea spp.	Lymnaea spp.			
Lymnaeidae fam.	Lymnaeidae fam.			
Menetus opercularis	Button Sprite			CS
Menetus spp.	Menetus spp.			
Physa acuta	Pewter Physa			Not on any status lists
Physa spp.	Physa spp.			
Planorbidae fam.	Planorbidae fam.			
Pyrgulopsis castaicensis	A Freshwater Snail			E
Stagnicola elodes	Marsh Pondsnail			CS
PLANTS				
Alnus rhombifolia	White Alder			

Anemopsis californica	Yerba Mansa			
Arundo donax	NA			
Azolla filiculoides	NA			
Azolla microphylla	Mexican mosquito fern		Special	CRPR - 4.3
Baccharis salicina				Not on any status lists
Berula erecta	Wild Parsnip			
Bolboschoenus maritimus paludosus	NA			Not on any status lists
Carex alma	Sturdy Sedge			
Castilleja minor minor	Alkali Indian-paintbrush			
Castilleja minor spiralis	Large-flower Annual Indian-paintbrush			
Cotula coronopifolia	NA			
Cyperus involucratus	NA			
Datisca glomerata	Durango Root			
Eleocharis macrostachya	Creeping Spikerush			
Eleocharis montevidensis	Sand Spikerush			
Eleocharis parishii	Parish's Spikerush			
Eleocharis rostellata	Beaked Spikerush			
Eustoma exaltatum	NA			
Euthamia occidentalis	Western Fragrant Goldenrod			
Juncus acutus leopoldii	Spiny Rush		Special	CRPR - 4.2
Juncus dubius	Mariposa Rush			
Juncus macrophyllus	Longleaf Rush			
Juncus rugulosus	Wrinkled Rush			
Juncus textilis	Basket Rush			
Juncus xiphioides	Iris-leaf Rush			
Lasthenia glabrata coulteri	Coulter's Goldfields		Special	CRPR - 1B.1
Lemna valdiviana	Pale Duckweed			
Ludwigia peploides peploides	NA			Not on any status lists
Lythrum californicum	California Loosestrife			
Mimulus cardinalis	Scarlet Monkeyflower			
Mimulus guttatus	Common Large Monkeyflower			
Mimulus parishii	Parish's Monkeyflower			
Mimulus pilosus				Not on any status lists

Najas guadalupensis guadalupensis	Southern Naiad			
Orcuttia californica	California Orcutt Grass	Endangered	Endangered	CRPR - 1B.1
Paspalum distichum	Joint Paspalum			
Persicaria lapathifolia				Not on any status lists
Persicaria maculosa	NA			Not on any status lists
Persicaria punctata	NA			Not on any status lists
Phacelia distans	NA			
Plagiobothrys leptocladus	Alkali Popcorn-flower			
Pluchea odorata odorata	Scented Conyza			
Pluchea sericea	Arrow-weed			
Potamogeton foliosus foliosus	Leafy Pondweed			
Rumex conglomeratus	NA			
Rumex salicifolius salicifolius	Willow Dock			
Salix exigua exigua	Narrowleaf Willow			
Salix laevigata	Polished Willow			
Salix lasiandra lasiandra				Not on any status lists
Salix lasiolepis lasiolepis	Arroyo Willow			
Schoenoplectus acutus occidentalis	Hardstem Bulrush			
Schoenoplectus americanus	Three-square Bulrush			
Schoenoplectus californicus	California Bulrush			
Scirpus microcarpus	Small-fruit Bulrush			
Stachys albens	White-stem Hedge-nettle			
Stuckenia pectinata				Not on any status lists
Typha domingensis	Southern Cattail			
Typha latifolia	Broadleaf Cattail			
Veronica anagallis-aquatica	NA			
Zannichellia palustris	Horned Pondweed			

