



August 19, 2019

Hicham Eltal, Merced GSP Contact  
Merced Irrigation District  
744 W 20<sup>th</sup> Street  
Merced, CA 95340

*Sent via email to mercedsgma@woodardcurran.com*

**Re: Comments on Draft Groundwater Sustainability Plan for Merced Subbasin**

Dear Mr. Eltal,

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

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

- The Nature Conservancy, in collaboration with state agencies, has developed several tools<sup>1</sup> for identifying groundwater dependent ecosystems in every SGMA groundwater basin and has made that tool available to each Groundwater Sustainability Agency.
- Audubon California is an expert in understanding wetlands and their role in groundwater recharge and the provision of ecosystem services.
- Clean Water Action and Clean Water Fund are sister organizations that have deep expertise in the provision of safe drinking water, particularly in California's small disadvantaged communities, and co-authored a report on public and stakeholder engagement in SGMA<sup>2</sup>.

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<sup>1</sup> <https://groundwaterresourcehub.org/>

<sup>2</sup> <https://www.cleanwater.org/publications/collaborating-success-stakeholder-engagement-sustainable-groundwater-management-act>

- The Union of Concerned Scientists has been working to ensure that future water supply meets demand and withstands climate change impacts by supporting stakeholder education and integration, and the creation and implementation of science-based Groundwater Sustainability Plans.
- American Rivers is committed to restoring damaged rivers and conserving clean water for people and nature.

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

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

### **Key Indicators**

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

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

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

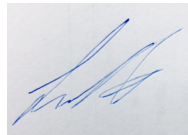
**Conclusion**

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

Sincerely,



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



Lisa Hunt  
Director of California River Restoration Science  
American Rivers



Samantha Arthur  
Working Lands Program Director  
Audubon California



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



Sandi Matsumoto  
Associate Director, California Water Program  
The Nature Conservancy

**Appendix A**  
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**Groundwater Basin/Subbasin:** Merced Subbasin (DWR # 5-022.04)  
**GSA:** Merced Irrigation-Urban Groundwater Sustainability Agency (MIUGSA), Merced Subbasin Groundwater Sustainability Agency (MSGSA), and Turner Island Water District Groundwater Sustainability Agency #1 (TIWD GSA-1)  
**GSP Date:** July 22, 2019 Public Review Draft

**1. Identification of Beneficial Users**

*Were key beneficial users identified and engaged?*

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

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page <sup>1</sup> )
1. Do identified beneficial users (BUs) include:					
a. Disadvantaged Communities (DACs)	<b>X</b>			"Additional interests (as listed in CWC §10723.2) include...Disadvantaged communities (DAC), combined list based on DWR's DAC Mapping Tool and Merced County's SB244 Analysis: <ul style="list-style-type: none"> <li>o Disadvantaged: Atwater City, Le Grand CDP, Merced City, Stevinson CDP, The Grove, Tuttle CDP, Winton CDP</li> <li>o Severely Disadvantaged: Bear Creek CDP (Celeste), El Nido CDP, Franklin CDP, Planada CDP"</li> </ul>	1.2.5.1, page 68
b. Tribes		<b>X</b>		"Potential interests (listed in CWC §10723.2) that are not present in the Merced Subbasin include: California Native American tribes"	1.2.5.1, page 68
c. Small community public water systems (<3,300 connections)	<b>X</b>			"Additional interests (as listed in CWC §10723.2) include: Public water systems/municipal well operators: <ul style="list-style-type: none"> <li>o Le Grand-Athlone Water District</li> <li>o Merquin County Water District</li> <li>o Plainsburg Irrigation District</li> <li>o Stevinson Water District</li> <li>o Lone Tree Mutual Water Company</li> <li>o Sandy Mush Mutual Water Company</li> <li>o California American Water, Meadowbrook District</li> <li>o Merced Area Groundwater Pool Interests (monitors and reports</li> </ul>	1.2.5.1, page 67-68

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Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page <sup>1</sup> )
					groundwater elevations in the Merced Subbasin) o Le Grand Community Services District o Planada Community Services District” The size of the water systems is not clearly identified.	
2. What data were used to identify presence or absence of DACs?	a. DWR <a href="#">DAC Mapping Tool</a> <sup>2</sup>	<b>X</b>			“DWR DAC Mapping tool: <a href="https://gis.water.ca.gov/app/dacs/">https://gis.water.ca.gov/app/dacs/</a> . Data is based on US Census ACS 2010-2014.”	1.2.5.1 footnote 3, page 68
	i. Census Places	<b>X</b>				
	ii. Census Block Groups		<b>X</b>		Not specified	
	iii. Census Tracts		<b>X</b>		Not specified	
	b. Other data source	<b>X</b>			“Merced County SB244 report: <a href="http://www.co.merced.ca.us/DocumentCenter/View/12199">http://www.co.merced.ca.us/DocumentCenter/View/12199</a> . Report is dated May 2016, based on 2000 Census data.”	1.2.5.1 footnote 4, page 68
3. Groundwater Conditions section includes discussion of:	a. Drinking Water Quality		<b>X</b>		“Data are available for active and inactive drinking water sources for water systems that serve the public ... Wells are monitored for Title 22 requirements, including pH, alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, barium, copper, iron, zinc, and nitrate.”  “The primary water quality constituents of concern related to human activity include salinity, nitrate, hexavalent chromium, petroleum hydrocarbons (such as benzene and MTBE), pesticides (such as DBCP, EDB, 1,2,3 TCP), solvents (such as PCE, TCE), and emerging contaminants (such as PFOA, PFOS). Of these issues, nitrate is the most widespread issue with a direct impact on public health. Salinity is also an issue due to the widespread nature of the problem and difficulty of management given increases in salinity as a result of both urban and agricultural use. The Merced County Department of Public Health, Division of Environmental Health maintains a list of areas of known adverse water quality in the County, shown below in Table 2-8.”	1.2.2.2.1.3, page 52;  2.2.4, page 148-173
	b. California Maximum Contaminant Levels (CA MCLs) <sup>3</sup> (or Public Health Goals where MCL does not exist, e.g. Chromium VI)		<b>X</b>		“Salinity levels within the Merced Subbasin range from less than 90 to greater than 3,000 mg/L as measured by TDS. The recommended drinking water secondary MCL for TDS is 500 mg/L, with an upper limit of 1,000 mg/L and a short-term limit <sup>5</sup> of 1,500 mg/l (SWRCB, 2006).”  “Within the Merced Subbasin area, chloride concentrations range from non-detect (typically less than 2 mg/L) to as much as 1,850 mg/L. The recommended secondary MCL for Cl is 250 mg/L and the upper secondary MCL is 500 mg/L (SWRCB, 2006).”  Other constituent concentrations compared to MCLs are: metals (arsenic, iron, manganese, hexavalent chromium), pesticides (DBCP and 123-TCP), petroleum hydrocarbons (benzene, MTBE), solvents (111-TCA, PCE, and TCE)	2.2.4, page 155-173
4. What local, state, and	a. Office of Environmental Health		<b>X</b>			

