to inform sustainable management criteria during the development of the GSP, uncertainties in model results were discussed in multiple committee meetings. The GSAs would have preferred to have the full model documentation available, but did not want to delay publishing the draft GSP document while the documentation was being finalized, and believe that the information provided in the GSP itself is sufficient for reviewing the water budgets and the GSP as a whole.

The GSP section on Water Budgets summarizes the major assumptions and data sources for the inputs to each scenario (under historical, current, and projected conditions). The appendix for model documentation largely provides additional technical information used to develop the model (such as aquifer layer definition and boundary conditions) as well as model calibration procedures and results. The majority of the underlying geology and aquifer layer definition is already included in the hydrogeologic conceptual model (HCM) section of the GSP.

Commenters requested additional detail on how urban demands were calculated in general and also how they were reduced for the sustainable yield analysis. To address these requests, additional information has been added to the water budgets section to describe the methodology by which urban demands were calculated, with some example water use rates (in GPCD) added in the list of baseline assumptions. Clarifying text has also been added to explain how urban demands were reduced in conjunction with agricultural demands for the sustainable yield scenario. The methodology for reducing basinwide pumping to estimate sustainable yield was developed solely for the purpose of estimating basinwide sustainable yield and is not intended to prescribe or describe how pumping would actually be reduced in the basin during GSP implementation to achieve sustainability. The implementation of pumping reductions to achieve sustainability will be done by the GSAs and take into account multiple considerations including water right and beneficial uses including the human right to water. The status of plans for implementing management actions related to pumping reductions is further discussed in Projects and Management Actions.

A comment suggested that acres of each land use type should be presented, particularly how historical land use varies over the historical water budget period. This information is presented for historical conditions in the Merced WRM Model Documentation (Appendix D to the GSP) in Figures 13 & 14.

A comment requested time series graphs of water budget results by year. In response to this comment, graphs were added to the GSP section for Water Budgets.

CLIMATE CHANGE

Comments on climate change requested more information on how climate change affects specific elements of the water budget and also expressed support for accounting for climate change in the planning process. As described in Section 2.4 of the GSP, the climate change sensitivity analysis was conducted (per DWR guidance) for 2070 conditions, versus the GSP planning horizon goal of 2040. The results of the climate change sensitivity analysis were used to better understand expected climate change trends and to inform planning. However, the Projected Conditions 2040 baseline was deemed most appropriate for use in analyzing the GSP implementation time period.

In addition to figures already in the GSP that show the results of the climate change water budget, several tables have been added to Section 2.4 in a format similar to the presentation of other water budget results. These tables provide additional detail on how climate change may affect elements of the water budget.

SUSTAINABILITY GOAL

One commenter suggested that degradation of groundwater quality specifically be called out in the text of the sustainability goal and that stakeholder feedback and vision be integrated into an expanded sustainability goal. The Merced Subbasin Sustainability Goal was developed with direction from the Coordinating Committee and succinctly states a goal of “sustainable groundwater management on a long-term average basis” while “avoiding undesirable

results", which are defined more specifically in the subsections of the Sustainable Management Criteria chapter for each of the sustainability indicators, including water quality. The Coordinating Committee chose to develop a sustainability goal that was brief and inclusive, rather than to prioritize specific sustainability indicators. The GSAs reviewed the goal as part of considering the public comments and have decided to keep the goal as written and agreed upon by the Coordinating Committee.

MANAGEMENT AREAS

Some comments expressed a desire to create management areas for various regions of the Subbasin, such as the Stevinson area or area near the Bear Creek confluence with San Joaquin River (due to higher groundwater elevations and/or lack of subsidence concerns) or for drinking water systems and communities relying on private wells (e.g. more protective thresholds due to potential community vulnerability).

The GSAs have considered management areas and have concluded that management areas *as defined by SGMA* are not needed in the Merced Subbasin at this time. A management area is defined in SGMA as an "*area within a basin for which the [GSP] may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors*" [CCR Title 23, Division 2, §351(r)]. The GSAs recognize that the implementation of management actions for the basin may entail identifying different regions with different implementation requirements, but do not believe that formal management areas, as defined by SGMA, with different sustainable management criteria and additional reporting requirements are needed at this time. The GSAs can consider establishing management areas in the future if during the course of GSP implementation it becomes apparent that some areas require a significantly different management approach.

GROUNDWATER LEVEL SUSTAINABLE MANAGEMENT CRITIERIA

Comments on the sustainable management criteria for groundwater levels raised several concerns which are addressed in the paragraphs below.

First, several comments assert that the existing groundwater level minimum thresholds are not adequately protective of drinking water for disadvantaged communities and that there was inadequate consideration of all beneficial uses (such as small community water systems serving DACs or GDEs). Additionally, it was suggested that a single well going dry should be considered significant and unreasonable.

Under the proposed GSP, the basin will be managed to a measurable objective which is based on the groundwater levels needed to achieve the long-term sustainability goal. The minimum threshold is used to define undesirable results and is also the threshold at which state intervention may be triggered if the basin is unable to correct the issue causing undesirable results. The GSAs intend to manage the Subbasin to the measurable objective by monitoring conditions and taking actions if progress toward the measurable objectives is not occurring.

In setting sustainable management criteria for water levels, the GSAs sought to be protective of the most sensitive beneficial users. Because domestic wells are often more shallow than agricultural, industrial, or municipal wells, domestic well users were considered the beneficial use most sensitive to changes in groundwater levels caused by pumping. The minimum threshold for groundwater levels was based on shallowest domestic well depths.

Comments from Self-Help Enterprises and Leadership Counsel incorrectly assert that nearly one-third of all domestic wells in the subbasin were not considered in the establishment of a minimum threshold for chronic lowering of groundwater levels. This appears to be a misinterpretation of the methodology used to set the minimum threshold. The

GSAs intend for the sustainable management criteria for groundwater levels to be protective of all beneficial users in the basin. The first step in setting sustainable management criteria for groundwater levels was to establish a representative well network based on existing wells in the basin that meet the SGMA-defined requirements to be used for monitoring wells (CASGEM status, screening information, etc.). As noted in comments, the well density of the groundwater level monitoring network is within DWR's recommended range and could be improved. The GSAs share a desire to increase basin monitoring (see additional discussion of Monitoring Network in GSP and in master response). The representative network selected for groundwater levels in this GSP is intended to be representative of water level conditions in the basin. The purpose of the monitoring network is not to monitor every unique use or user, but instead to identify a number of representative sites that assist in evaluating the effects and effectiveness of Plan implementation. Therefore, the GSAs do not plan to identify specific users associated with each representative monitoring well, but will continue to work on filling data gaps to make sure the monitoring network achieves its objectives.

Once the representative wells were selected, the elevation of the minimum threshold was determined at each well based on the shallowest depth of nearby domestic wells (nearby defined as a two-mile radius). This two-mile radius was used to set the elevation of the minimum threshold at each representative well. It is not an indication of the limits of which wells are "protected" within the basin. The representative wells are intended to represent groundwater level conditions beyond the two-mile radius. The GSAs believe the sustainable management criteria selected for groundwater levels are protective of beneficial uses, including domestic use, throughout the basin based on available information and existing wells, and acknowledge that additional monitoring wells are desirable. The GSAs are pursuing funding to address data gaps and will develop a methodology to establish sustainable management criteria at new monitoring wells that lack historical data.

In response to comments about presentation of domestic well data used for establishing the minimum threshold, the depth and location of individual domestic wells contained within the Merced County well database are confidential and cannot be published in detail in the GSP.

In response to comments about increasing the elevation of the minimum threshold from the bottom of total construction depth to a value related to the screened interval: there is limited information available on the depths of screened intervals and pump placement within wells. While it is recognized that there may be impacts on pumping if groundwater levels were to approach the bottom of the shallowest well, the impacts are not expected to be significant and unreasonable. Using the constructed depth of the shallowest domestic well for this analysis is considered the best source of data for setting the minimum threshold.

Commenters suggested that any well going dry should be considered an undesirable result. Other comments suggested that the sustainable management criteria for water level should not exclude dry and critically dry years in its definition of undesirable results. DWR guidance states:

> "Undesirable results are one or more of the following effects: Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods…."[1]

[1] Best Management Practices for the Sustainable Management of Groundwater, DWR, 2017, page 4.

The GSAs do not consider a single well going dry an undesirable result that should trigger state intervention in the subbasin. A domestic well going dry would trigger further investigation and efforts to provide drinking water. The GSAs are open to developing a mitigation program for domestic wells that go dry due to lowering groundwater levels during implementation. The GSP states that the GSAs will evaluate development of a mitigation program within the first five years of implementation.

Some commenters questioned the definition of undesirable result requiring a hydrological condition of two consecutive wet, above normal, or below normal years. DWR's guidance states that overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels. Extended dry periods are not reflective of long term average basin conditions and thus the water year type condition was included in the definition of undesirable result. The GSAs intend to manage the Subbasin to the measurable objective by monitoring conditions and taking actions if progress toward the measurable objectives is not occurring. The GSAs reviewed the definition of undesirable result and, based on the State guidance, no changes were made to the definition of undesirable results.

Some commenters questioned whether the sustainable management criteria were protective of environmental beneficial uses. The GSAs intend the measurable objective and minimum threshold to be protective of all beneficial uses, including environmental uses. Areas deemed likely groundwater dependent ecosystems (GDEs) in the basin are in areas of relatively high groundwater levels. More information is needed to develop a comprehensive understanding of the relationship between groundwater levels, deep aquifer pumping, and GDEs in the Subbasin (see more explanation in master response for Groundwater Dependent Ecosystems).

GROUNDWATER STORAGE SUSTAINABLE MANAGEMENT CRITIERIA

Comments were received about the lack of a sustainable management criteria for groundwater storage. The GSAs maintain that due to the volume of water available in storage and the relatively small changes in storage under historical pumping in comparison to the total stored volume, there are no significant and unreasonable effects due to reduced groundwater storage. There are other basins where groundwater storage is a concern separate and distinct from groundwater level. For example, this would include shallow basins where groundwater wells are typically screened to the bottom of the aquifer. In such shallow basins, managing for storage is important as extraction facilities are sensitive to the presence of water, not the depth of water.

This is not the case for the Merced Subbasin. The significant and unreasonable effects in the Merced Subbasin have been related to changes in groundwater level. Concerns about *accessing* groundwater are most appropriately addressed by the groundwater level sustainability indicator.

Further, minimum thresholds and measurable objectives for groundwater storage would need to be measured by groundwater levels as a proxy and would not change the GSP approach because ability to access groundwater and meeting measurable objectives for groundwater levels will still drive basin management. For these reasons, the GSAs find that there is not a need to set separate sustainable management criteria for the groundwater storage sustainability indicator.