Attachment D

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

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

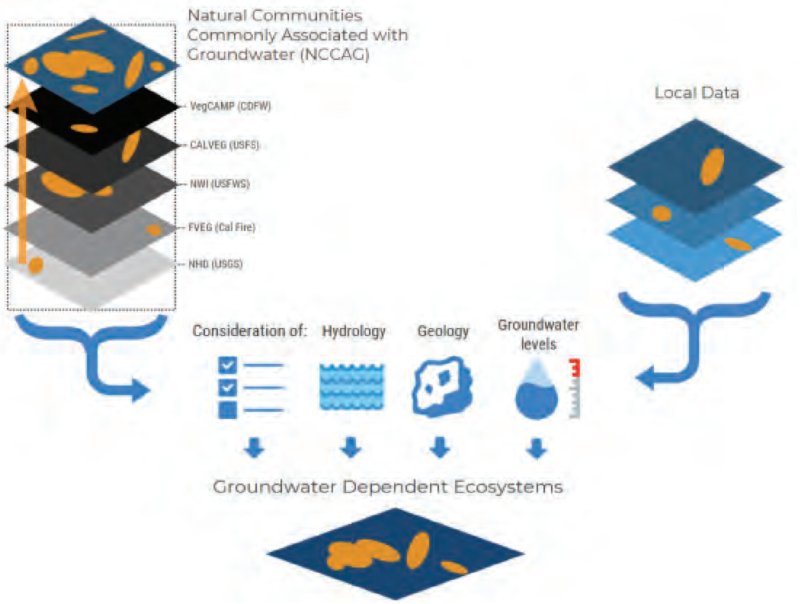


Figure 1. Considerations for GDE identification.
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[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/

[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

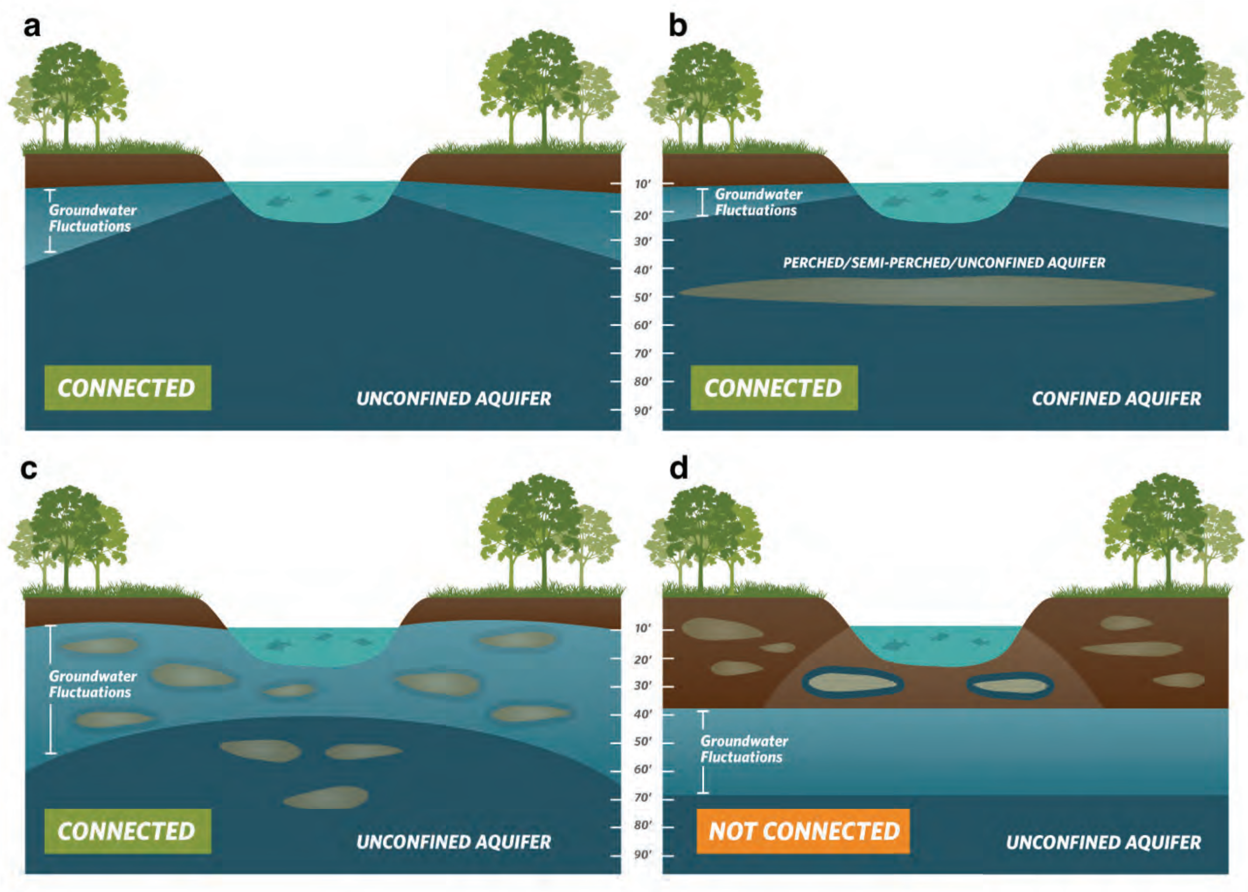

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying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