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federal standards or plans were used to assess drinking water BUs in the development of Minimum Thresholds (MTs)?					
Hazard Assessment Public Health Goal (OEHHA PHGs) <sup>4</sup>					
b. CA MCLs <sup>3</sup>	<b>X</b>			<p>“The minimum threshold for salinity is defined based on the potential impact of salinity on drinking water and agricultural beneficial uses, as aligned with state and federal regulations. The recommended drinking water secondary MCL for TDS is 500 mg/L with an upper limit of 1,000 mg/L and a short-term limit<sup>11</sup> of 1,500 mg/L (SWRCB, 2006).”</p> <p>No MTs defined for other water quality constituents, based on input from Stakeholder Advisory Committee.</p>	3.6.2, page 239  page 238-239
c. Data Quality Objectives (DQOs) in Regional Water Quality Control Plans		<b>X</b>			
d. Sustainable Communities Strategies/ Regional Transportation Plans <sup>5</sup>		<b>X</b>			
e. County and/or City General Plans, Zoning Codes and Ordinances <sup>6</sup>		<b>X</b>			
5. Does the GSP identify how environmental BUs and environmental stakeholders were engaged throughout the development of the GSP?		<b>X</b>		<p>The environment is listed as one of the beneficial users of groundwater in the Subbasin, but few details are given. The US Fish and Wildlife is listed as operating several wildlife refuges supported by groundwater, as shown in Figure 1-7 (p. 1-20), along with state parks. A statement is made that there are other wetlands and GDEs that exist mostly in the western part of the subbasin, but they are not specified.</p> <p>The types and locations of environmental uses, species and habitats supported, and the designated beneficial environmental uses of surface waters that may be affected by groundwater extraction in the Subbasin should be specified.</p> <p>The stakeholder outreach process is described, and include outreach to federal, state, and local agencies, but did not appear to engage environmental groups.</p>	1.2.5
<p><b>Summary / Comments</b></p> <p>Based on our review of the draft GSP, it does not appear that that PHGs or Regional Water Quality Control Plan DQOs, were considered in the assessment of drinking water users. It is suggested that the number of connections for each public water system be provided, as this is valuable information regarding the scale of the population dependent on these systems.</p>					

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page <sup>1</sup> )
Groundwater quality discussion must include potential impacts to drinking water sources. <sup>1</sup>					
The GSP makes a statement that there are other wetlands and GDEs that exist mostly in the western part of the subbasin; these should be specified in the document.					
The types and locations of environmental uses, species and habitats supported, and the designated beneficial environmental uses of surface waters that may be affected by groundwater extraction in the Subbasin should be specified. To identify environmental users, please refer to the following:					
<ul style="list-style-type: none"> <li>• Natural Communities Commonly Associated with Groundwater dataset (NC Dataset) - <a href="https://gis.water.ca.gov/app/NCDataSetViewer/">https://gis.water.ca.gov/app/NCDataSetViewer/</a></li> <li>• The list of freshwater species located in the Merced Subbasin is available here: <a href="https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/">https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/</a>. Please take particular note of the species with protected status.</li> <li>• Lands that are protected as open space preserves, habitat reserves, wildlife refuges, etc. or other lands protected in perpetuity and supported by groundwater or interconnected surface waters should be identified and acknowledged.</li> </ul>					
The stakeholder outreach process is described, and includes outreach to federal, state, and local agencies, but did not appear to engage environmental groups.					

<sup>1</sup> Community Water Center and Stanford School of Earth, Energy, and the Environmental Sciences, *Groundwater Quality in the Sustainable Groundwater Management Act (SGMA): Scientific Factsheet on Arsenic, Uranium, and Chromium*, [https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1560371896/CWC\\_FS\\_GrndwtrQual\\_06.03.19a.pdf?1560371896](https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1560371896/CWC_FS_GrndwtrQual_06.03.19a.pdf?1560371896); Community Water Center, *Guide to Protecting Drinking Water Quality Under the Sustainable Groundwater Management Act*, [https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide\\_to\\_Protecting\\_Drinking\\_Water\\_Quality\\_Under\\_the\\_Sustainable\\_Groundwater\\_Management\\_Act.pdf?1559328858](https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858).

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**2. Communications Plan**

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

<p><u>Selected relevant requirements and guidance:</u>  GSP Element 2.1.5, "Notice &amp; Communication" (§354.10):  <i>Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:</i>  (c) <i>Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.</i>  (d) <i>A communication section of the Plan that includes the following:</i>  (1) <i>An explanation of the Agency's decision-making process.</i>  (2) <i>Identification of opportunities for public engagement and a discussion of how public input and response will be used.</i>  (3) <i>A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.</i>  (4) <i>The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.</i></p> <p><b>DWR Guidance Document for GSP Stakeholder Communication and Engagement<sup>7</sup></b></p>
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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Is a Stakeholder Communication and Engagement Plan (SCEP) included?		X		A Stakeholder Engagement Strategy document is referenced, but is not included as part of the GSP.	
2. Does the SCEP or GSP identify that ongoing engagement will be conducted during GSP implementation?	X			<p>"Activities under GSP Implementation Program Management also include stakeholder engagement through the Stakeholder Advisory Committee (SC)."</p> <p>"The GSAs intend to continue public outreach and provide opportunities for engagement during GSP implementation. This will include providing opportunities for public participation, especially from beneficial users, at public meetings, providing access to GSP information online, and continued coordination with entities conducting outreach to DAC communities in the Basin. Announcements will continue to be distributed via email prior to public meetings (e.g., Stakeholder Committee meetings, Coordinating Committee meetings, public workshops, and GSA Board meetings). Emails will also be distributed as specific deliverables are finalized, when opportunities are available for stakeholder input and when this input is requested, or when items of interest to the stakeholder group arise, such as relevant funding opportunities. The Merced SGMA website, managed as part of GSP Administration, will be updated a minimum of monthly, and will house meeting agendas and materials, reports, and other program information. The website may be updated to add new pages as the program continues and additional activities are implemented. Additionally, public workshops will be held semi-annually, or more frequently if necessary, to provide an opportunity for stakeholders and members of the public to learn about, discuss, and provide input on GSP activities, progress towards meeting the Sustainability Goals of this GSP, and the SGMA program."</p>	<p>1.2.5.5.2, page 71;</p> <p>7.2, page 323; 7.4, page 324</p>