GROUNDWATER QUALITY SUSTAINABLE MANAGEMENT CRITIERIA

Comments asserted that the existing sustainable management criteria do not adequately protect drinking water quality, additional minimum thresholds should be established for constituents in addition to salinity, and that there are not enough representative or general water quality monitoring wells.

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 for which to develop a minimum threshold in the GSP because the causal nexus between salinity concentrations and groundwater management activities has been established. Relatively high salinity groundwater in the basin has been shown to migrate due to groundwater extraction activities. Groundwater management is the only mechanism available to GSAs to implement SGMA, including water quality. Establishing minimum thresholds for constituents that cannot be managed by changing pumping or recharge was deemed inappropriate by the GSAs.

This does not mean that there are not important water quality concerns for the Subbasin. The GSAs recognize importance of protecting drinking water quality. The GSAs also recognize that water quality in the Merced Subbasin is being addressed through various water quality programs (e.g., CV-SALTS and ILRP) and agencies (e.g., RWQCB, EPA) that have the authority and responsibility to address them. The GSAs desire to coordinate with these agencies and their ongoing efforts to avoid duplication of efforts and efficiently use limited resources. The GSAs will abide by any future local restrictions that may be implemented by the agencies or coalitions managing these programs.

The monitoring of water quality constituents is included in ongoing monitoring efforts listed below and will be summarized in future GSP updates. The GSAs have laid out several activities that will be used to coordinate on water quality, including:

- Monthly review of data submitted to the Department of Pesticide Regulation (DPR), Division of Drinking Water (DDW), Department of Toxic Substances Control (EnviroStor), and GeoTracker as part of the Groundwater Ambient Monitoring and Assessment (GAMA) database.
- Quarterly check-ins with existing monitoring programs, such as CV-SALTS and ESJWQC GQTM.
- Annual review of annual monitoring reports prepared by other programs (such as CV-SALTS and ILRP)
- GSAs will invite representative(s) from the Regional Water Quality Control Board, Merced County Division of Environmental Health, and ESJWQC to attend an annual meeting of the GSAs to discuss constituent trends and concerns in the Subbasin in relation to groundwater pumping.
- GSAs will consider potential beneficial and adverse effects on groundwater quality in siting groundwater recharge projects and other management actions.

The purpose of these reviews will be to monitor and summarize the status of constituent concentrations throughout the Subbasin with respect to typical indicators such as applicable MCLs or SMCLs. The Merced Subbasin GSP Annual Report and 5-Year Update will include a summary of the coordination and associated analyses of conditions. The GSP 5-year updates can include evaluation of whether minimum thresholds for additional constituents are needed.

Some comments specifically requested additional monitoring in the communities of Planada, El Nido, and Le Grand. Planada and Le Grand are served by Community Services Districts (CSDs) that conduct regular monitoring of their wells. In fact, when comparing existing monitoring throughout the Merced Groundwater Subbasin, there is disproportionate representation in the DAC areas compared to the surrounding “White” areas. Increased monitoring within the “White” areas could provide a larger benefit to DACs in forecasting water quality trends than installing additional wells directly in a DAC area. This will be evaluated as part of the Data Gap Plan that will be developed in the first year of GSP implementation.

The Planada and Le Grand CSDs conduct routine testing of their groundwater wells as required by state and federal regulations. The 2018 Consumer Confidence Report for the Planada Community Services District indicated the water met state and federal standards for drinking water.

One comment suggested setting a higher salinity minimum threshold for agricultural wells, particularly in the El Nido area where some shallow groundwater exceeds 1,000 mg/l TDS. The GSAs have set minimum thresholds at representative wells in the basin, all of which at this time are domestic wells. In pockets of the Subbasin with elevated TDS (greater than 1,000 mg/L), water use behaviors have already shifted to accommodate these concentrations. For example, agriculture has focused on more salt-tolerant crops, and more saline water supplies are blended with less saline water supplies. As a result, TDS concentrations in excess of 1,000 mg/L where currently experienced are not considered to be undesirable. There is, however, a desire on the part of Subbasin stakeholders to limit increases in salinity in parts of the Subbasin where TDS is below 1,000 mg/L to prevent undesirable results such as requirements to change cropping, blending supplies, etc. Therefore, the GSAs did not make changes to the sustainable management criteria for water quality, but will re-assess sustainable management criteria for water quality in future GSP updates.

The GSAs have identified data gaps in water quality monitoring, specifically with relatively few monitoring wells closer to the San Joaquin River and Mariposa County, as well as many wells used for monitoring not having construction information (for distinguishing below or above the Corcoran Clay).

The plan to fill this data gap includes coordination with Eastern San Joaquin Water Quality Coalition on existing plans to add new wells to the Groundwater Quality Trend Monitoring Plan, as well as a separate effort to obtain additional construction information for at least 20 public water system wells. In addition to the coordination efforts outlined above, the GSAs intend to fill all data gaps and will start by requesting funding to address water quality data gaps through Prop 68.

The GSAs understand that a DAC water needs assessment is being conducted under the IRWM program. The San Joaquin River Funding Area Disadvantaged Community Needs Assessment Report is in draft and the GSAs will incorporate information from the report in their GSP update when it is publicly available.

The GSP's Plan Implementation chapter has been revised to state that projects considered for implementation will be evaluated for potential water quality impacts during the selection and implementation process.

SUBSIDENCE SUSTAINABLE MANAGEMENT CRITIERIA

Comments expressed concern that historical and ongoing subsidence is significant and there have been adverse impacts on infrastructure. Some comments called for defining a measurable objective of zero subsidence, while others called for reducing pumping below the Corcoran Clay or otherwise implementing a more aggressive approach to reducing land subsidence.

The GSAs recognize that subsidence is an area of concern. However, subsidence is a gradual process that takes time to develop and time to halt. Even despite wetter conditions, subsidence in the Merced Subbasin between December 2017 and December 2018 was approximately -0.17 ft/yr and -0.32 ft/yr, depending on the location. Due to the thickness and low permeability of clayey units responsible for subsidence, subsidence may take years or decades to be fully realized after groundwater levels decline. As a result, some level of future subsidence, likely at rates similar to those currently experienced, is likely to be underway already and will not be able to be prevented.

Further, the GSAs recognize the importance of managing pumping volumes below the Corcoran Clay, as this is the depth range believed to be causing subsidence. The understanding of the depth at which subsidence is occurring is identified as a data gap in the GSP. The County of Merced is currently funding a project designed to study the potential impacts of moving pumping from below the Corcoran Clay to above the Corcoran Clay which includes streamlining the process of environmental permitting that is required during this change in pumping. This analysis is intended to facilitate

moving pumping while meeting the requirements of Merced County's Groundwater Ordinance and is described further in the Projects and Management Acts section. The Projects and Management Actions section also discusses installation of extensometers or other ground surface monitoring stations to better characterize the magnitude, extent, and depth of subsidence (and help fill identified data gaps) and the relationship of subsidence to groundwater pumping activities. The Merced GSP will continue to coordinate efforts with surrounding subbasins to develop regional or local solutions to subsidence occurring in the Merced, Chowchilla, and Delta-Mendota Subbasins.

The GSAs reviewed the proposed sustainable management criteria for subsidence in response to these comments and are not revising them at this time. The GSAs will reevaluate the sustainable management criteria for subsidence within the next five years. In the meantime, the GSAs intend to continue coordination with neighboring basins on subsidence to better understand subsidence and develop regional and local solutions to help address it. Interferometric Synthetic Aperture Radar (InSAR) data was recently (May 2019) published as part of DWR's SGMA technical assistance program. This satellite data provides high resolution subsidence information for the whole Subbasin. This data will be potentially useful in Annual Reporting in conjunction with existing USBR control points and will be evaluated more thoroughly as part of the GSP 5-year update.

Additionally, one comment requested considering adding El Nido community infrastructure as an example of infrastructure that has the potential to be damaged due to subsidence. This was added to the GSP.

DEPLETIONS OF INTERCONNECTED SURFACE WATERS SUSTAINABLE MANAGEMENT CRITIERIA

Commenters requested documenting the methodology used to determine gaining/losing streams in more detail and also stated that the GSP does not go far enough in considering avoiding or minimizing harm to public resources (e.g. where there is a hydrologic connection between groundwater and a navigable surface water body).

The methodology for determining gaining/losing streams is contained within Section 2.1.3.5.2 – Natural Groundwater Recharge and Discharge. It describes how a MercedWRM historical simulation was used to identify median monthly stream gains and losses to designate gaining or losing streams. Additional text has been added to further clarify the methodology.

As described in the GSP and acknowledged in the GSP regulations, there are significant challenges associated with directly measuring streamflow depletions. Additionally, managing depletions is difficult without direct measurements. The MercedWRM is a fully integrated surface and groundwater flow model developed and calibrated specifically for the Subbasin. The MercedWRM is a necessary and valuable tool for quantifying stream depletions. The GSAs have identified information on depletions of interconnected surface waters as a data gap that can be substantially filled by additional depth-discrete groundwater elevation data near selected rivers and streams. Data from these locations will be used to refine the MercedWRM in the future, resulting in improved estimates of depletions.

USING GROUNDWATER LEVELS AS PROXY FOR DEPLETION OF INTERCONNECTED SURFACE WATERS

Some commenters expressed concern that the justification for using groundwater levels as a proxy for depletion of interconnected surface waters was inadequate. The GSP section on the justification has been updated with additional results from the analysis used to support the justification. Additional information has been added on the level of data certainties related to smaller creeks which are primarily used for conveyance of irrigation water. There are significant challenges associated with directly measuring streamflow depletions. Based on the best information currently available through the use of the MercedWRM, the GSAs have determined that depletions occurring under groundwater level conditions that would cause undesirable results for groundwater levels would not be considered undesirable. Thus, the

existing minimum thresholds for groundwater levels can be considered a protective proxy for depletions of interconnected surface waters. This represents the best available information. The GSAs have identified information on depletions of interconnected surface waters as a data gap that can be substantially filled by additional depth-discrete groundwater elevation data near selected rivers and streams.

MONITORING NETWORKS

Several comments raised the issue that there are not enough monitoring locations for any of the sustainability indicators, particularly near vulnerable communities and other groundwater stakeholders. Additional comments suggested considering identification of beneficial users that are associated with each of the existing monitoring wells.

The GSAs agree that the basin would benefit from additional monitoring data. The GSP identifies key data gaps and the GSAs are seeking funding to begin addressing them.