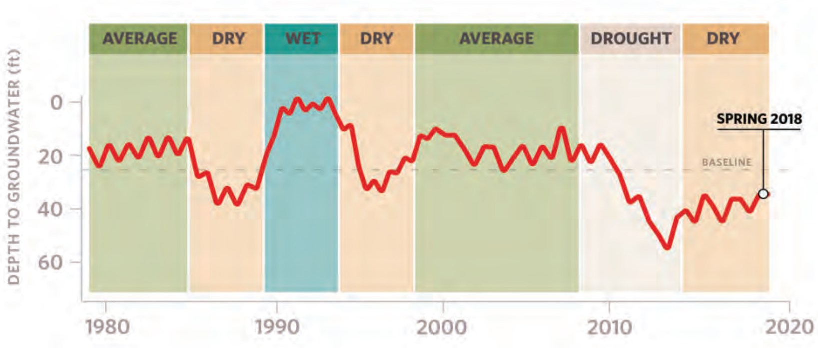

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so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

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[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

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).

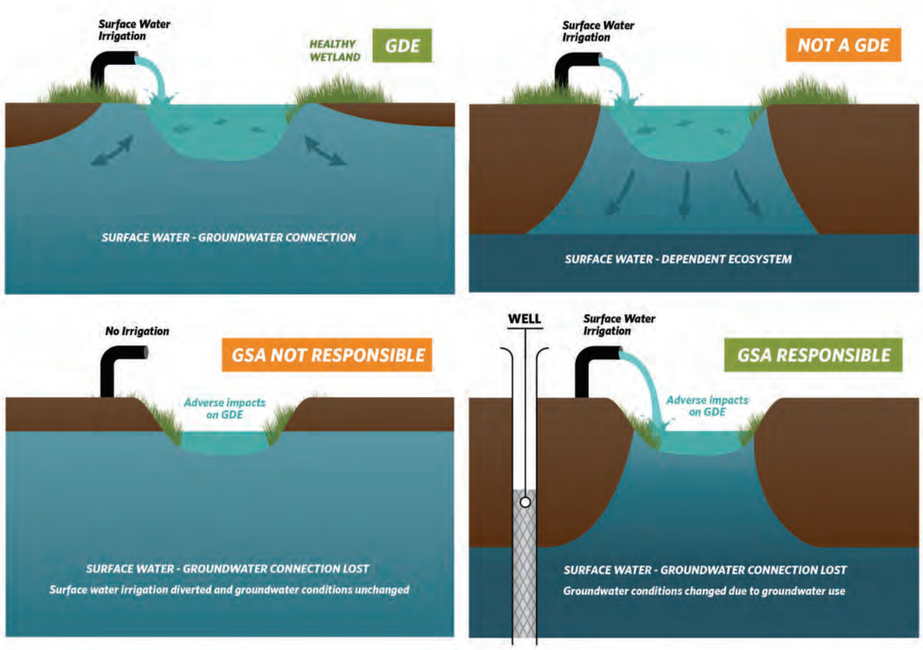

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent.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

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[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.