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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
3. Does the SCEP or GSP specifically identify how DAC beneficial users were engaged in the planning process?	X			<p>“Active public participation was encouraged through the following opportunities for public engagement:</p> <ul style="list-style-type: none"> <li>• Accepting public comment at GSA Board Meetings of all three GSAs.</li> <li>• Accepting public comments at Coordinating Committee Meetings and Stakeholder Advisory Committee Meetings.</li> <li>• Forming the Stakeholder Advisory Committee that includes community representatives of the diverse interests in the Subbasin to review and provide input on the elements of the GSP through monthly meetings open to the public.</li> <li>• Conducting briefings and Public Workshops to provide opportunities for community members and interests groups to learn about, discuss, and comment on the GSP planning process before major decision milestones.</li> <li>• Coordinating with Leadership Counsel and Self-Help Enterprises in their DAC outreach efforts.</li> <li>• Developing a robust website with timely, pertinent information, opportunity to make comments, and sign-up for email notifications. The website houses information about SGMA, the GSP process, the Merced Subbasin GSA Boards, Coordinating Committee, Stakeholder Advisory Committee, Public Workshops, and draft GSP sections.</li> <li>• Issuing news releases announcing public participation opportunities at Public Workshops.</li> <li>• Providing translation services at Public Workshops. Coordinating with Leadership Counsel and Self-Help Enterprises in their DAC outreach efforts.”</li> </ul>	1.2.5.2, page 69;

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
4. Does the SCEP or GSP explicitly describe how stakeholder input was incorporated into the GSP process and decisions?	X			<p>“The GSAs were also informed by a 23-member Stakeholder Advisory Committee which consisted of community representatives who reviewed groundwater conditions, management issues and needs, and projects and management actions to improve sustainability in the basin. The committee met monthly starting in May 2018 in sessions open to the public, providing a forum for testing ideas as well as providing information and feedback from members’ respective constituencies.”</p> <p>The GSP does not identify who the members of the Stakeholder Advisory Committee were or what interests and/or organizations they represent were.</p> <p>“Salinity was selected by the GSAs based on stakeholder input and the recommendation of the Merced County Division of Environmental Health as the only constituent to monitor in the GSP because the causal nexus between salinity concentrations and groundwater management activities has been established (see Section 3.6.2 – Minimum Thresholds).”</p> <p>“During GSP development, the Merced GSP Program used multiple forms of outreach to communicate SGMA-related information and solicit input.”</p>	<p>1.2.5.5.1, page 71;</p> <p>3.6.1, page 237;</p> <p>7.4, page 324</p>
<b>Summary / Comments</b>					
<p>The GSP does not include a copy of the SCEP. The SCEP must be included in the GSP as an appendix or attachment.</p> <p>We understand that Leadership Counsel and Self-Help Enterprises received funding from DWR to support their engagement efforts in this basin. Additional funding will be needed to support this outreach through GSP implementation.</p> <p>The GSP does not identify who the members of the Stakeholder Advisory Committee were or what interests and/or organizations they represent. This information is important for the reader to be able to understand just who was involved in the process and what interests provided input in the process.</p> <p>Stakeholder outreach notification appears to have been done primarily through email. This approach is inadequate, because not everyone has consistent access to the internet. Thus, major decisions and development as well as engagement opportunities need to be posted in key public locations as well.</p>					

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**3. Maps Related to Key Beneficial Uses**

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

Selected relevant requirements and guidance:

GSP Element 2.1.4 "Additional GSP Elements" (§354.8):

*Each Plan shall include a description of the geographic areas covered, including the following information:*

*(a) One or more maps of the basin that depict the following, as applicable:*

*(5) The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.*

GSP Element 3.5 Monitoring Network (§354.34)

*(b) Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor*

*groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:*

*(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

*(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:*

*(A) A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.*

*(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.*

*(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:*

*(A) Flow conditions including surface water discharge, surface water head, and baseflow contribution.*

*(B) Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.*

*(C) Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.*

*(D) Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.*

*(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*

*(3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.*

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1. Does the GSP Include Maps Related to Drinking Water Users?	a. Well Density	<b>X</b>			<p>“Figure 1-8 shows the density of non-domestic wells per square mile in the Merced Subbasin.”</p> <p>It is not clear if non-domestic wells include public drinking water supply wells.</p> <p>“Figure 1-9 shows the density of domestic wells per square mile in the Merced Subbasin.”</p> <p>“Figure 2-39 contains a series of maps showing the density per square mile of irrigation and domestic wells per principal aquifer.”</p>	<p>Figure 1-8, page 48;</p> <p>Figure 1-9, page 49;</p> <p>Figure 2-39, page 128</p>
	b. Domestic and Public Supply Well Locations & Depths		<b>X</b>		No map is provided.	
	i. Based on DWR <a href="#">Well Completion Report Map Application</a> <sup>8</sup> ?			<b>X</b>		
	ii. Based on Other Source(s)?			<b>X</b>		
2. Does the GSP include maps related to Groundwater Dependent Ecosystem (GDE) locations?	a. Map of GDE Locations		<b>X</b>		<p>A map was included of NCCAG units that might be classified as GDEs (Figure 2-85 p. 2-109). The units were then screened using the following categories: areas with groundwater depth greater than 30 feet, habitat areas with supplemental water sources, areas adjacent to irrigated fields, areas dependent on losing surface waters, and areas of vernal pool complexes. The areas that were not screened out are shown in Figures 2-87 and 2-88 (p. 2-112 and 2-113).</p> <p>No information was given on the historical or current groundwater conditions in the GDEs or the ecological conditions present. The vegetation species were not ranked as having a high, moderate or low value and no inventory of the vegetation types or habitat types were provided.</p>	2.2.7
	b. Map of Interconnected Surface Waters (ISWs)	<b>X</b>			<p>A map showing gaining and losing streams was provided in Figure 2-9 (p. 2-15) as determined using the Merced Water Resources Model (MercedWRM). The report stated that no field studies have been conducted to confirm the designations and the documentation of the model was not provided in the GSP (Appendix D). Therefore, no estimates of surface water depletions by water year type were made.</p>	2.1.3.5.2; 2.2.6
	i. Does it identify which reaches are gaining and which are losing?	<b>X</b>				
	ii. Depletions to ISWs are quantified by stream segments.		<b>X</b>			
iii. Depletions to ISWs are quantified seasonally.			<b>X</b>			
3. Does the GSP include maps of monitoring networks?	a. Existing Monitoring Wells		<b>X</b>		<p>No map provided.</p> <p>“The existing monitoring and management landscape within the Merced Subbasin is a patchwork of local, regional, state, and federal programs, each serving its own specific function. ... This patchwork of programs also creates redundancies, inconsistent protocols, and inconsistent timing of monitoring that will need to be improved under SGMA.”</p>	1.2.2, page 49