In Chapter 4 (Monitoring Networks), the subsections for each sustainability indicator contain information on Data Gaps and Plan to Fill Data Gaps. These gaps and plans have been summarized below:

- Groundwater Levels
    - Three specific data gaps identified from previous CASGEM planning efforts, plus acknowledgement of general data gap along western edge of Subbasin.
    - The plan to fill data gaps includes adding representative wells in the Above & Below Corcoran Clay Principal Aquifers in the southwesterly portion of the Subbasin, as well as along the northwestern portion of the Subbasin.
- Groundwater Quality
    - Two significant data gaps identified for (1) near San Joaquin River and close to Mariposa County and (2) limited or no well construction information.
    - The plan to fill data gaps includes coordinating with ESJWQC on existing specific plans to add additional wells and obtaining construction information for other wells.
- Subsidence
    - Data gaps include understanding the depth at which subsidence is occurring which will help characterize the relationship between subsidence and groundwater pumping activities.
    - The GSAs will develop a plan to fill identified data gaps through interbasin coordination on additional subsidence monitoring that may include installation of extensometers or other measurement methods to help characterize the magnitude, extent, and depth of subsidence.

Regarding identification of beneficial users per monitoring location: the intent of the SGMA-compliant monitoring network is to demonstrate short-term, seasonal, and long-term trends of the Subbasin as a whole. The intent of the monitoring network is not to monitor every unique use or user, but instead to select a number of representative sites that evaluate the effects and effectiveness of Plan implementation. Therefore, the GSAs do not plan to identify specific users associated with each representative monitoring well, and will continue to work on filling data gaps to make sure the monitoring network achieves its objectives.

ALLOCATION FRAMEWORK

The allocation framework refers to the way in which the sustainable yield of the basin will be shared among users. The GSAs have agreed on some elements of a framework and are continuing to discuss other important aspects of the allocation and how it would be implemented. The allocation framework has been a topic of discussion at the monthly Coordinating Committee and Stakeholder Committee meetings since October 2018. This is one of the most important and challenging aspects of the GSP and it is taking time to develop and reach agreement.

There were numerous comments received on the allocation framework. Comments included the need to consider allocation to non-irrigated lands, fairness of allocation, economics, adaptive management of the allocation in response to undesirable results and droughts, and incentives. There were comments highlighting the need to consider all beneficial users in the basin including managed habitats and environmental uses, domestic users in disadvantaged areas, de minimus users, and range lands. Comments expressed a desire for more information and the opportunity to engage and comment.

The GSP states that the GSAs intend to allocate water to each GSA but have not yet reached agreement on allocations or how they will be implemented. The GSP includes estimates of basin-wide sustainable yield and developed supply for illustrative purposes. The GSP also identifies the following steps in the first five years of the GSP to develop allocations:

- Agreeing upon details of how allocations to each GSA will be established
- Developing, refining, and documenting estimates of developed supply and determining rights to confirmed estimates of developed supply
- Determining how pumping will be measured through metering program or equivalent
- Implementation schedule and timing
- Conducting outreach and communications
- Establishing sustainable allocation trading and crediting rules

The GSP reflects the current state of understanding and agreement between the GSAs. This topic is the subject of ongoing discussions among the GSAs through the Coordinating Committee. The GSAs intend to continue discussion and reach agreement on an allocation framework for the Basin with public input and transparency.

DEMAND MANAGEMENT

Because the basin is in overdraft, there is a recognition that pumping in the basin must be reduced. The GSP includes a specific management action that the Merced Subbasin GSA is planning to implement to reduce pumping within its area. Many of the comments received on demand management were about managing pumping reductions in general and not necessarily specific to Merced's proposed action. Comments included recommendations on timing of implementation – including multiple commenters recommending using the full 20 year implementation period and a commenter recommending implementation be accelerated in the first 10 years. Some comments suggested considerations regarding fee and demand reductions excluding some users (e.g. DAC and SDAC community water systems, de minimus users, etc.) There were comments seeking information about how demand reduction would be implemented during droughts. There were comments encouraging public participation in demand management decisions.

Demand reduction and the allocation framework are related and both are areas of active development for the GSPs. The specifics of demand management are the subject of ongoing discussions by the Coordinating Committee. The information in the GSP reflects the current state of information about the GSAs' plans. The GSAs intend to continue discussion and refinement of each GSA's program with public input and transparency.

NEW PROJECT RECOMMENDATIONS

Several comments recommended new projects for consideration. The projects on the existing list in the GSP were identified through a several month process involving Stakeholder and Coordinating Committees and the general public. This included a public project solicitation. A template for project submission was posted online for the public in September 2018 and provided to the Stakeholder and Coordinating Committees. This project submission template was also advertised during several committee meetings and remains online for public download on the Merced SGMA

website. Project information was received from committee members and interested members of the public. This list was discussed and presented during the January and February 2019 committee meetings. Input received from committee members and members of the public was integrated and used to refine the project list into a shortlist of projects for inclusion in the GSP. This shortlist was created based on priorities identified by the public and committee members (see Section 6.3 of the GSP for a detailed list).

Implementation of projects will be an ongoing and live aspect of the GSP and the GSAs are committed to working with both urban and agricultural communities to pursue various tools to achieve sustainability through projects and management actions. The recommended new projects have been documented and will be taken into future consideration during the implementation phase. The GSAs will also continue to work with interested parties and agencies to pursue funding for projects.

PROJECT-SPECIFIC RECOMMENDATIONS

Comments were received on a several specific projects outlined in Chapter 6 of the GSP (Projects and Management Actions). The comments and response to comments are summarized in the table below. In general, the shortlisted projects (coming out of the project prioritization process described in the GSP) are still in the planning phase, with much more work needed to better define them and evaluate potential benefits, costs, and impacts.

Comment	Response
USFWS: Projects 5 and 9 will contribute to increase in groundwater withdrawal at Merced NWR and loss of wetlands in Central Valley	The GSP does not relieve any agency of its commitments. MID responded to USFWS' comment letter specifically regarding these projects with a written response dated 9/4/2019.
Sandy Mush Mutual Water Co: El Nido Improvement Canal project should be reinstated; Merced Subbasin GSA should cost-share with MID on improvements to increase peak capacity downstream of Mariposa Creek	While MID is a member of MIUGSA, MID has discretion over funding and projects allocated for its facilities. GSAs will re-evaluate this project during GSP implementation
Audubon: Evaluate Project 1: Planada Groundwater Recharge Basin Pilot Project, Project 4: Merquin County Water District Recharge Basin, and Project 10: Vander Woude Dairy Offstream Temporary Storage for "water for habitat" benefits	See master response for "Project Prioritization" below.
Self-Help Enterprises: Comments and recommendations pertaining to water quality for recharge and storage projects 4 & 10	These projects are in the planning phase. The GSP Plan Implementation chapter has been updated to state that projects selected for implementation will be evaluated for water quality impacts. CEQA compliance for most projects would also include analysis of water quality and water supply benefits/impacts
Self-Help Enterprises: Confirm that wells associated with Planada GW Recharge Basin Pilot Project and El Nido GW Monitoring Well will be established as representative monitoring wells for GWL and GWQ MTs	This is the intent of the GSAs and part of why funding was sought for these wells. As additional wells are added to the monitoring network, they will be considered for inclusion as representative monitoring wells based on their ability to contribute to characterization and management of groundwater conditions in the Subbasin. The GSAs will be developing a methodology for establishing minimum thresholds at new wells which lack pre-2015 historical data.

PROJECT PRIORITIZATION

One commenter suggested expanding criteria for "project addresses and or prioritizes water for habitat" to read "project addresses and or prioritizes water for habitat and or creates new or sustains existing managed habitat benefits". The existing prioritization criteria was intended to encompass and is consistent with the suggested revision of prioritization description. This change to the text would not alter the results of current or future project prioritization.

A second commenter requested explaining how groundwater recharge projects (#1, #4, and #10) could benefit GDEs and how they will be evaluated. There is limited information at this time to be able to evaluate how those projects could benefit GDEs. As described in the GSP and in earlier comment responses regarding GDEs and depletions of interconnected surface waters, there is uncertainty about identifying and confirming GDEs in the Subbasin. Shallow groundwater monitoring, particularly in the El Nido area and near the San Joaquin River, is identified as a critical data gap in the GSP. It is expected that as more information becomes available and depletions of interconnected surface waters are more understood, then GDEs will be more thoroughly evaluated as part of project prioritization and evaluation. Further, the Projects and Management Actions include evaluation of the GDE Pulse application as a method of assessing GDE or NCCAG health. Future GSP updates may consider this tool or other available information to evaluate project benefits.

PLAN IMPLEMENTATION

Leadership Counsel and Self-Help Enterprises provided comments on the Plan Implementation section of the GSP. The comments requested that the GSP consider using adaptive management to reconsider GSP elements as-needed and not necessarily be tied to the five-year update as required by DWR. The GSAs plan to utilize adaptive management. A full GSP update is a significant undertaking and not something that the GSAs plan to conduct on a rolling or as-needed basis. However, the GSP does envision that water levels, water quality, and subsidence will be monitored and evaluated regularly. The values reported by monitoring do not need to reach minimum thresholds in order to for the GSAs to act. The GSAs will be actively managing to reach the measurable objectives that have been set based on sustainable conditions and drinking water standards. Additionally, the GSAs will have outreach activities and meetings during the implementation phase at which there will be opportunities for seeking and incorporating feedback from the public on an ongoing basis.

Attachments:

1. Comment letters received
2. Meeting Minutes from September 18, 2019 joint board meeting of the three GSA Boards

AMSTERDAM WATER DISTRICT
2941 South State Hwy 59 - Merced, CA 95341
209-829-9914

August 15, 2019

Merced Irrigation District
Attention: Mr. Hicham Eltal
GSP Contact
744 W. 20th St.
Merced, CA 95340
mercedsgma@woodardcurran.com

Dear Mr. Eltal,

Thank you for the opportunity to provide comments on the Draft Merced Subbasin Groundwater Sustainability Plan (GSP) dated July 19, 2019. Implementation of the Sustainable Groundwater Management Act (SGMA) in the Merced Subbasin is of upmost important to Amsterdam Water District (AWD), and the agricultural community in whole. We appreciate the effort your team as put forth.

The landowners within the Amsterdam Water District have been preparing for the implementation of SGMA by: 1) organizing; 2) purchasing out-of-district Merced Irrigation District (MID) surface water when available; 3) conducting a Water Supply Study; and 4) creating a data management plan. In the near future, we would like to partner with MID on a groundwater recharge project.

The GSP describes several demand management tools, including allocations, water markets, fallowing programs, and groundwater extraction fees. We understand there is overdraft and SGMA requires a change in farming practices. Changes in farming practices can't happen overnight so any demand management program that is considered must fully utilize the 20-year transition period from 2020 to 2040.

Once again, we appreciate your efforts thus far and are willing partners moving forward. Please don't hesitate to contact me if you have any questions or comments.

Sincerely,

Bert Crane, Jr.
President, Amsterdam Water District

August 16, 2019

Merced Irrigation District
Attention: Mr. Hicham Eltal
GSP Contact
744 W. 20th St.
Merced, CA 95340
mercedsgma@woodardcurran.com

Dear Mr. Eltal,

I am a landowner in the "White Area" of the Merced Subbasin and have a diversified agricultural operation, including a soil amendment business, beef cattle, and row crop farming. Thank you for the opportunity to provide comments on the Draft Merced Subbasin Groundwater Sustainability Plan (GSP) dated July 19, 2019.