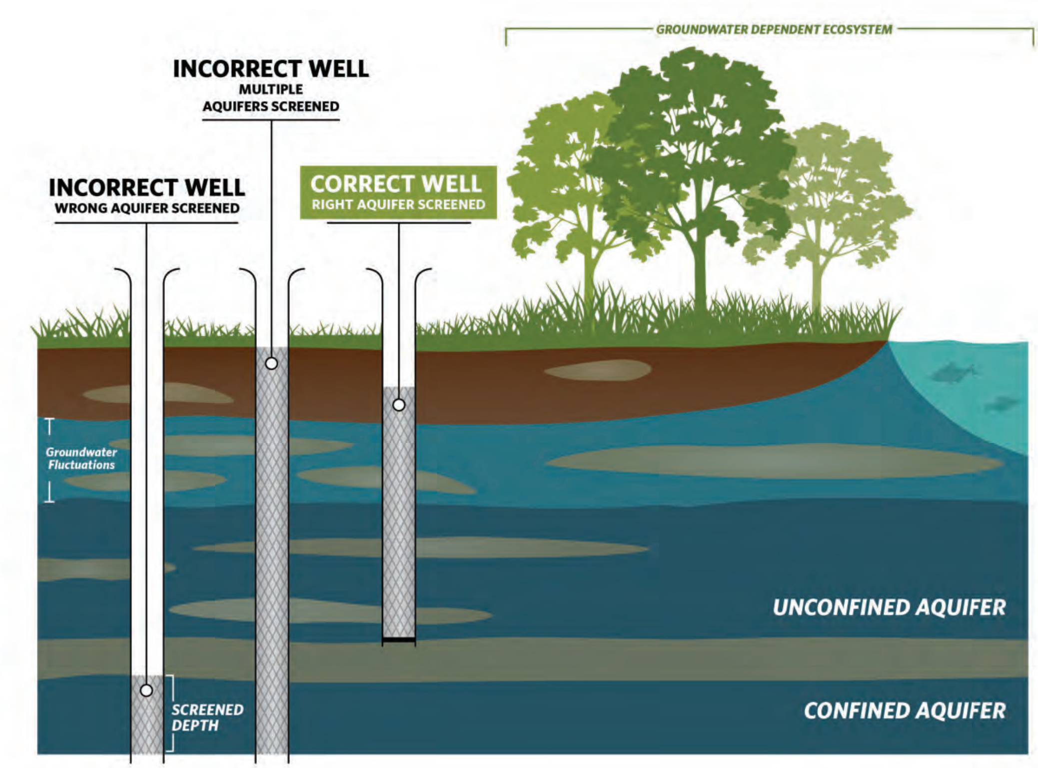

Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

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.

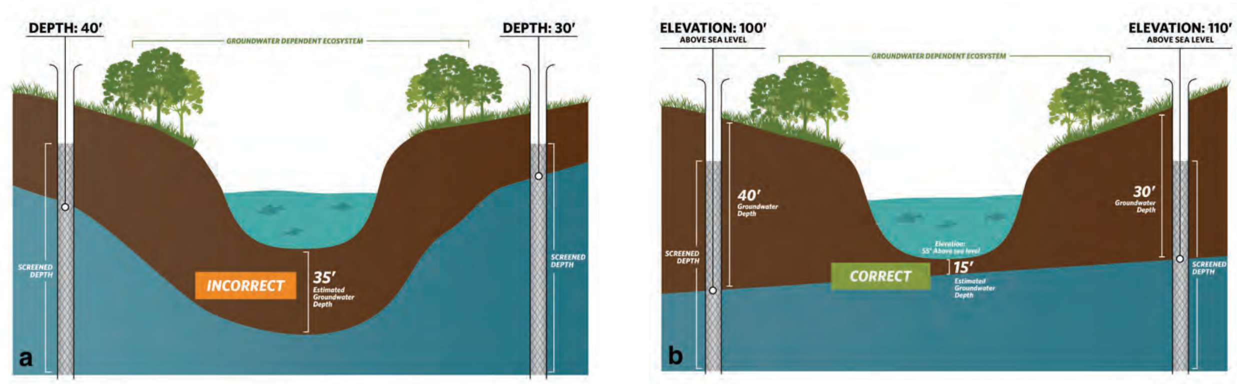

Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

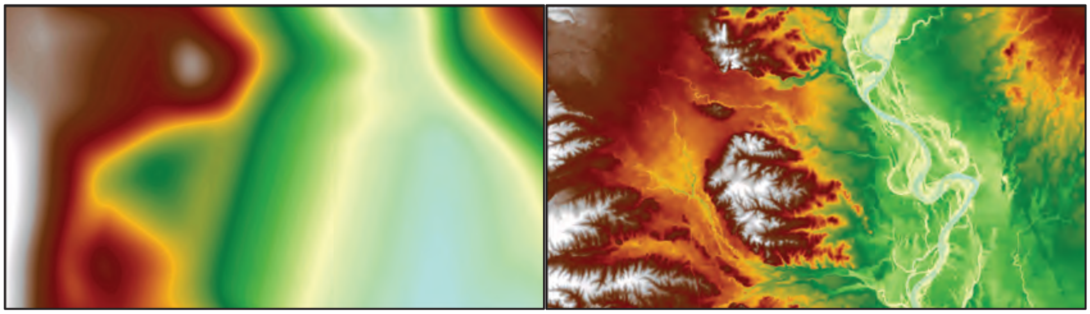

Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation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

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[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.