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
b. Existing Monitoring Well Data sources:				“Groundwater elevations are measured biannually, in the spring and fall, by local monitoring agencies as part of the California Statewide Groundwater Elevation Monitoring Program (CASGEM) program.”	1.2.2.1.3, page51
i. California Statewide Groundwater Elevation Monitoring (CASGEM)	X				
ii. Water Board Regulated monitoring sites		X			
iii. Department of Pesticide Regulation (DPR) monitoring wells	X			“Exact locations are not known, but based on estimation of coordinates via county, township, range, and section, there are 951 wells are monitored within the Merced Subbasin with groundwater quality measurements on pesticides, such as DBCP and xylene, sampled between 1979 through 2015. “  “In the Merced Subbasin, CDPR reported groundwater quality measurements for 170 wells with water quality data from 1981 through 2012. CDPR only monitors for pesticides and therefore does not have results on water quality constituents such as nitrates and TDS.”	1.2.2.2.1.2, page 52;  1.2.2.2.1.3, page 52
c. SGMA-Compliance Monitoring Network	X			Figure 4-1: Merced Subbasin GSP Groundwater Level Monitoring Network Wells  Figure 4-5: Merced Subbasin GSP Groundwater Level Monitoring Network Monitoring and Representative Wells  Figure 4-7: Merced Subbasin GSP Groundwater Quality Monitoring Network Wells	Figure 4-1, page 249;  Figure 4-5, page 255;  Figure 4-7, page 263
i. SGMA Monitoring Network map includes identified DACs?		X		Figure 6-1 (Location of Proposed Monitoring Well Clusters) for identified project 2 (El Nido Groundwater Monitoring Wells) shows severely DAC areas, but the SGMA Monitoring Network maps do not include DACs.	
ii. SGMA Monitoring Network map includes identified GDEs?		X			

**Summary / Comments**

Detailed information regarding the location and depths of domestic wells and existing monitoring networks is currently lacking in the GSP. Because the measurement of the undesirable result and MTs of groundwater levels are based upon the depth of domestic wells in proximity to representative monitoring wells, this lack of information in the draft makes it impossible to understand: (1) how many domestic wells are considered within the representative monitoring network, (2) whether specific areas or communities are excluded from the monitoring plan, and (3) whether undesirable result may be exacerbated by a lack of representative monitoring wells proximate to areas of shallow domestic wells.

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

A map was included of NCCAG units that might be classified as GDEs (Figure 2-85 p. 2-109). The units were then screened using the following categories: areas with groundwater depth greater than 30 feet, habitat areas with supplemental water sources, areas adjacent to irrigated fields, areas dependent on losing surface waters, and areas

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				<p>of vernal pool complexes. The areas that were not screened out are shown in Figures 2-87 and 2-88 (p. 2-112 and 2-113). Areas with depth to groundwater greater than 30 feet can serve as a water source to some plants, e.g. oak trees, in the dry part of the year. Areas within 300 feet of losing streams identified by the model, MERCEDWRM, were eliminated. The distance of 300 feet seems excessive and may have eliminated some areas prematurely. The documentation of the model was not included in the draft report, Appendix D, so this information could not be verified. The potential GDEs were not grouped into larger units. Please check that potential GDEs were not excluded by the screening process.</p> <p>No information was given on the historical or current groundwater conditions in the GDEs or the ecological conditions present. The vegetation species were not ranked as having a high, moderate or low value and no inventory of the vegetation types or habitat types were provided. Please identify whether any endangered or threatened freshwater species of animals and plants or areas with critical habitat were found in any of the potential GDEs. The list of freshwater species located in the Merced Subbasin is located here: <a href="https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/">https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/</a>. Please provide groundwater data for historical and current conditions near the GDEs or identify as a data gap.</p> <p>According to the GSP, no field studies have been conducted to confirm the designations of streams as gaining or losing, and the associated documentation of the model was not provided in the GSP (i.e., Appendix D is missing). Therefore, the document does not include any estimates of surface water depletions by water year type were made. Please provide the documentation for the model and how the gaining and losing streams were determined.</p>	

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**4. Water Budgets**

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

<p><u>Selected relevant requirements and guidance:</u>  GSP Element 2.2.3 “Water Budget Information” (Reg. § 354.18)  <i>Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.</i>   <i>Projected water budgets shall be used to estimate future baseline conditions of supply, <b>demand</b>, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:</i>  <i>(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:</i>  <i>(5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.</i>  <i>(6) The water year type associated with the annual supply, demand, and change in groundwater stored.</i>  <i>(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:</i>  <i>(1) Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, <b>water demand</b>, and land use information.</i></p> <p><b>DWR Water Budget BMP<sup>9</sup></b>  <b>DWR Guidance for Climate Change Data Use During GSP Development and Resource Guide<sup>10</sup></b></p>
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<b>Review Criteria</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Relevant Info per GSP</b>	<b>Location (Section, Page)</b>
1. Are climate change projections explicitly incorporated in future/ projected water budget scenario(s)?	<b>X</b>			“Consistent with §354.18(d)(3) and §354.18(e) of the SGMA Regulations, analyses for the Merced GSP evaluated the projected water budget with and without climate change conditions.”	2.4.1, page 209
2. Is there a description of the methodology used to include climate change?	<b>X</b>			<p>“The approach developed for this GSP is based on the methodology in DWR’s guidance document (DWR, 2018). Similarly, the “best available information” related to climate change in the Merced Subbasin was deemed to be the information provided by DWR combined with basin specific modeling tools. The following resources from DWR were used in the climate change analysis:</p> <ul style="list-style-type: none"> <li>• SGMA Data Viewer</li> <li>• Guidance for Climate Change Data Use During Sustainability Plan Development and Appendices (Guidance Document)</li> <li>• Water Budget BMP</li> <li>• Desktop IWFM Tools</li> </ul> <p>...</p> <p>The methods suggested by DWR in the above resources were used, with modifications where needed, to ensure the resolution would be</p>	2.4.2, page 210;