Most of my land is in the southwest corner of the Merced Subbasin, near Grasslands Wildlife Management Area, where Bear Creek and other creeks, sloughs, and other drainages merge with the San Joaquin River. Much of this land floods every year and declining groundwater levels and/or subsidence are not a concern. As such, I believe the Merced Subbasin GSP must create Management Areas.

There are unique groundwater settings throughout the Subbasin, such as a) land subsidence in the El Nido area, b) a cone of depression in the Le Grand area, and c) shallow groundwater in the Stevinson area. These and potentially other concerns, should be managed independently since each is susceptible to unique Undesirable Results and require different management actions. For example, land subsidence is best avoided by reducing pumping below the Corcoran Clay layer. As such, the El Nido area should be managed to encourage recharge and withdrawal from of the upper aquifer and avoidance of deep aquifer pumping. This situation is unique to the El Nido area and it should be managed accordingly. Because of this situation, draft GSPs recently released in adjacent subbasins have created Management Areas with unique Sustainability Management Criteria.

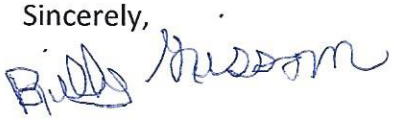
The Draft GSP describes a potential groundwater allocation system where the "sustainable yield" is allocated to landowners. I want to emphasize that *non-irrigated* land receive the same

allocation as currently *irrigated* farmland. Owners of non-irrigated land did not create the overdraft situation and their land values shouldn't suffer as a consequence.

The Merced Subbasin is in overdraft by approximately 150,000 AF/Y with the SGMA expectation that the Subbasin will reach sustainability by 2040. As such, any sort of demand management program should recognize the need to slowly transition from overdraft to sustainability during the 20-year implementation period. Hard and fast pumping restrictions would unnecessarily devastate the local economy by not allowing farmers to thoughtfully adjust their practices.

I plan to continue to stay engaged during the preparation of the GSP so please contact me if you would like clarification of my comments.

Sincerely,



Billy Grissom
PO Box 951
Hilmar, CA 95324
(209) 723-632-6055

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4593
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

August 16, 2019

Via Mail and Electronic Mail

Hicham Eltal
Merced GSP Contact
Merced Subbasin Groundwater Sustainability Agency
744 West 20th Street
Merced, California 95340
mercedsgma@woodardcurran.com

Subject: Comments on the Merced Subbasin Draft Groundwater Sustainability Plan

Dear Mr. Eltal:

The California Department of Fish and Wildlife (Department) Central Region is providing comments on the Merced Subbasin Draft Groundwater Sustainability Plan (GSP) prepared by Merced Subbasin Groundwater Sustainability Agency (Merced Subbasin GSA, MSGSA), Turner Island Water District GSA, and Merced Irrigation-Urban GSA pursuant to the Sustainable Groundwater Management Act (SGMA). 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 and species depend on groundwater and interconnected surface waters. SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to Groundwater Sustainability Plans:

- Groundwater Sustainability Plans should identify and consider impacts to groundwater dependent ecosystems pursuant to 23 CCR § 354.16(g) and Water Code § 10727.4(l);

- Groundwater Sustainability Agencies should consider all beneficial uses and users of groundwater, including environmental users of groundwater pursuant to Water Code §10723.2 (e); and Groundwater Sustainability Plans should identify and consider potential effects on all beneficial uses and users of groundwater pursuant to 23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3);

- Groundwater Sustainability Plans should 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 pursuant to 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 pursuant to 23 CCR § 354.34(c)(6)(D); and

- Groundwater Sustainability Plans should account for groundwater extraction for all Water Use Sectors including managed wetlands, managed recharge, and native vegetation pursuant to 23 CCR §§ 351(al) and 354.18(b)(3).

Accordingly, the Department values SGMA groundwater planning that carefully considers and protects groundwater dependent ecosystems and fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.

COMMENT OVERVIEW

The Department supports ecosystem preservation in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science.

The Department recommends the GSP provide additional information and analysis that considers all environmental beneficial uses and users of groundwater in its sustainability management criteria and better characterize or consider surface water-groundwater connectivity. In addition, the Department is providing additional comments and recommendations below.

COMMENTS AND RECOMMENDATIONS

The Department comments are as follows:

1. **Comment #1** (Basin Setting, 2.2.7 Groundwater-Dependent Ecosystems, pp 2-110): GDE identification, pursuant to 23 CCR § 354.16 (g), is based on a limited data set to demonstrate exclusion of risk to ecosystems that may depend on groundwater.

    a. *Issue*: Methods applied to the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset to eliminate potential GDEs are not robust.

i. Depth to Groundwater: The removal of 'areas with a depth to groundwater greater than 30 feet in Spring 2015' relies on a single-point-in-time baseline hydrology, specifically a point in time that is several years into a historic drought when groundwater levels were trending significantly lower due to reduced surface water availability. Exclusion of potential GDEs based on this singular groundwater elevation measurement is questionable because it does not consider representative climate conditions (i.e. seasons and a range of water type years) and it does not account for GDEs that can survive a finite period of time without groundwater access (Naumburg et al. 2005), but that rely on groundwater table recovery periods for long term survival.

ii. Adjacent to Irrigation or Surface Water: The removal of potential GDEs that are 'adjacent to irrigated fields' or 'depending on adjacent losing surface water bodies' does not consider GDE's adaptability and opportunistic nature in accessing water supply.[1] The GSP assumes that these potential GDEs are accessing and primarily dependent on irrigation water or surface water discharges based on proximity to a surface water source, but this assumption is poorly justified and there is no acknowledgement of the potential for shifting reliance between surface and ground water. Additionally, GDEs that are near an *interconnected* surface water bodies may depend on sustained groundwater elevations that stabilize the gradient or rate of loss of surface water; meaning ecosystems near interconnected surface waters may depend on sustainable groundwater elevations. Therefore, it is possible that any of these potential GDEs rely on groundwater during specific seasons or water year types.

b. *Recommendations*:

i. Depth to Groundwater: Develop a hydrologically robust baseline from which to remove 'areas with a depth to groundwater greater than 30 feet' that relies on multiple, climatically representative years of groundwater elevation and that accounts for the inter-seasonal and inter-annual variability of GDE water demand.

---

[1] The Department assumes that potential GDEs removed under this step overlie shallow groundwater, otherwise they would have already been removed during the step of excluding potential GDEs that overlie a depth to groundwater of 30+ feet.

ii. Adjacent to Irrigation or Surface Water: Reevaluate potential GDEs previously removed due to proximity to irrigated lands or a losing surface water body. The Department recommends the GSP be more conservative and all-inclusive until there is evidence that the overlying ecosystem has no significant dependence on groundwater across seasons and water year types. The Department advises that these riparian GDE beneficial users of groundwater and surface water are carefully considered in the analysis of undesirable results and minimum thresholds for depletions of interconnected surface waters.

iii. Include additional references for evaluation: The Department recognizes that NCCAG (Klausmeyer et al. 2018) provided by Department of Water Resources (DWR) is a good starting reference for GDE's; however, the Department recommends the GSP included additional resources for evaluating GDE locations. The Department recommends consulting other references, including but not limited to: California Department of Fish and Wildlife (CDFW) (2019) VegCAMP, CDFW (2019) CNDDB, California Native Plant Society (CNPS) (2019A and 2019B), Klausmeyer et al. (2019), Rohde et al. (2018), The Nature Conservancy (TNC) (2014), U.S. Forest Service (USFS) (2019) CalVeg, U.S. Fish and Wildlife Service (USFWS) (2018) NWI, USFWS (2019), and Witham et al. (2014).

2. **Comment #2** (Basin Setting, 2.3.3.3 Projected Water Budget, starting pp 2-117): The Department is concerned the projected water budget assumptions risk overestimating water availability by not relying on best available information pursuant to 23 CCR § 354.18(e).

   a. *Issue*: Key water budget assumptions, which potentially underscores sustainable yield estimates, risk overestimating water availability. Overestimation of water availability could result in the overallocation of both surface and groundwater water resources, potentially impacting environmental beneficial users. It is recommended the three water budget assumptions include additional best available information that improves sustainable yield allocation. Specifically, the Department is concerned that: 1) the first 25 years of the 'Projected Conditions Baseline' assumes static basin conditions and only considers expected population, land use, and water demand/supply projections starting in 2040, discounting the first 25 years of change; 2) the climate change analysis that predicts a net depletion of aquifer storage is not reflected in the projected water budget; and 3) projected surface water deliveries appear to not reflect anticipated regulatory reductions of surface water deliveries such as those codified in

the State Water Resources Control Board Water Quality Control Plan for the Bay Delta: San Joaquin River Flows and Southern Delta Water Quality.

b. *Recommendation*: The Department recommends amending the water budget and sustainable yield to reflect: 1) a refined understanding of changing water demands over the next 25 years; 2) application of climate change estimates; and 3) adjusted, regulatorily-compliant surface water delivery estimates. These adjustments should improve projected water availability and provide a more realistic sustainable yield.

3. **Comment #3** (Sustainable Management Criteria, starting pp 3-1): Sustainable Management Criteria does not appear to protect against undesirable results for fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.

   a. *Issues*:

      i. Proxy Metrics: Before addressing the individual sustainability criteria that are applied to both Groundwater Levels and Depletions of Interconnected Surface Water, the Department does not concur with the use of groundwater elevations as a proxy metric for Depletions of Interconnected Surface Water. The GSP does not provide adequate documentation that a "significant correlation exists between groundwater elevations" [23 CCR § 354.36(b)(1)] and Depletions of Interconnected Surface Water. Instead, the GSP seems to use a circular reference to get to the proxy metric by associating the proposed Groundwater Level minimum threshold with the absence of significant and unreasonable surface water depletions and by claiming that "historical depletions of interconnected surface water in the Subbasin are not considered significant and unreasonable" (GSP pp 3-19, 4th paragraph under Justification of Groundwater Levels a Proxy). The GSP offers few details to substantiate this claim and does not share specifics on the modeling exercise used to determine the insignificance of surface water depletions. Considering the status of surface water allocations and aquatic ecosystems on the Merced River, the Department believes that any surface water depletions attributable to groundwater pumping are likely significant, particularly when contrasted with the benchmark year of 2015, which was the third documented consecutive critical dry year in a drought cycle.