Attachment E

Maps of representative monitoring sites in relation to key beneficial users

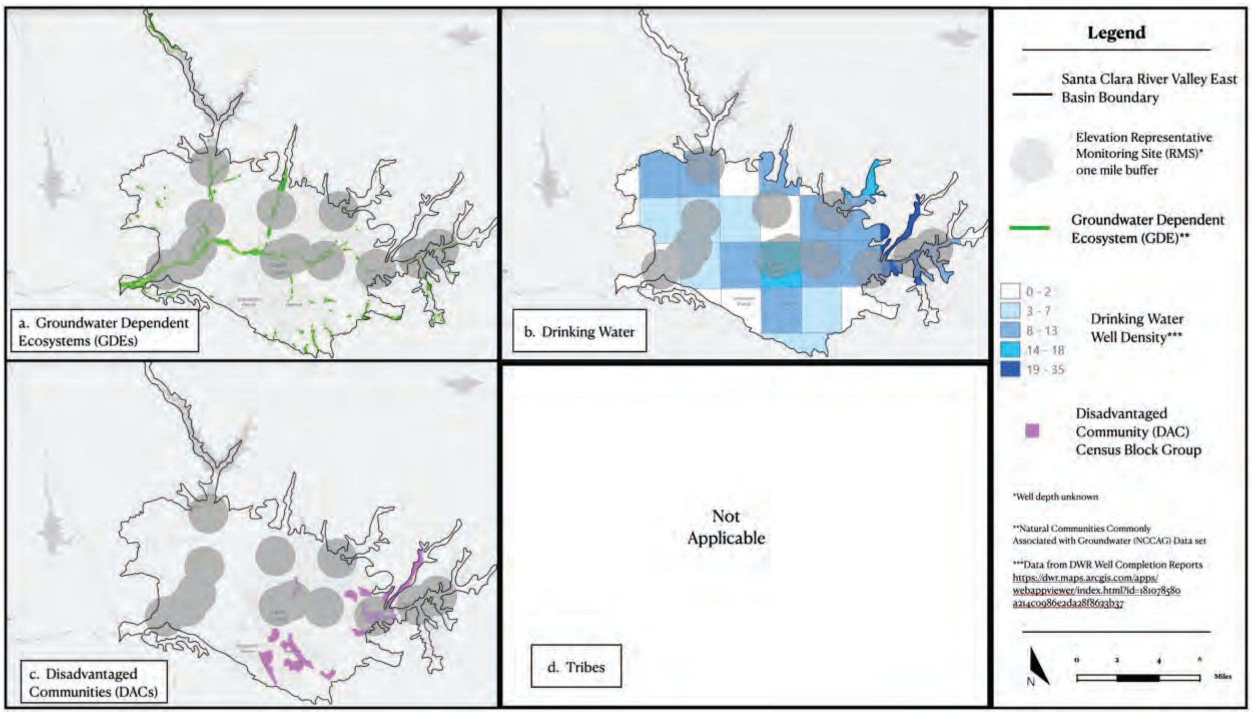

Figure 1. Groundwater elevation representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