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				<p>reasonable for the Merced Subbasin and align with the assumptions of the Merced Water Resources Model (MercedWRM). Figure 2-101 shows the overall process developed for the Merced GSP consistent with the Climate Change Resource Guide (DWR, 2018) and describes workflow beginning with baseline projected conditions to perturbed 2070 conditions for the projected model run.”</p> <p>“For climate change impacts on groundwater, accepted methods are based on the assessment of impacts on the individual water resource system elements that directly link to groundwater. These elements include precipitation, streamflow, evapotranspiration and, for coastal aquifers, sea level rise as a boundary condition.</p> <p>The method for perturbing the streamflow, precipitation, and evapotranspiration input files is described in the following sections. A future scenario in 2070 was evaluated in this analysis, consistent with DWR guidance (DWR, 2018).</p> <p>DWR combined 10 global climate models (GCMs) for two different representative climate pathways (RCPs) to generate the central tendency scenarios in the datasets used in this analysis. The “local analogs” method (LOCA) was used to downscale these 20 different climate projections to a scale usable for California (DWR, 2018). The 2070 central tendency among these projections serves to assess impacts of climate change over the long-term planning and implementation period.”</p>	2.4.3, page 212
3. What is used as the basis for climate change assumptions?	X			“The methods suggested by DWR in the above resources were used, with modifications where needed, to ensure the resolution would be reasonable for the Merced Subbasin and align with the assumptions of the Merced Water Resources Model (MercedWRM).”	2.4.2, page 210
a. <a href="#">DWR-Provided Climate Change Data and Guidance</a> <sup>11</sup>			X		From the descriptions above, the relevant assumptions of MercedWRM model are not clearly identified.
4. Does the GSP use multiple climate scenarios?		X		“A future scenario in 2070 was evaluated in this analysis, consistent with DWR guidance (DWR, 2018).” Only one climate scenario was used in this GSP.	2.4.3, page 212
5. Does the GSP quantitatively incorporate climate change projections?	X			“The analysis was based on the projected conditions baseline with climate change perturbed inputs for streamflow, precipitation, and ET. Under the climate change scenario, the average annual volume of evapotranspiration is seven percent higher than the projected baseline, increasing to 916,000 AFY from 853,000 AFY. Due to changes to local hydrology, the average	2.4.3.3, page 223



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				annual surface water availability was projected to increase 4 percent from 274,000 AFY to 286,000 AFY. <sup>8</sup> The simulated increase in surface water supply is not enough to meet the increased water demands under the climate change scenario. As a result, private groundwater production is simulated to increase approximately 7 percent, from 536,000 AFY to 565,000 AFY. Under climate change conditions, depletion in aquifer storage is expected to increase by about 60 percent to an average annual rate of 130,000 AFY, from 82,000 AFY in the projected conditions baseline. A graphical representation of simulated changes to evapotranspiration, surface deliveries, and groundwater pumping are presented in Figure 2-116 through Figure 2-118 below and complete water budgets for the climate change scenario are shown in Figure 2-119 and Figure 2-120.”	
6. Does the GSP explicitly account for climate change in the following elements of the water budget?	X			“DWR change factors were multiplied by projected baseline precipitation to generate projected precipitation under the 2070 central tendency future scenario using the Desktop IWFM GIS tool (DWR, 2018).”	2.4.3.2.1, page 220
a. Inflows:					<p data-bbox="590 743 919 824">i. Precipitation</p> <p data-bbox="590 824 919 906">ii. Surface Water</p> <p data-bbox="590 906 919 1377">“While river flows and surface water diversions in the Merced, Chowchilla, and San Joaquin rivers are simulated in CalSim II, there are significant variations when compared to local historical data. Due to the uncertainty in reservoir operations, flows from CalSim II provided by the state are not used directly in the Merced GSP. Instead, as explained later in this section, relative perturbation factors were used to derive surface water inflows and diversions for analysis with the MercedWRM.</p> <p data-bbox="590 1003 919 1377">Local tributaries and smaller streams within Merced Subbasin are not simulated in CalSim II and must be simulated using adjustment factors developed by DWR for unregulated stream systems. While not all of these local tributaries are completely unregulated, most control structures are minor in operation, do not significantly impair natural flow when simulated on a monthly timestep, and are considered unimpaired for this analysis. Resolution of these perturbation factors are available at the HUC 8 watershed scale and include Bear Creek, Owens Creek, and Mariposa Creek. The remaining streams simulated in the MercedWRM utilize the IWFM small-watershed package, whose climate change impacts are calculated internally dependent on both precipitation and evapotranspiration refinement.”</p>
iii. Imported Water		X		“The analysis was based on the projected conditions baseline with climate change perturbed inputs for streamflow, precipitation, and ET.” No climate change impacts on imported water were discussed in the GSP.	
iv. Subsurface Inflow		X		“The analysis was based on the projected conditions baseline with climate	

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				change perturbed inputs for streamflow, precipitation, and ET.” No climate change impacts on subsurface inflow were discussed in the GSP.	
b. Outflows: i. Evapotranspiration	<b>X</b>			“Potential ET in the Merced Subbasin is aggregated to one of seventeen land use categories but does not vary spatially. DWR provides change factors for ET in the same spatially distributed manner as precipitation, as described above. However, to match the level of discretization with the Merced model, an average ET change factor was calculated across all VIC grid cells within the Merced Subbasin boundary. Therefore, the tool to process ET provided by DWR was not needed or used. Change factors provided by DWR for November 1, 1964 through December 1, 2011 were averaged. This average ET change factor was then applied to the baseline ET time series for each crop type.”	2.4.3.2.2, page 220
ii. Surface Water Outflows (incl. Exports)		<b>X</b>		“The analysis was based on the projected conditions baseline with climate change perturbed inputs for streamflow, precipitation, and ET.” No climate change impacts on surface water outflows were discussed in the GSP.	
iii. Groundwater Outflows (incl. Exports)		<b>X</b>		“The analysis was based on the projected conditions baseline with climate change perturbed inputs for streamflow, precipitation, and ET.” No climate change impacts on groundwater outflows were discussed in the GSP.	
7. Are demands by these sectors explicitly included in the future/projected water budget?			<b>X</b>	“Development of the projected water demand is based on the population growth trends reported in the 2015 UWMP, and land use, evapotranspiration, and crop coefficient information from the 2015 AWMP. This data has been adjusted based on projected growth identified in general, agricultural, and urban water management plans to evaluate future scenarios of water demand uncertainty associated with projected changes in local land use planning, population growth, and climate.”  But projected demands by sectors are not described explicitly.	2.3.4.3, page 205-209
b. State Small Water systems (5-14 connections)		<b>X</b>		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
c. Small community water systems (<3,300 connections)		<b>X</b>		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
d. Medium and Large community water systems (> 3,300 connections)		<b>X</b>		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
e. Non-community water systems		<b>X</b>		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
8. Are water uses for native vegetation and/or wetlands explicitly		<b>X</b>		The water budget for the surface water components did not include an explicit evapotranspiration term, but the following footnote was included	2.3