      If a significant correlation is lacking between Groundwater Elevations and Depletions of Interconnected Surface Waters, particularly at the representative monitoring well locations used to track groundwater

elevations, then groundwater elevations used as a proxy for surface water depletions may misinform groundwater management activities and poorly predict instream habitat conditions for fish and wildlife species. Accordingly, the Department does not concur that the subsequent application of Groundwater Level sustainable management criteria to Depletions of Interconnected Surface Water is appropriate, as it is not grounded in a quantifiable and site-specific understanding of surface water-groundwater connectivity pursuant to 23 CCR § 354.28 (c)(6)(A).

ii. Undesirable Results: Current Groundwater Level undesirable results do not mention impacts to environmental beneficial users (pp 3-3). Additionally, the method used to identify undesirable results for Groundwater Levels (i.e., minimum threshold exceedances in groundwater elevation) does not account for dry or critically dry years and is applied to the identification of undesirable results for the Depletions of Interconnected Surface Water. The measure of 25% of monitoring wells falling below their minimum thresholds for two consecutive (non-dry) years may have little relevance to accurately identifying undesirable results for Depletions of Interconnected Surface Water. Firstly, the GSP does not provide data that a relationship between representative monitoring wells and depletions of surface waters exists. Secondly, the indicators of undesirable results are tolerant of exceeding minimum thresholds and do not take into account dry water years suggesting undesirable results may be well underway and impacting ecosystems, before they are identified. Effectively, the GSP does not connect identification of undesirable results for Depletions of Interconnected Surface Waters to impacts on surface water beneficial users. Finally, the GSP notes that groundwater levels that fall below the minimum threshold during hydrologically dry or critical years are not considered to be an undesirable result (pp 3-4), which results in no groundwater management actions to mitigate impacts in the most challenging of times for water resources management.

iii. Minimum Thresholds and Measurable Objectives: Minimum thresholds and measurable objectives for Groundwater Levels, and by proxy, for Depletions of Interconnected Surface Waters, are not protective of environmental beneficial uses and users of groundwater. Minimum thresholds allow for a significant decrease of groundwater elevation from 2015 for almost all representative monitoring sites, and measurable objectives are set at projected future average groundwater levels as predicted by the Merced Water Resources Model sustainable yield simulation. These sustainability

criteria suggest that: 1) groundwater elevations at representative wells can continue to decrease for the next 20 years from a benchmark date derived several years into a historic drought in a basin already designated *Critically Overdrafted* without witnessing undesirable results (pp 3-9); and 2) measurable objectives for groundwater levels match average groundwater levels necessary to meet sustainable yield (pp 3-7). The Department is concerned that the decline in terrestrial and aquatic groundwater dependent ecosystem health around the 2015 benchmark has already been demonstrated to have impacts to beneficial uses and further groundwater decline will undoubtedly lead to significant impacts for fish and wildlife beneficial uses and users of groundwater and interconnected surface waters under these sustainability criteria. In addition, groundwater levels above the minimum threshold and below the measurable objective (in the margin of operational flexibility), which are acceptable according to the GSP, will not allow the basin to achieve sustainability in the long run.

b. *Recommendation*:

i. Proxy Metrics: To justify use of groundwater elevations as a proxy metric for Depletions of Interconnected Surface Water, the Department recommends the GSP specify how groundwater elevations are significantly correlated to surface water depletions; and define an expeditious path to identifying the location, quantity, and timing of surface water depletions caused by groundwater use, pursuant to 23 CCR § 354.28(c)(6)(A), to better inform sustainability criteria for Depletions of Interconnected Surface Water.

ii. Undesirable Results: The Department recommends a discussion of Groundwater Level undesirable results for environmental beneficial users of groundwater during dry and critical water years and provide measurable undesirable result indicators for Depletions of Interconnected Surface Waters that are relevant to beneficial users of surface water.

iii. Minimum Thresholds and Measurable Objectives: Reconsider minimum thresholds and measurable objectives, accounting for undesirable results for fish and wildlife beneficial uses and users of groundwater and interconnected surface water.

4. **Comment #4** (Sustainability Criteria, 3.6 Degraded Water Quality, starting pp 3-10): The Department does not concur that GSP abdicates responsibility for some

constituents by incorrectly claiming no nexus between some contaminants and "increasing or decreasing pumping" (GSP pp 3-12).

a. *Issue*: The GSP states that "GSAs do not have control over the presence of [naturally occurring constituents such as arsenic, uranium, iron, and manganese] in aquifer materials," (GSP pp 3-12) and therefore, the GSP does not set threshold for these constituents claiming "there is no demonstrated local correlation between fluctuations in groundwater elevations and/or flow direction and concentrations of these constituents at wells." Conversely, over-pumping of aquifers has the potential for clay layers to compress and release dissolved arsenic, as well as high rates of pumping in deep wells drawdown shallow water, resulting in an increase of dissolved uranium in extracted water (Fendor et al. 2019). Thus, pumping actions can affect the presence, movement, and concentration of naturally occurring constituents in groundwater. The GSP cites arsenic and uranium as the primary naturally occurring constituents of concern (GSP pp 2-76).

b. *Recommendation*: Establish a plan to investigate the relationship between groundwater pumping and the presence, movement, and concentration of arsenic and uranium in the Merced Subbasin and develop sustainability criteria accordingly for these constituents by the first 5-year plan update in 2025.

5. **Comment #5** (Monitoring Networks, starting pp 4-1): Shallow groundwater monitoring wells are lacking.

a. *Issue*: The current monitoring network lacks a representative distribution of shallow groundwater monitoring wells sufficient to monitor impacts to environmental beneficial uses and users of groundwater pursuant to 23 CCR § 354.34(2). Few monitoring wells are near interconnected surface waters or concentrated GDEs; and therefore, there are few data points on shallow groundwater level trends that are important to understanding groundwater management impacts on fish and wildlife beneficial uses and users of groundwater, including GDEs and interconnected surface water habitats.

b. *Recommendation*: The Department recommends a plan to install additional shallow groundwater monitoring wells near GDEs and interconnected surface waters, potentially to be paired with streamflow gauges for improved understanding of surface water-groundwater interconnectivity.

6. **Comment #6** (Project and Management Actions, 6.2.2 Merced Subbasin GSA Groundwater Demand Reduction Management Actions, starting pp 6-5): Demand reduction management actions lack specificity critical to timely implementation and sustainability goal achievement.

    a. *Issue*: The Department understands development of sustainable yield allocations within 5 years of implementation will result in the quantification of demand reduction requirements for distinct responsible parties. However, in contrast to supply augmentation project and management actions, demand reduction management actions lack implementation details. This lack of specificity on how demand will be managed may lead to deprioritization or delayed implementation of demand management actions, which can undermine a basin's ability to achieve sustainably goals.

    b. *Recommendation*: The Department recommends including specific measures for initiating demand reduction on an earlier timeline in the Merced Subbasin to account for groundwater pumping lag impacts, implementation challenges, and scaled ramping-down of groundwater use that is a necessary ingredient in San Joaquin Valley long-term groundwater sustainability.

CONCLUSION

In conclusion, the Merced Subbasin Draft GSP needs to address all SGMA statutes and regulations, and the Department recommends the GSP seriously consider fish and wildlife beneficial uses and interconnected surface waters. The Department recommends that the MSGSA consider the above comments before the GSP is submitted to the Department of Water Resources (DWR). The Department appreciates the opportunity to provide comments on the Merced Subbasin Draft GSP. If you have any further questions, please contact Dr. Andrew Gordus at Andy.Gordus@wildlife.ca.gov or (559) 243-4014 x 239.

Sincerely,

Julie A. Vance
Regional Manager, Central Region

Enclosures (Literature Cited)

ec: **California Department of Fish and Wildlife**

Joshua Grover, Branch Chief
Water Branch
Joshua.Grover@wildlife.ca.gov

Robert Holmes, Environmental Program Manager
Statewide Water Planning Program
Robert.Holmes@wildlife.ca.gov

Briana Seapy, Statewide SGMA Coordinator
Groundwater Program
Briana.Seapy@wildlife.ca.gov

Annee Ferranti, Environmental Program Manager
Central Region
Annee.Ferranti@wildlife.ca.gov

Andy Gordus, Staff Toxicologist
Central Region
Andy.Gordus@wildlife.ca.gov

Annette Tenneboe, Senior Environmental Scientist
Central Region
Annette.Tenneboe@wildlife.ca.gov

California Department of Water Resources

Craig Altare, Supervising Engineering Geologist
Sustainable Groundwater Management Program
Craig.Altare@water.ca.gov

Amanda Peisch-Derby, Merced Subbasin SGMA Point of Contact
South Central Region Office
Amanda.Peisch@water.ca.gov

National Marine Fisheries Service

Rick Rogers, Fish Biologist
West Coast Region
Rick.Rogers@noaa.gov

Erin Strange, San Joaquin River Branch Lead
West Coast Region
Erin.Strange@noaa.gov

U.S. Fish and Wildlife Service
San Luis National Wildlife Refuge Complex

Kim Forrest, Refuge Manager
kim_forrest@fws.gov

State Water Resources Control Board

James Nachbaur, Director
Office of Research, Planning & Performance
James.Nachbaur@waterboards.ca.gov

Literature Cited

California Department of Fish and Wildlife (CDFW). 2019. Vegetation Classification and Mapping Program. Available from https://www.wildlife.ca.gov/Data/VegCAMP

California Department of Fish and Wildlife. 2019. CNDDB (California Natural Diversity Database). Rarefind Version 5. Internet Application. CDFW, Sacramento, California. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data

California Native Plant Society (CNPS). 2019A. A Manual of California Vegetation, online edition. http://www.cnps.org/cnps/vegetation/.

California Native Plant Society (CNPS). 2019B. California Protected Areas Database. (CPAD). Sacramento, California. https://www.calands.org/cpad/

Fendor, S., A. Sherris, A. Hamann, and A. Wells. 2019. Groundwater quality in the Sustainable Groundwater Management Act (SGMA). Community Water Center. Sacramento, California. www.communitywatercenter.org.

Naumburg E, R. Mata-Gonzalez, R.G. Hunter, T. McLendon and D. Martin. 2005. Phreatophytic vegetation and groundwater fluctuations: a review of current research and application of ecosystem response modeling with an emphasis on great basin vegetation. *Environmental Management.* 35(6):726-40.

Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, and A. Lyons. 2018. Mapping indicators of groundwater dependent ecosystems in California. https://data.ca.gov/dataset/natural-communities-commonly-associated-groundwater

Klausmeyer, K. R., T. Biswas, M. M. Rohde, F. Schuetzenmeister, N. Rindlaub, and J. K. Howard. 2019. GDE pulse: taking the pulse of groundwater dependent ecosystems with satellite data. San Francisco, California. Available at https://gde.codefornature.org (Same as:TNC. 2019. GDE pulse. Interactive map. Website. https://gde.codefornature.org/#/home

Rohde, M. M., S. Matsumoto, J. Howard, S. Liu, L. Riege, and E. J. Remson. 2018. Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans. The Nature Conservancy, San Francisco, California.

TNC (The Nature Conservancy). 2014. Groundwater and stream interaction in California's Central Valley: insights for sustainable groundwater management. Prepared by RMC Water and Environment.