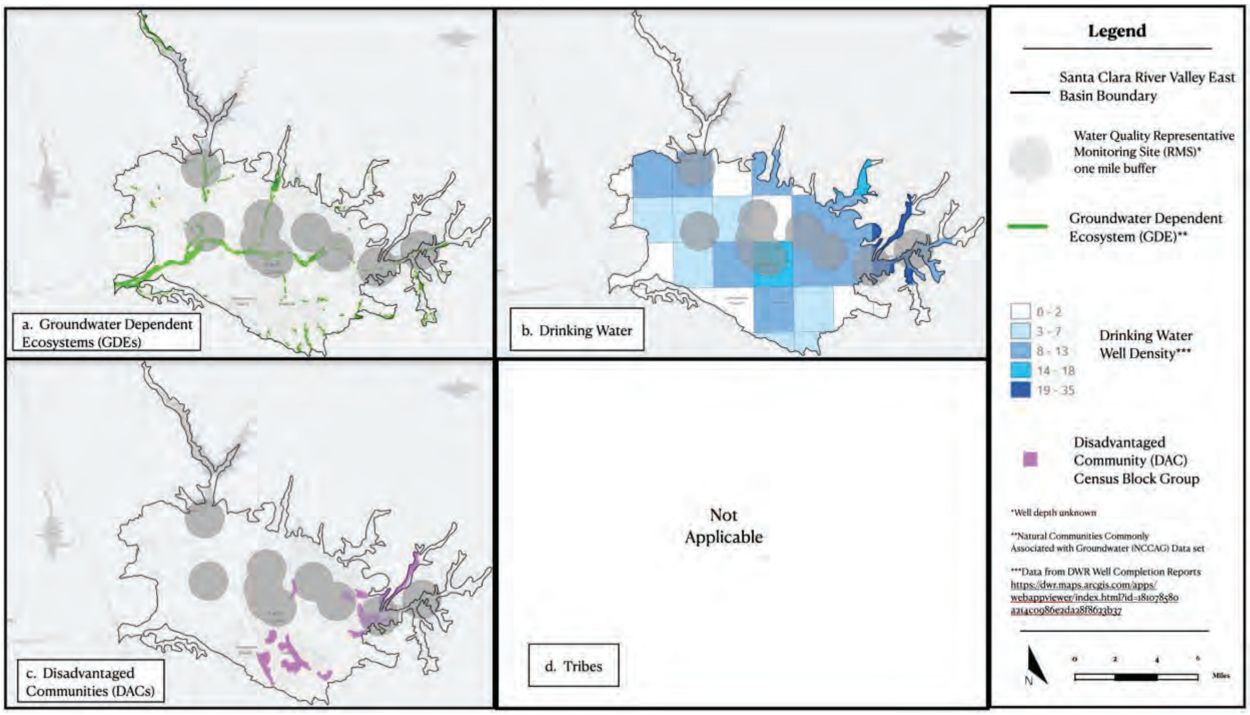

Figure 2. Groundwater quality representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

SANTA CLARITA VALLEY
GROUNDWATER SUSTAINABILITY AGENCY
MEMORANDUM

DATE: January 24, 2022

TO: SCV-GSA Board of Directors

FROM: Rick Viergutz, Principal Water Resources Planner, SCV Water

SUBJECT: Final SCV-GSA Groundwater Sustainability Plan

The Final GSP was successfully uploaded to the Department of Water Resources' website portal on January 24, 2022. At this stage, the California Department of Water Resources will post the Final GSP on its website starting the 60-day public comment period and notifying interested parties.

Following the SCV-GSA Board's direction, we included comment letters provided during the 60-day public comment period, and two comment letters received just prior to the January 3, 2022 Board Meeting. Responses to comments for the most recent two comment letters were also included in the upload and attached to this memo for reference.

There were two comments at the Board meeting regarding public comment letters not being distributed or discussed. As discussed, this was not the case. Key details are included below:

- October 20, 2021 Board Package included all public comment letters received during the 60-day GSP Public comment period. A high-level summary of public comments was provided at the Board meeting, and the public was provided an opportunity to provide additional comment.
- November 23, 2021 Board Package included a detailed table of public comments provided during the 60-day public comments and draft responses to the 60-day public comment letters. A high-level summary of public comments was again provided, and the public was again provided an opportunity to provide additional comment.
- January 3, 2022 Board Package again included all public comment letters received during the 60-day GSP public comment period, and a redline version of the table on public comments and responses shared November 23, 2021 reflecting some updates to the earlier draft responses. The two comment letters submitted prior to the Board meeting were scanned and distributed to stakeholders and your board via an email blast the day of the January 3, 2022 Board meeting. Both letters were mentioned at the Board meeting, and detailed responses to those comments are now attached. These detailed responses to the two recent comment letters are consistent with past discussions with stakeholders and the SCV-GSA Board.

GSI Water Solutions, Inc.

MEMORANDUM

Response to Comments on the Final GSP Received after the Public Comment Period Closed

To: Mr. Rick Viergutz, SCV Water

From: Jeff Barry, GSI Water Solutions, Inc.

Attachments: Comment Letters

Date: January 24, 2022

This memorandum presents responses to comments on the final GSP received after the public comment period ended on October 15, 2021 and after the Final GSP had been prepared for adoption by the GSA Board. The comments and responses are presented below.