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included in the current and historical water budgets?				as an explanation to Table 2-14 (p. 2-121 to 2-122). "Other flows is a closure term that captures the stream and canal system include gains and losses not directly measured or simulated within IWFM. Some of these features include but may not be limited to direct precipitation, evaporation, unmeasured riparian diversions and return flow, temporary storage in local lakes and regulating reservoirs, and inflow discrepancies resulting from simulating impaired flows." Riparian uptake from streams and evapotranspiration was included in the Land System Budget Table 2-15 (p. 2-123 to 2-124). The groundwater budget (Table 2-16 p. 2-125 and 2-126) did not include an explicit evapotranspiration term but included the following footnote "Other flows within the groundwater system including temporary storage in the vadose zone, and root water uptake from the aquifer system." The water budgets were calculated by the model, MercedWRM, and without the documentation the water budget is uncertain.	
<p><b>Summary / Comments</b></p> <p>Given the uncertainties of climate change, it is appropriate to analyze the impacts of climate change for a range of scenarios (e.g., a mild effects scenario and a high (worst case) effects scenario).</p> <p>Based on the data presented, it is not clear how climate change is expected to affect specific elements of the water budget (i.e., imported water, subsurface flows, surface water and groundwater outflows, including exports).</p> <p>The GSP also does not provide specifics on drinking water demands included for large urban water systems, domestic well users, or community water systems in the historical, current or future water budgets. This information should be provided for full transparency of the assumptions, data, and results of the water budgets.</p> <p>The GSP does not provide summaries of land use type by acreages, so the accuracy of the land use types used in the water budget cannot be reviewed by the public.</p> <p>The GSP is incomplete because Appendix D - MercedWRM Model Documentation was not provided in the public review draft. This appendix is necessary for understanding the assumptions and methodologies inherent in the model used for this GSP.</p> <p>Managed habitats that use applied water (e.g., Merced NWR) are not listed in the water budget. These managed habitats should be listed alongside ag and urban throughout the water budget (Table 2-15 and 2-16) as both groundwater pumpers and as supplying deep percolation.</p> <p>It is also not clear how climate change is anticipated to change the demands of domestic users and public water systems and how these demands were accounted for in the projected water budget.</p> <p>Based on the information presented in the GSP, the water budget for the surface water components and groundwater budget do not include explicit evapotranspiration terms.</p>					

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<p>The water budgets were calculated by the model, MercedWRM, and the appendix detailing the model methodology and assumptions was omitted from the document. Please provide a more complete description of the budget and Appendix D (full model documentation).</p>					

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**5. Management Areas and Monitoring Network**

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

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

*(b) A basin that includes one or more management areas shall describe the following in the Plan:*

*(2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.*

*(3) The level of monitoring and analysis appropriate for each management area.*

*(4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.*

*(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.*

**CWC Guide to Protecting Drinking Water Quality under the SGMA<sup>12</sup>**  
**TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs<sup>13</sup>**

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP define one or more Management Area?		X		"Management Areas have been discussed in the Merced GSP Stakeholder and Coordinating Committee Meetings, as well as GSA Board Meetings. At this time, there are no management areas established for the purposes of defining sustainability criteria for the Subbasin."	3.2, page 229
2. Were the management areas defined specifically to manage GDEs?			X		
3. Were the management areas defined specifically to manage DACs?			X		
a. If yes, are the Measurable Objectives (MOs) and MTs for GDE/DAC management areas more restrictive than for the basin as a whole?			X		
b. If yes, are the proposed management actions for GDE/DAC management areas more restrictive/ aggressive than for the basin as a whole?			X		
4. Does the GSP include maps or descriptions indicating what DACs are located in each Management Area(s)?			X		
5. Does the GSP include maps or descriptions indicating what GDEs are located in each Management Area(s)?			X		
6. Does the plan identify gaps in the monitoring network for DACs and/or GDEs?		X			
a. If yes, are plans included to address the identified deficiencies?			X		
<b>Summary / Comments</b>					

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<p>If management areas are defined in the future, care should be taken so that they and the associated monitoring network are designed to adequately assess and protect against impacts to all beneficial users, including GDEs and DACs.</p> <p>The monitoring network for water quality consists of 5 representative monitoring wells. This amounts to 0.65 wells per 100 square miles, which is at the very low end of DWR guidance for monitoring well densities of between 0.2 and 10 wells per 100 square miles.<sup>2</sup> Given the complexity of this subbasin, the volume of groundwater use this representative monitoring well density is insufficient for the protection of beneficial users.</p>					

<sup>2</sup> DWR, 2016. Best Management Practices for the Sustainable Management of Groundwater, Monitoring Networks and Identification of Data Gaps (BMP #2), December 2018.

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**6. Measurable Objectives and Undesirable Results**

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

<p><u>Selected relevant requirements and guidance:</u>  GSP Element 3.4 “Undesirable Results” (§ 354.26):  <i>(b) The description of undesirable results shall include the following:</i>  <i>(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results</i></p> <p>GSP Element 3.2 “Measurable Objectives” (§ 354.30)  <i>(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.</i></p>
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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are DAC impacts considered in the development of Undesirable Results (URs), MOs, and MTs for groundwater levels and groundwater quality?			<b>X</b>	<p>DACs are not explicitly identified, but domestic well users are discussed in terms of URs, MOs, and MTs.</p> <p>“If groundwater were to reach levels that cause undesirable results, effects could include: de-watering of a subset of the existing groundwater infrastructure, starting with the shallowest wells (which are generally domestic wells) and adverse effects on groundwater dependent ecosystems.”</p> <p>“If groundwater quality were degraded to levels causing undesirable results, the effect could potentially cause a reduction in usable supply to groundwater users, with domestic wells being most vulnerable as treatment or access to alternate supplies may be unavailable or at a high cost for small users. Water quality degradation could cause potential changes in irrigation practices, crops grown, crop productivity, adverse effects to property values, and other economic effects. Degraded water quality could have impacts on native vegetation or managed wetlands. Additionally, reaching undesirable results levels for groundwater quality could adversely affect current and projected municipal uses, and users could have to install wellhead treatment systems or seek alternate supplies.”</p> <p>“The measurable objective is a TDS concentration of 500 mg/L, which aligns with the Secondary MCL for TDS. The margin of operational flexibility (MoOF) is 500 mg/L TDS, the difference between the measurable objective of 500 mg/L and the minimum threshold of 1,000 mg/L.”</p> <p>“The minimum threshold for groundwater levels was defined as the construction depth of the shallowest domestic well within a 2-mile radius. Based on the undesirable results described in Section 3.3.1, dewatering of domestic wells is considered the most protective indicator, since domestic</p>	<p>3.3.1, page 230;</p> <p>3.3.2, page 231;</p> <p>3.6.1, page 237</p> <p>3.6.3, page 240; Page 231</p>