U. S. Forest Service. 2019. Landsat-based classification and assessment of visible ecological groupings, USDA Forest Service (March 2007). https://www.fs.fed.us/r5/rsl/projects/classification/system.shtml

USFWS (U.S. Fish and Wildlife Service). 2018. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

USFWS. 2019. Threatened & Endangered Species Active Critical Habitat Report: online mapping tool. https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77

Witham, C. W., R. F. Holland, and J. E. Vollmar. 2014. Changes in the Distribution of Great Valley Vernal Pool Habitats from 2005 to 2012. Prepared for CVPIA Habitat Restoration Program, U.S. Fish and Wildlife Service, Sacramento, CA. USFWS Grant Agreement No.F11AP00169 with Vollmar Natural Lands Consulting. October 14.

California Poultry FEDERATION
4640 Spyres Way, Suite 4 | Modesto, CA 95356 | Phone: (209) 576-6355 | Fax: (209) 576-6119 | www.cpif.org

VIA E-MAIL

August 15, 2019

Hicham Eltal
Merced GSP Contact
Merced Irrigation District
744 W. 20th Street
Merced, California 95340
c/o mercedsgma@woodardcurran.com

Dear Mr. Eltal:

The California Poultry Federation ("CPF") is pleased to submit these comments on the draft Merced Groundwater Subbasin Groundwater Sustainability Plan (hereinafter the "Draft GSP"). CPF represents all parts of the poultry industry, including growers, hatchers, breeders, and processors working with chickens, turkeys, ducks, and game birds. For all those segments, water is essential for nutrition as well as maintaining safe and sanitary conditions. CPF therefore encourages effective measures to assure reliable water supplies.

In this regard, CPF supports the emphasis in the Draft GSP on augmenting yield and increasing recharge. Such measures are essential for avoiding the undesirable result of groundwater elevations being too low to satisfy beneficial uses. We believe the Merced Subbasin's Groundwater Sustainability Agencies ("GSAs") must continue identifying and implementing additional measures to increase water supplies.

We appreciate the burden to GSAs of developing sustainability plans that address the many requirements of the Sustainable Groundwater Management Act. But at the same time, CPF is concerned about those facets of the Draft GSP that have been deferred to a later date. These include the allocation among the GSAs and plans for any specific demand reduction measure to be taken. The Draft GSP does not assess the pros and cons of the various alternatives under consideration for these important additions. It is critical for the GSAs to do so, giving particular attention to the likely success of measures to increase water supplies as well as the costs that demand reduction measures would impose on all beneficial users and surrounding communities. Particularly concerning is the Draft GSP text (at 6-6) that "[t]he development of the demand reduction program *may* include outreach and feedback from stakeholders and MSGSA member agencies." Public participation is indispensable to the GSP process, and the public must be given adequate time to review and submit written comments on any proposed demand reduction measures. CPF looks forward to those opportunities.

CPF appreciates your consideration of these comments. Please contact me if you need any additional information.

Very truly yours,

Bill Mattos

Bill Mattos
President

Clayton Water District
Comments on GSP

Merced GSP Comments

1. Water Quality thresholds – Threshold is set at 1,000mg/L, which is lower than the current actual water quality for many ag wells in the El Nido area. Many of the shallow wells in this area have been out of compliance for dozens of years using this standard, approximately at 1,500 mg/L. Obviously, drinking water quality needs to be at a much higher standard, but domestic wells in the area are in the lower aquifer, where the 1000 mg/L threshold is achievable.

   If the language could be changed to state that the water quality threshold is 1,000 mg/L, or the current level + 20% for ag wells, this is more realistic. By the way, this is what is stated in the Chowchilla Subbasin GSP.

Contact: Julia Berry
Juliaberry@sbcglobal.net

TURLOCK GROUNDWATER

August 19, 2019

Electronic Submittal via E-Mail

Mr. Hicham Eltal
Merced Irrigation District
744 W. 20th Street
Merced CA 95340

Subject: Comments on the Merced Subbasin's Draft Groundwater Sustainability Plan

Dear Mr. Eltal:

The East Turlock Subbasin and West Turlock Subbasin groundwater sustainability agencies (GSA) Joint Technical Advisory Committee (TAC) thanks you for the opportunity to comment on the Merced Subbasin Draft Groundwater Sustainability Plan (GSP).

We offer no specific comments at this time. We understand there remains opportunity to comment on the GSP before fall adoption hearings, and there remains potential for more coordination and refined comments until such time.

As an adjacent Subbasin to the Merced Subbasin, we look forward to continuing to coordinate with the Merced Subbasin GSAs as we continue to build upon our knowledge and understanding of the Subbasins while we continue to develop, refine and implement our GSPs to achieve sustainability within the region. Interbasin coordination will continue to be a vital part of the groundwater planning and implementation process.

Generally, the Turlock Subbasin GSAs are supportive of the current and historical efforts of the Merced Subbasin GSAs to reach groundwater sustainability and achieve stakeholder participation. As we continue to coordinate with the Merced Subbasin, we would expect to work together to address various data gaps and other opportunities for continued interbasin coordination to present themselves as our combined knowledge of our Subbasins increases and information is developed by our technical teams.

Thank you again for the opportunity to review and comment on the Merced Subbasin Draft GSP. We look forward to continued coordination as both Subbasins continue to move forward toward groundwater sustainability.

Sincerely,

Kevin Kauffman
Chair, East Turlock Subbasin GSA TAC

Michael Cooke
Chair, West Turlock Subbasin GSA TAC

August 19, 2019

Hicham Eltal, Merced GSP Contact
Merced Irrigation District
744 W 20th 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[1] 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[2].

[1] https://groundwaterresourcehub.org/

[2] 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.

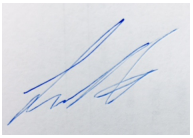
7. Management Actions and Costs. This element looks at how identified management actions impact DACs, GDEs and interconnected surface water bodies; whether mitigation for impacts to DACs is discussed or funded; and what efforts will be made to fill identified data gaps in the first five years of the 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 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
Review of Public Draft GSP

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?

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
(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.
GSP Element 2.2.2, "Groundwater Conditions" (§354.16):
(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.
(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.
(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.
GSP Element 3.3, "Minimum Thresholds" (§354.28):
(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
1. Do identified beneficial users (BUs) include:	a. Disadvantaged Communities (DACs)	X			"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: o Disadvantaged: Atwater City, Le Grand CDP, Merced City, Stevinson CDP, The Grove, Tuttle CDP, Winton CDP o Severely Disadvantaged: Bear Creek CDP (Celeste), El Nido CDP, Franklin CDP, Planada CDP"	1.2.5.1, page 68
	b. Tribes		X		"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)	X			"Additional interests (as listed in CWC §10723.2) include: Public water systems/municipal well operators: o Le Grand-Athlone Water District o Merquin County Water District o Plainsburg Irrigation District o Stevinson Water District o Lone Tree Mutual Water Company o Sandy Mush Mutual Water Company o California American Water, Meadowbrook District o Merced Area Groundwater Pool Interests (monitors and reports	1.2.5.1, page 67-68

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
					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 DAC Mapping Tool[2]	X			"DWR DAC Mapping tool: https://gis.water.ca.gov/app/dacs/. Data is based on US Census ACS 2010-2014."	1.2.5.1 footnote 3, page 68
	i. Census Places	X				
	ii. Census Block Groups		X		Not specified	
	iii. Census Tracts		X		Not specified	
	b. Other data source	X			"Merced County SB244 report: http://www.co.merced.ca.us/DocumentCenter/View/12199. 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	X			"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)[3] (or Public Health Goals where MCL does not exist, e.g. Chromium VI)	X			"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[5] 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		X			

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
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)[4]					
	b. CA MCLs[3]	X			"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[11] of 1,500 mg/L (SWRCB, 2006)." No MTs defined for other water quality constituents, based on input from Stakeholder Advisory Committee.	3.6.2, page 239 page 238-239
	c. Data Quality Objectives (DQOs) in Regional Water Quality Control Plans		X			
	d. Sustainable Communities Strategies/ Regional Transportation Plans[5]		X			
	e. County and/or City General Plans, Zoning Codes and Ordinances[6]		X			
5. Does the GSP identify how environmental BUs and environmental stakeholders were engaged throughout the development of the GSP?			X		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. 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. The stakeholder outreach process is described, and include outreach to federal, state, and local agencies, but did not appear to engage environmental groups.	1.2.5

Summary / Comments

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.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page[1])
Groundwater quality discussion must include potential impacts to drinking water sources.[1] 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: • Natural Communities Commonly Associated with Groundwater dataset (NC Dataset) - https://gis.water.ca.gov/app/NCDatasetViewer/ • The list of freshwater species located in the Merced Subbasin in available here: https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/. Please take particular note of the species with protected status. • 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. The stakeholder outreach process is described, and includes outreach to federal, state, and local agencies, but did not appear to engage environmental groups.					

[1] 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; 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.

2. Communications Plan

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

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):

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:

(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.

(d) A communication section of the Plan that includes the following:

(1) An explanation of the Agency's decision-making process.

(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.

(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.

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

DWR Guidance Document for GSP Stakeholder Communication and Engagement[7]

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			"Activities under GSP Implementation Program Management also include stakeholder engagement through the Stakeholder Advisory Committee (SC)." "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."	1.2.5.5.2, page 71; 7.2, page 323; 7.4, page 324

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			"Active public participation was encouraged through the following opportunities for public engagement: • Accepting public comment at GSA Board Meetings of all three GSAs. • Accepting public comments at Coordinating Committee Meetings and Stakeholder Advisory Committee Meetings. • 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. • 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. • Coordinating with Leadership Counsel and Self-Help Enterprises in their DAC outreach efforts. • 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. • Issuing news releases announcing public participation opportunities at Public Workshops. • Providing translation services at Public Workshops. Coordinating with Leadership Counsel and Self-Help Enterprises in their DAC outreach efforts."	1.2.5.2, page 69;

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			"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." The GSP does not identify who the members of the Stakeholder Advisory Committee were or what interests and/or organizations they represent were. "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)." "During GSP development, the Merced GSP Program used multiple forms of outreach to communicate SGMA-related information and solicit input."	1.2.5.5.1, page 71; 3.6.1, page 237; 7.4, page 324

Summary / Comments

The GSP does not include a copy of the SCEP. The SCEP must be included in the GSP as an appendix or attachment.

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.

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.

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.

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.