Lloyd E. Carder II, January 3, 2022
Castaic
Reg 3 Land-use Member CATC

Comment:

While most of my comments have been submitted in the SCOPE Letter of 10-14-21, I would like to add some further observations and comments on the posted Groundwater Sustainability Plan for the Santa Clara River Valley East Groundwater Sub-basin:

On the map of the report showing the wells serving water I noted that District 36 wells are not shown on the map. District 36 has 2 wells one located on the Pitches Honor Ranch and the second located at the corner of Hasley Canyon Rd and Del Vale intersection that presently produces all of the water for District 36 in 2021. These wells should be present, and their pumping rates and available pumping rates should be listed. The well for Dist. 36 will have to fulfill an expected 500 acer feet of water increase in 2022 from the approved Del Vale project now building out. This is a concern since this well is very close to the landfill and could draw contamination from the landfill to this well site.

Response:

We are uncertain which map you are referring to. The two LA County Water District 36 wells mentioned in the comment are included in the Final GSP and shown on Figure 3-8. They are labeled generally as small public water system (Pitchess) and municipal (District 36) wells. Pumping from both wells is included in Table 6.5-4 that shows the total pumping by water use sector in the Basin. Pumping from both of these wells is also accounted for in the Basin water budgets. The County Waterworks District 36 regularly collects water quality samples consistent with State requirements from its well.

Comment:

It is my understanding that the Pitches well has been shut down for some time due to contamination if so any and all contaminated wells should be listed as such and addressed what steps need to be taken to re-establish this well site. This also pertains to wells in Newhall that are now inactive or reduced due to contamination. The added costs of cleaning, processing, and filtering this water must be reported and should be shown on the map by indicating these wells a different color so that the issue is clearly present to the public and regulators. Further the map should indicate where in the report the contamination results are indicated.

Response: The Final GSP contains a discussion, including an appendix, describing water quality (Hydrogeologic Conceptual Model). The GSP does not describe what each well operator is doing to address contaminants at individual wells, but some general discussion is included in the GSP about municipal efforts to treat contaminated groundwater. Further the GSA and member agencies are aware of groundwater quality concerns, including contamination at some wells, and collaborate with State Agencies in this regard.

Comment:

In your depiction of the aquifers, it shows below the Saugus Aquifer is just above an artesian well. This is most ingenuous because most of the area below the Saugus Aquifer is the Pico Aquifer that is both polluted by oil field drilling, dumping and is highly concentrated with solids and minerals making it non potable without major treatment at extreme cost that would have to be passed on to the consumer.

Response:

You are correct that the Pico Formation is present beneath the Saugus Formation in many areas of the Basin. The Pico Formation is of marine origin and contains predominantly saline water. It is not considered a potable aquifer. We are aware that this Formation is penetrated by oil drilling activities and that oil drilling wastewater has been re-injected in some areas such as in Potrero Canyon on the south and west end of the Basin. We are not aware of locations in the Basin where contamination from past oil drilling/development activities has impacted groundwater quality in the Basin's Principal Aquifers. The GSP presents a water quality monitoring program that is intended to provide information should contamination present in the Pico Formation impact Basin water quality in the future.

Comment:

Finally, we should be concerned about the pumping levels stated. Nowhere is over pumping addressed scientifically and how we expect to avoid it. Presently we are pumping the head waters of the San Francisquito Creek and have seen the effects of the loss of 2 year-round springs and wither water flow. In the 1980s early 1990s we were able to allow our horses the pleasure to drinking from the springs and graze around the swamp grass nearby, that are now gone completely. In the central valley where I am from, we have had signs of land subsidence when there is not enough water pressure to hold up the land mass above. This is due to over pumping and in some cases to the water levels you have stated we can sustain. **Once subsidence has occurred that water shed area is PERMANENTLY REDUCED, and not recoverable.**

As water needs increase as project build-out continues the public must be aware of the added costs not attached to development costs that are not born by the developer.

Response:

The pumping values included in the Final GSP, including the effects of historical, present, and future pumping on Basin water levels and an analysis of overall Basin sustainability have been thoroughly evaluated in the GSP. The GSP finds the basin has been managed sustainably in the past, and future pumping will not create chronic overdraft and other undesirable results. Further, the GSP includes specialized monitoring and Sustainable Management Criteria to address potential undesirable results from pumping.