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				wells are expected to be the most shallow groundwater accessing infrastructure.” Water level MOs are set above this threshold.	
2. Does the GSP explicitly discuss how stakeholder input from DAC community members was considered in the development of URs, MOs, and MTs?	<b>X</b>			<p>“The undesirable result for chronic lowering of groundwater levels in the Merced Subbasin is sustained groundwater elevations that are too low to satisfy beneficial uses within the basin over the planning and implementation horizon of this GSP. During development of the GSP, potential undesirable results identified by stakeholders included:</p> <ul style="list-style-type: none"> <li>• Significant and unreasonable unusable and stranded groundwater extraction infrastructure</li> <li>• Significant and unreasonable reduced groundwater production</li> <li>• Significant and unreasonable increased pumping costs due to greater lift and deeper installation or construction of new wells</li> <li>• Significant and unreasonable number of shallow domestic wells going dry”</li> </ul> <p>“In identifying undesirable results for the Subbasin, the GSAs sought input from beneficial users through multiple venues including the stakeholder advisory committee and public workshops held in locations specifically selected to provide access to disadvantaged communities. The protection of water quality for drinking and for agricultural use was identified as a priority for users in the basin. ... The GSAs also sought input from the Merced County Division of Environmental Health as to which constituents of concern in the Subbasin could be tied to groundwater management activities and therefore managed through SGMA. While the Division of Environmental Health has identified several constituents of concern in the Subbasin (see Section 2.2.4 – Groundwater Quality in Current and Historical Groundwater Conditions), this GSP focuses on only those constituents where groundwater management activities have the potential to cause undesirable results.”</p>	3.3.1, page 229;  3.6.1, page 236
3. Does the GSP explicitly consider impacts to GDEs and environmental BUs of surface water in the development of MOs and/or MTs for groundwater levels and depletions of ISWs?		<b>X</b>		<p>The measurable objectives addressed only the representative monitoring wells and was set at 25 feet above the minimum threshold. GDEs were not considered.</p> <p>The minimum threshold was set at each of the representative monitoring wells. The level was defined as “The minimum threshold for groundwater levels was defined as the construction depth of the shallowest domestic well within a 2-mile radius.” Thus, GDEs were not considered.</p> <p>Chronic lowering of groundwater levels were considered by proxy only for the Merced River and San Joaquin River, not for the other creeks in the Merced Subbasin.</p>	3.3.3  3.3.2
4. Does the GSP explicitly consider impacts GDEs and environmental BUs of surface water and recreational lands in the discussion and development of Undesirable Results?		<b>X</b>		Undesirable results are defined as follows: “For the Merced Subbasin, an undesirable result for declining groundwater levels is considered to occur during GSP implementation when November groundwater levels at greater	3.3.1



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				than 25% of representative monitoring wells (at least 7 of 25) fall below their minimum thresholds for two consecutive years where both years are categorized hydrologically as below normal, above normal, or wet". GDEs are not specifically addressed. No hydrologic or biological data are compiled for the GDEs and data gaps are not described. Potential impacts on the GDEs are not described.	
<b>Summary / Comments</b>					
<p>Based on the presented information, domestic well uses are considered under URs and for the development of water level MOS and MTs, but DAC members are not explicitly considered. More detail and specifics regarding DAC members, including those that rely on smaller community drinking water systems, not only domestic wells, is necessary to demonstrate that these beneficial users were adequately considered.<sup>3</sup></p> <p>The GSP includes insufficient data on the proximity of DACs to the representative monitoring wells that will be used to measure undesirable results.</p> <p>Water level MTs are established based on the minimum of: (1) the construction depth of the shallowest well in a two-mile radius of each representative monitoring well and (2) the minimum pre-January 2015 elevation. However, the GSP does not include any analysis or data showing what wells and well depths were considered and how many domestic wells fall outside of these 2-mile radius zones. This data is necessary for understanding how sensitive drinking water users may be impacted or protected by the proposed MTs.</p> <p>The water level MTs are set relative to the <i>bottom</i> of the total well construction depth. A water supply well becomes unusable or subject to decreased performance and longevity as water levels fall within the screened interval, which will occur before water levels reach the bottom of the well. Therefore, many domestic wells within the 2-mile radius may be significantly impacted before this MT is exceeded or undesirable results are triggered.</p> <p>The measurable objectives addressed only the representative monitoring wells and was set at 25 feet above the minimum threshold. GDEs were not considered. Please expand the Measurable Objectives to include protection of the environmental health of GDEs and ISWs.</p> <p>The minimum threshold was set at each of the representative monitoring wells. The level was defined as "The minimum threshold for groundwater levels was defined as the construction depth of the shallowest domestic well within a 2-mile radius." Thus, GDEs were not considered. Please explain whether any adverse impacts to GDEs are expected and if changes to the minimum threshold should be made.</p> <p>Chronic lowering of groundwater was considered by proxy only for the Merced River and San Joaquin River, not for the other creeks in the Merced Subbasin. Please identify areas on rivers or creeks where depletions are expected and if the minimum threshold should be changed.</p>					

<sup>3</sup> Community Water Center and Stanford School of Earth, Energy, and the Environmental Sciences, *Groundwater Quality in the Sustainable Groundwater Management Act (SGMA): Scientific Factsheet on Arsenic, Uranium, and Chromium*, [https://d3n8a8pro7vhm.cloudfront.net/communitywatercenter/pages/293/attachments/original/1560371896/CWC\\_FS\\_GrndwtrQual\\_06.03.19a.pdf?1560371896](https://d3n8a8pro7vhm.cloudfront.net/communitywatercenter/pages/293/attachments/original/1560371896/CWC_FS_GrndwtrQual_06.03.19a.pdf?1560371896); Community Water Center, *Guide to Protecting Drinking Water Quality Under the Sustainable Groundwater Management Act*, [https://d3n8a8pro7vhm.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide\\_to\\_Protecting\\_Drinking\\_Water\\_Quality\\_Under\\_the\\_Sustainable\\_Groundwater\\_Management\\_Act.pdf?1559328858](https://d3n8a8pro7vhm.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858).

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
<p>Undesirable results are defined as follows: “For the Merced Subbasin, an undesirable result for declining groundwater levels is considered to occur during GSP implementation when November groundwater levels at greater than 25% of representative monitoring wells (at least 7 of 25) fall below their minimum thresholds for two consecutive years where both years are categorized hydrologically as below normal, above normal, or wet”. GDEs are not specifically addressed. No hydrologic or biological data are compiled for the GDEs and data gaps are not described. Potential impacts on the GDEs are not described. For existing GDEs, please provide hydrologic and biological data for current conditions and describe how susceptible they are to future impacts.</p>					

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**7. Management Actions and Costs**