Review Criteria		Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Does the GSP Include Maps Related to Drinking Water Users?	a. Well Density	X			"Figure 1-8 shows the density of non-domestic wells per square mile in the Merced Subbasin." It is not clear if non-domestic wells include public drinking water supply wells. "Figure 1-9 shows the density of domestic wells per square mile in the Merced Subbasin." "Figure 2-39 contains a series of maps showing the density per square mile of irrigation and domestic wells per principal aquifer."	Figure 1-8, page 48; Figure 1-9, page 49; Figure 2-39, page 128
	b. Domestic and Public Supply Well Locations & Depths		X		No map is provided.	
	i. Based on DWR Well Completion Report Map Application[8]?			X		
	ii. Based on Other Source(s)?			X		
2. Does the GSP include maps related to Groundwater Dependent Ecosystem (GDE) locations?	a. Map of GDE Locations		X		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). 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.	2.2.7
	b. Map of Interconnected Surface Waters (ISWs)	X			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.	2.1.3.5.2; 2.2.6
	i. Does it identify which reaches are gaining and which are losing?	X				
	ii. Depletions to ISWs are quantified by stream segments.		X			
	iii. Depletions to ISWs are quantified seasonally.		X			
3. Does the GSP include maps of monitoring networks?	a. Existing Monitoring Wells		X		No map provided. "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."	1.2.2, page 49

Review Criteria			Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
b. Existing Monitoring Well Data sources:	i.	California Statewide Groundwater Elevation Monitoring (CASGEM)	X			"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
	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

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
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. 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: https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/. Please provide groundwater data for historical and current conditions near the GDEs or identify as a data gap. 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.					

4. Water Budgets

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

Selected relevant requirements and guidance:
GSP Element 2.2.3 "Water Budget Information" (Reg. § 354.18)

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.

*Projected water budgets shall be used to estimate future baseline conditions of supply, **demand**, 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:*

(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

(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.

(6) The water year type associated with the annual supply, demand, and change in groundwater stored.

(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:

*(1) 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.*

DWR Water Budget BMP[9]
DWR Guidance for Climate Change Data Use During GSP Development and Resource Guide[10]

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
1. Are climate change projections explicitly incorporated in future/ projected water budget scenario(s)?	X			"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?	X			"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: • SGMA Data Viewer • Guidance for Climate Change Data Use During Sustainability Plan Development and Appendices (Guidance Document) • Water Budget BMP • Desktop IWFM Tools … The methods suggested by DWR in the above resources were used, with modifications where needed, to ensure the resolution would be	2.4.2, page 210;

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				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." "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. 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). 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."	2.4.3, page 212
3. What is used as the basis for climate change assumptions? a. DWR-Provided Climate Change Data and Guidance[11]	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
b. Other		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

Review Criteria			Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
						annual surface water availability was projected to increase 4 percent from 274,000 AFY to 286,000 AFY.8 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 though 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?	a. Inflows:	i. Precipitation	**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
		ii. Surface Water	**X**			"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. 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."	2.4.3.1, page 212
		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	

Review Criteria			Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
						change perturbed inputs for streamflow, precipitation, and ET." No climate change impacts on subsurface inflow were discussed in the GSP.	
	b. Outflows:	i. Evapotranspiration	X			"Potential ET is 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)		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 surface water outflows were discussed in the GSP.	
		iii. Groundwater Outflows (incl. Exports)		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 groundwater outflows were discussed in the GSP.	
7. Are demands by these sectors explicitly included in the future/projected water budget?	a. Domestic Well users (<5 connections)			X		"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)			X		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
	c. Small community water systems (<3,300 connections)			X		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)			X		Projected demands by sectors are not explicitly stated.	2.3.4.3, page 205-209
	e. Non-community water systems			X		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				X		The water budget for the surface water components did not include an explicit evapotranspiration term, but the following footnote was included	2.3

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
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.	

Summary / Comments

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).

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).

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.

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.

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.

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.

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.

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.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
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).					

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[12]
TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs[13]

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		
Summary / Comments					

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
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. 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.[2] Given the complexity of this subbasin, the volume of groundwater use this representative monitoring well density is insufficient for the protection of beneficial users.					

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

6. Measurable Objectives and Undesirable Results

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

Selected relevant requirements and guidance:

GSP Element 3.4 "Undesirable Results" (§ 354.26):

(b) The description of undesirable results shall include the following:

(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

GSP Element 3.2 "Measurable Objectives" (§ 354.30)

(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.

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?		X		DACs are not explicitly identified, but domestic well users are discussed in terms of URs, MOs, and MTs. "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." "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." "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." "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	3.3.1, page 230; 3.3.2, page 231; 3.6.1, page 237 3.6.3, page 240; Page 231

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				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?	X			"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: • Significant and unreasonable unusable and stranded groundwater extraction infrastructure •Significant and unreasonable reduced groundwater production •Significant and unreasonable increased pumping costs due to greater lift and deeper installation or construction of new wells •Significant and unreasonable number of shallow domestic wells going dry"	3.3.1, page 229;
				"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."	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?		X		The measurable objectives addressed only the representative monitoring wells and was set at 25 feet above the minimum threshold. GDEs were not considered.	
				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.	3.3.3
				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.	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?		X		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

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				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.	

Summary / Comments

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.[3]

The GSP includes insufficient data on the proximity of DACs to the representative monitoring wells that will be used to measure undesirable results.

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.

The water level MTs are set relative to the *bottom* 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.

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.

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.

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.

[3] 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; 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.

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
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.					

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;

Review Criteria	Yes	No	N/A	Relevant Info per GSP	Location (Section, Page)
				"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."	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?	**X**			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. For example: "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. … 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. "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."	Table 6-3, page 299; 6.4 Project 1-5, page 300-306; 6.4 Project 9-12, page 309-312
4. Does the GSP include plans to fill identified data gaps by the first five-year report?		**X**		"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."	7.8, page 330

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

Summary / Comments

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.

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.

[1] Page numbers refer to the page of the PDF.
[2] DWR DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/
[3] CA MCLs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[4] OEHHA PHGs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[5] CARB: https://ww2.arb.ca.gov/resources/documents/scs-evaluation-resources
[6] OPR General Plan Guidelines: http://www.opr.ca.gov/planning/general-plan/
[7] 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
[8] DWR Well Completion Report Map Application: https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37
[9] 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
[10]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
[11] 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
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
[12] 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
[13] TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs: https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf

From: LANNY E SELIGER
To: mercedsgma
Subject: GSP Draft comments
Date: Sunday, August 4, 2019 8:41:28 PM

The steep decline in groundwater storage during the drought should be of concern as with climate change another 5 year drought is probable more likely to occur than not before 2040. With another 5 year drought either the valley turns into a desert or we have surface water stored to handle the dry period, or the ground water levels drop and the GSA fails.

The GSA should protect itself by again requesting an additional reservoir as part of a successful GSP at any location found acceptable by the Army Corp. The climate in Sacramento regarding fresh water has changed. Ask for more storage.

Audubon | CALIFORNIA

August 19, 2019

Hicham Eltal, Merced GSP Contact
Merced Irrigation District
744 W 20th Street
Merced, CA 95340

Sent via email to mercedsgma@woodardcurran.com

Re: Comments on Draft Groundwater Sustainability Plan for Merced Subbasin

Dear Mr. Eltal,

Audubon California appreciates the opportunity to provide public comment on the draft Groundwater Sustainability Plan for the Merced Groundwater Subbasin.

Audubon California is a statewide nonprofit organization with a mission to protect birds and the places they need. Our organization has a long history of solutions-focused work in the Central Valley in collaboration with state and federal agencies, water districts, non-profits, and industry. We are commenting on draft Groundwater Sustainability Plans (GSPs) to provide technical information that may be missing or misrepresented and to identify areas of opportunity to partner with landowners or Groundwater Sustainability Agencies to provide groundwater and wildlife habitat benefits.

Audubon California is reviewing GSPs as a stakeholder for the environment with a particular focus on wetlands. Over 95 percent of historic wetlands in the Central Valley have been replaced with agriculture or urban development. The remaining wetlands are a critical component of the Pacific Flyway, supporting millions of migratory waterfowl and hundreds of thousands of shorebirds. Wetlands in the Central Valley are highly managed, operating similar to agriculture in that they utilize delivered surface water or pumped groundwater to grow food resources and habitat for waterbirds.

Our comments on the Merced Subbasin draft GSP are detailed below. We welcome any follow up questions and look forward to seeing the issues raised below addressed in the final GSP submittal in January 2020.

P. 1-19: 1.2.1 Summary of Jurisdictional Areas and Other Features. Figure 1-6 and the accompanying text represent four land use categories in the Merced Subbasin, cropland, rangeland, undeveloped, and urban. This map classifies areas as either rangeland or undeveloped that are actually managed wetland habitat for migratory birds, which rely on applied water. Figure 1-7 shows US Fish and Wildlife Service (USFWS) Refuges in the Merced Subbasin, including Merced National Wildlife Refuge, Grasslands Wildlife Management Area, and San Luis National Wildlife Refuge, which are managed for migratory birds and other species through surface and groundwater use. Private landowners in this western portion of the Merced subbasin also apply surface or groundwater for managed wetlands. Additional land use categories should be added to accurately reflect the managed wetland habitat in the western portion of the Merced Subbasin and to distinguish this land use from rangeland in the eastern portion of the Subbasin.

P. 1-20: 1.2.1 Summary of Jurisdictional Areas and Other Features. Figure 1-7 is missing California Department of Fish and Wildlife fee and easement interests. Additionally, the introduction to this section reads, "Figure 1-7 shows a map with boundaries of federal and state parks within the Merced Subbasin." The federal lands are not parks, but are wildlife refuges that use applied surface water and pumped groundwater to produce food resources and habitat for migratory birds.

P. 1-20: 1.2.1 Summary of Jurisdictional Areas and Other Features. Figure 1-7 does not accurately represent the USFWS properties in the Merced Subbasin, which could have consequences for water budget development later in the draft GSP and future allocations under the proposed framework. See the below map of the San Luis National Wildlife Refuge Complex for a representation of the USFWS fee and easement boundaries. The detailed map below labels each management unit within the Grasslands Ecological Area, which straddles both the Merced Subbasin and the Delta-Mendota Subbasin. Within the Merced Subbasin, the Merced, Lone Tree, Arena Plains, and Snobird units comprise Merced National Wildlife Refuge, which is owned in fee title by USFWS. The East Bear Creek unit is a part of San Luis National Wildlife Refuge, also owned in fee title by USFWS. The remaining units in the Merced Subbasin are USFWS easements (marked in blue), referenced in other maps as Grasslands Wildlife Management Area. As we detail below in reviewing the water budget in the draft GSP, Merced National Wildlife Refuge uses pumped groundwater and delivered surface water, East Bear Creek unit of San Luis National Wildlife Refuge receives delivered surface water, and private wetlands in the Grasslands Wildlife Management Area pump groundwater to produce habitat.