Section 6 of the GSP presents the water budget analysis that includes pumping in accordance with the adopted groundwater operating plan used by SCV Water for a range of conditions, including variable climate, state water project water availability, and future Basin build out, with and without climate change. The groundwater flow model that was used to assess changes in water levels and to evaluate sustainability considered pumping in the tributaries, including San Francisquito Creek. Groundwater elevations in the headwaters are affected to some degree by pumping for domestic purposes and climate factors. Reduced rainfall recharge over the past 20 years in the upper portions of the watershed has also had a significant effect on groundwater levels in these relatively thin aquifers. But an undesirable result as defined in the GSP has not taken place.

We have not had reports of land surface changes caused by subsidence in the Basin. The GSA intends to conduct subsidence monitoring going forward as described in the GSP and will assess the efficacy of subsidence monitoring in the area mentioned. If the monitoring indicates that subsidence is likely occurring as a result of pumping, the GSP includes management actions to address the problem.

Duncan Mandel, January 3, 2022
Newhall, CA

Comment:

I DO NOT agree with lowering the groundwater level for future development!

Response: The Groundwater Sustainability Plan does not incentivize future development, but instead evaluates groundwater demand consistent with the Urban Water Management Plan published by municipal water providers consistent with State requirements. After a thorough evaluation, the GSP found that future demands will not lead to chronic reduction of groundwater levels (see Section 7) under a range of climatic conditions and pumping. The evaluation presented in Section 6 and 7 of the GSP showed that chronic lowering of groundwater levels is not likely to occur in the future and that the Basin has been and will continue to be managed in a sustainable manner. The GSP includes a robust monitoring plan and Sustainable Management Criteria. If it is determined that undesirable results, including chronic lowering of groundwater levels, are a result of groundwater pumping, the GSP would implement one or more management actions that are intended to address eliminate undesirable results over time.

Attachments

Public Comments

Lloyd E. Carder II, January 3, 2022
Castaic
Reg 3 Land-use Member CATC

Duncan Mandel, January 3, 2022
Newhall, CA

ITEM NO. 4.1

From: Lloyd E. Carder
To: SCV GSA
Subject: Comments on the Ground Water Sustainability
Date: Sunday, January 2, 2022 1:44:49 PM

Jan 3 2021 meeting

SCV Water

While most of my comments have been submitted in the SCOPE Letter of 10-14-21, I would like to add some further observations and comments on the posted Groundwater Sustainability Plan for the Santa Clara River Valley East Groundwater Sub-basin:

On the map of the report showing the wells serving water I noted that District 36 wells are not shown on the map. District 36 has 2 wells one located on the Pitches Honor Ranch and the second located at the corner of Hasley Canyon Rd and Del Vale intersection that presently produces all of the water for District 36 in 2021. These wells should be present, and their pumping rates and available pumping rates should be listed. The well for Dist. 36 will have to fulfill an expected 500 acer feet of water increase in 2022 from the approved Del Vale project now building out. This is a concern since this well is very close to the landfill and could draw contamination from the landfill to this well site.

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Finally, we should be concerned about the pumping levels stated. Nowhere is over pumping addressed scientifically and how we expect to avoid it. Presently we are pumping the head waters of the San Francisquito Creek and have seen the effects of the loss of 2 year-round springs and wither water flow. In the 1980s early 1990s we were able to allow our horses the pleasure to drinking from the springs and graze around the swamp grass nearby, that are now gone completely. In the central valley where I am from, we have had signs of land subsidence when there is not enough water pressure to hold up the land mass above. This is due to over pumping and in some cases to the water levels you have stated we can sustain. **Once subsidence has occurred that water shed area is PERMANENTLY REDUCED,**

and not recoverable.

As water needs increase as project build-out continues the public must be aware of the added costs not attached to development costs that are not born by the developer.

Best Regards,

Lloyd E. Carder II

Castaic

Reg 3 Land-use Member CATC

Best Regards,

Lloyd E. Carder
Pacific Automated Welding Solutions
Castaic CA, 91384 USA
001.661.600.2134
www.pacificautomatedwelding.com
lloyd@pacificautomatedwelding.com

From:	Duncan Mandel
To:	Eunie Kang
Subject:	Comments for Public Hearing on the SCV Ground Water Sustainability Plan
Date:	Monday, January 3, 2022 9:40:13 AM

I DO NOT agree with lowering the groundwater level for future development!

Duncan Mandel
Newhall, CA