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

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

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP identify benefits or impacts to DACs as a result of identified management actions?	X			Table 6-3 (Projects Shortlist for Merced Subbasin Groundwater Sustainability Plan) identifies projects anticipated to have benefits to DACs. The subsequent sections detail the benefits by project. For example:  "The Planada Groundwater Recharge Basin Pilot Project is a three-year pilot project to construct a groundwater recharge basin in the Planada area, an SDAC that is completely reliant on groundwater. The project addresses a demonstrated need for greater groundwater monitoring and data collection for potential recharge projects, particularly within this SDAC area. .... Groundwater basin recharge will be an important component of the GSP; this pilot program will provide information critical to establishing long-term Basin sustainability, while directly benefitting an SDAC that needs a sustainable groundwater supply."	Table 6-3, page 299;  6.4 Project 1, page 300
2. If yes: a. Is a plan to mitigate impacts on DAC drinking water users included in the proposed Projects and Management Actions?		X		Within each project description section, the "Expected Benefits and Evaluation" part describes how the project will benefit DACs and "How Project Will Be Accomplished" includes a general project plan.  A plan to specifically mitigate impacts to DAC drinking water users, such as a well replacement program or program to connect well users to a public water system is not clearly specified. The emergency tanked water program implemented during the drought is identified, but the program ended in 2018 and the GSP does not identify implementing this or a similar program in the future, if necessary to protect shallow domestic well users.	6.4, page 300-310
b. Does the GSP identify costs to fund a mitigation program?	X			Table 6-3 (Projects Shortlist for Merced Subbasin Groundwater Sustainability Plan) summarizes the project costs and described again under each project section.	Table 6-3, page 299; 6.4, page 300-310
c. Does the GSP include a funding mechanism to support the mitigation program?	X			"Estimated Costs and Plans to Meet Costs" under project sections include the funding resources.	6.4, page 300-310;

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				<p>“The range of applicable projects, per SWRCB Funding Opportunities fact sheet and per Water Code §10727.4(h), include recharge projects, groundwater contamination remediation, water recycling projects, in-lieu use, diversions to storage, conservation, conveyance, and extraction projects. Additional Projects or Management Actions outside of this list that a GSA determines will help achieve the sustainability goal for the Basin may also be applicable (see GSP Regulations §354.44). Many of the available funding mechanisms accept applications on a continuing basis. Table 6-7 provides a brief overview of the project types and available funding and programs as well as important dates to consider for implementation.”</p>	6.6, page 319
3. Does the GSP identify specific management actions and funding mechanisms to meet the identified MOs for groundwater quality and groundwater levels?	<b>X</b>			<p>Table 6-3 provides a summary of the MOs Expected to Benefit by each project. According to the table, projects 1-5 and 9-12 are identified to mitigate the chronic lowering groundwater levels; and projects 2-4 and project 7 are expected to improve groundwater quality. The funding mechanisms are included in the detailed description of each project following the table.</p> <p>For example:</p> <p style="padding-left: 40px;">“Description: The El Nido Groundwater Monitoring Wells project is comprised of installing monitoring wells in and near the community of El Nido that will improve the understanding of stratigraphy and groundwater conditions in the area and improve ongoing monitoring of water elevation and water quality.</p> <p style="padding-left: 40px;">... Measurable Objective: The project addresses measurable objectives for water level and subsidence by enhancing monitoring efforts, especially for areas prone to subsidence. To the extent the project improves understanding of groundwater movement three-dimensionally in the Basin, it will also help address measurable objectives for water quality.</p> <p style="padding-left: 40px;">“Estimated Costs and Plans to Meet Costs: The estimated cost for this project is \$395,000. Costs for this project are met through Proposition 1 Funding through DWR.”</p>	<p>Table 6-3, page 299;</p> <p>6.4 Project 1-5, page 300-306;</p> <p>6.4 Project 9-12, page 309-312</p>
4. Does the GSP include plans to fill identified data gaps by the first five-year report?			<b>X</b>	<p>“Creating a Data Gaps Plan It is anticipated that within one year of the acceptance of the GSP by DWR, the GSAs will develop a plan to address identified data gaps with a timeline for implementation based on priority. Within two years after the acceptance of GSP by DWR, the GSAs will provide a plan to fill in identified gaps, with a timeline for priorities of implementation.”</p>	7.8, page 330

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Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
5. Do proposed management actions include any changes to local ordinances or land use planning?		X		Proposed projects include construction of new infrastructure, which will have a limited change to land use, including conversion of 50-acres field to a storage reservoir. No changes to ordinances or land use planning are proposed.  "The Merced Subbasin, the Merced Region Water Use Efficiency Program will be implemented by multiple water purveyors in the Region to increase the level of water conservation & ensure long-term water use efficiency by the regions urban and agricultural users."	6.4 Project 7, page 307
6. Does the GSP identify additional/contingent actions and funding mechanisms in the event that MOs are not met by the identified actions?		X			
7. Does the GSP provide a plan to study the interconnectedness of surface water bodies?		X			
8. If yes:					
a. Does the GSP identify costs to study the interconnectedness of surface water bodies?			X		
b. Does the GSP include a funding mechanism to support the study of interconnectedness surface water bodies?			X		
9. Does the GSP explicitly evaluate potential impacts of projects and management actions on groundwater levels near surface water bodies?				A process was conducted by the three GSAs and stakeholders to select 12 projects. The projects are listed in Table 6-3. Only a general way of evaluating each project is given. Up to 50 future potential projects, listed in Table 6-6 Projects Running List for Reference, and may be implemented as priorities and funding change. None of the 12 selected projects are expected to directly benefit GDEs. Please explain how the groundwater recharge projects (Project #1, #4, and #10) could benefit GDEs or a location near the GDEs and how the projects will be evaluated.	6.3
<b>Summary / Comments</b>					
<p>The GSP does not appear to include any plans to address impacts to domestic well users if domestic wells do go dry in the future. While many of the identified projects are intended to benefit and protect DACs and domestic well users, no program is provided as a contingency in case: 1) groundwater conditions decline before the projects are fully implemented, or 2) implementation of such projects does not have the desired effects. A plan to mitigate impacts to DAC drinking water users could include a program to replace wells, connect well users to a public water system, reinstatement of the emergency tanked water program, etc. Of these, connecting well users to a public water systems would be most preferable as this will result in a more sustainable water supply for these users over the long-term.</p> <p>A process was conducted by the three GSAs and stakeholders to select 12 projects, but based on the information presented in the GSP, none of the 12 selected projects are expected to directly benefit GDEs. Please explain how the groundwater recharge projects (Project #1, #4, and #10) could benefit GDEs or a location near the GDEs and how the projects will be evaluated.</p>					

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<sup>1</sup> Page numbers refer to the page of the PDF.

<sup>2</sup> DWR DAC Mapping Tool: <https://gis.water.ca.gov/app/dacs/>

<sup>3</sup> CA MCLs: [https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/MCLsandPHGs.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html)

<sup>4</sup> OEHHHA PHGs: [https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/MCLsandPHGs.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html)

<sup>5</sup> CARB: <https://ww2.arb.ca.gov/resources/documents/scs-evaluation-resources>

<sup>6</sup> OPR General Plan Guidelines: <http://www.opr.ca.gov/planning/general-plan/>

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

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

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

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

<sup>11</sup> DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: [https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance\\_Final.pdf](https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf)

DWR Resource Guide DWR-Provided Climate Change Data and Guidance for Use During GSP Development: [https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance\\_v8.pdf](https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance_v8.pdf)

<sup>12</sup> CWC Guide to Protecting Drinking Water Quality under the SGMA:

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

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