P. 1-40: 1.2.5.1 Beneficial Uses and Users in the Basin. This section inaccurately states 15,000 acre-feet per year (AFY) as the surface water use at Merced NWR. Annual surface water deliveries from Merced Irrigation District to Merced NWR have dropped from an average of approximately 11,000 AFY from 2009 to 2013 to 3,234 AF in 2017 (a flood year) and 4,502 AF in 2018 (a normal rain year). As surface water deliveries to Merced NWR have dropped, Merced NWR has been forced to rely on groundwater to provide the habitat needed by thousands of migratory birds, including listed species like the Tricolored Blackbird and Greater Sandhill Crane. In the non-drought years of 2017 and 2018, 11,475 AF and 11,219 AF, respectively, were pumped from wells to meet the water demands of important habitat. Additionally, under the 1992 Central Valley Project Improvement Act, Congress mandated that Merced NWR receive 16,000 AFY to meet necessary habitat benefits. Merced Irrigation District is required to deliver up to 15,000 AFY to Merced NWR as mitigation for the Merced River Hydroelectric Project.

P. 1-40: 1.2.5.1 Beneficial Uses and Users in the Basin. State interests should be included as additional interests in this section, including Great Valley Grasslands State Park and California Department of Fish and Wildlife.

P. 2-110: 2.2.7 Groundwater-Dependent Ecosystems. The section includes explanation of the areas not identified as Groundwater Dependent Ecosystems (GDEs) from the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset. The second bullet describes that habitat areas that are supported by supplemental water were removed from GDE consideration, but it should be noted here that these managed wetlands heavily rely on pumped groundwater. Additionally, the amount of surface water referenced as delivered to Merced NWR does not match earlier references (p. 1-40) and does not include recent, non-drought years. The inaccurate reference to 15,000 AFY on p. 1-40 should be updated and p. 2-110 should reference the surface water deliveries in 2017 and 2018 (3,234 and 4,502 AF, respectively), which clearly indicate that the ongoing low surface water deliveries to Merced NWR are not a result of drought conditions. In order to meet water demands for wetland habitat needs, Merced NWR relies heavily on groundwater, pumping an average of 9,220 AFY from 2009-2018, 11,698 AFY from 2015-2018, and 11,347 AFY from 2017-2018, which were notably wet and normal rain years.

P. 2-109 and 2-111: 2.2.7 Groundwater-Dependent Ecosystems. The representation of the variance between Figures 2-85 and 2-86 is unclear and there should be more detailed representation of actual acreage suggested for removal from the NCCAG map. The spatial data input to generate Figure 2-86 appears to be inaccurate because it does not show known managed wetlands in the Merced Subbasin.

P. 2-117: 2.3.3.2 Current Water Budget. The land use information listed in the Current Conditions Baseline developed to apply current land and water use conditions to historical hydrology appears to be inadequate to classify managed wetlands and habitat areas. Please clarify the local ground truthing and refinement conducted to accurately represent habitat areas that are not included in 2013 United States Department of Agriculture's CropScape Cropland Data Layer.

P. 2-117: 2.3.3.2 Current Water Budget. It is unclear whether the water demand information used in the Current Conditions Baseline includes the water demands of managed wetlands. Please clarify whether this land use and water demand is included in the Current Conditions Baseline. Habitat water demands need to be recognized as an existing user, similar to other overlying groundwater users, particularly as the GSAs may move towards allocation systems that reflect current or past groundwater use.

P. 2-118: 2.3.3.3 Projected Water Budget. It is unclear whether land use and water demand information in the Projected Conditions Baseline reflects the managed wetlands land use type and associated water demands. See our above comments regarding the Current Water Budget.

P. 2-123: Table 2-15 Average Annual Water Budget – Land Surface System, Merced Subbasin. The water budget should add managed habitats, which use both delivered surface water and pumped groundwater, to the following components in Table 2-15: Inflows – surface water supply and groundwater supply; Outflows – deep percolation from surface water and deep percolation from groundwater. Table 2-15 currently includes a component for evapotranspiration of "Refuge, Native, and Riparian," but it is unclear if this includes evapotranspiration of applied water to managed habitat (refuges) and if it includes the full acreage extent of managed habitats, including federal, state, and private, given the errors earlier in the document, detailed above.

P. 2-123: Table 2-16 Average Annual Water Budget – Groundwater System, Merced Subbasin. Similar to the previous comment above, Table 2-16 should include managed habitats in the following components: Inflows – deep percolation from surface water and deep percolation from groundwater; Outflows – groundwater production.

P. 2-130: Table 2-17 Average Annual Values for Key Components of Water Budget by Year Type. Managed habitats should be included in the water demand and water supply summary components of Table 2-17. These habitats are federal, state, and private and utilize delivered surface water and pumped groundwater and contribute to deep percolation.

P. 4-14. 4.5.6 Data Gaps. We encourage the quick resolution of data gap #2, which is an area of "virtually no known wells" on the western edge of the Subbasin. This represents critical habitat for migratory birds on the Pacific Flyway and other listed species.

P. 6-1. 6.2.1 Initial Groundwater Allocation Framework. This section should include managed habitats throughout the groundwater allocation framework. Specifically, deep percolation from managed habitats should be accounted for in the "Developed Supply" in step 2 because surface water is imported from outside the basin to manage wetlands. This surface water amount should be treated on par with surface water imported for agricultural lands under the proposed framework. East Bear Creek Unit, which is the portion of San Luis National Wildlife Refuge within the Merced Subbasin received 8,200 AF last year of

imported surface water. Merced National Wildlife Refuge is mandated 16,000 AFY by the Central Valley Project Improvement Act, receiving an average of 7,164 AFY of surface water between 2009 and 2018.

P. 6-2. 6.2.1 Initial Groundwater Allocation Framework. We recommend the allocation framework account for the benefits that seepage from unlined canals provides to important habitats in any future estimates of "Developed Supply" and "Sustainable Yield of Native Groundwater." Also, because a portion of managed habitat water needs are met with developed supplies, any removal of such designated supply must remain with the managed habitat interests (ownership), along with any benefits from seepage or deep percolation that may be determined. Managed habitat lands that apply water need to be addressed in the same manner as agricultural lands.

P. 6-4. 6.2.1 Initial Groundwater Allocation Framework. This section outlines the next steps to begin implementation of allocations in the first five years of the GSP. Representatives of private, state, and federal wildlife areas should be included in the development of allocation methods to ensure accurate identification of land area, developed supply, and historical use. These habitat areas are vitally important to the Pacific Flyway and provide local recreational benefits.

P. 6-7: 6.3 Projects. Many priorities across a wide stakeholder group need to be addressed in order to effectively develop and implement projects. We are enthusiastic about the inclusion of the priority "*Project addresses and or prioritizes water for habitat*," but suggest it be expanded to include the importance of maintaining and improving existing habitat in the Subbasin. We recommend that this priority include more general benefits to wildlife and habitat, and should be amended to read "*Project addresses and or prioritizes water for habitat and or creates new or sustains existing managed habitat benefits*". Expanding priorities that have added benefit, such as habitat and wildlife value, can also lead to non-target benefits (e.g. water filtration or recreation opportunities). This may open the door to additional funding sources that otherwise would not have been there if these benefits were not part of a project.

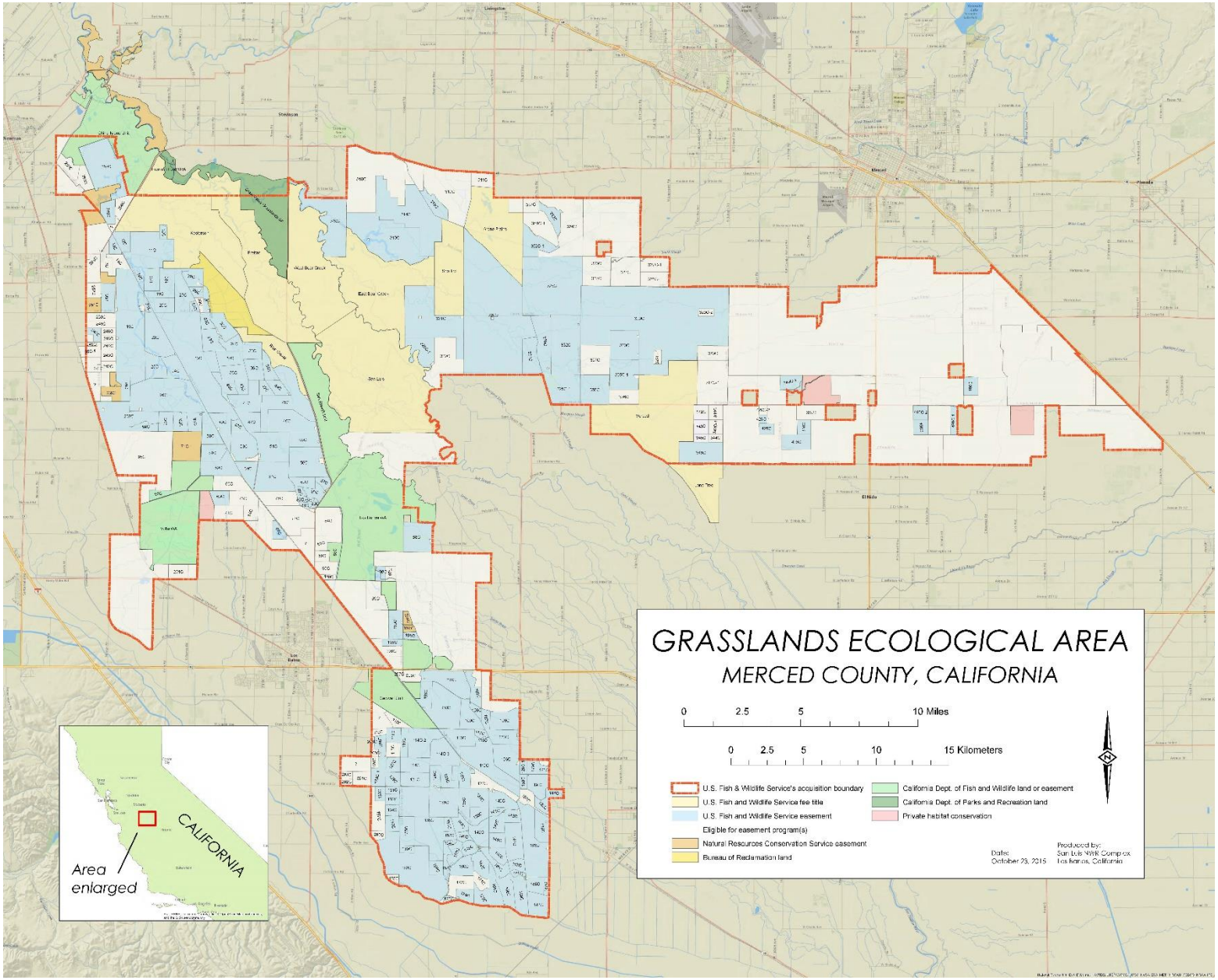
P. 6-8: 6.4 Projects Shortlist. As specific projects become further developed, managed habitat areas may offer ideal opportunities for recharge or temporary storage of water during high flow events. Projects that utilize habitat lands may lessen negative impacts to cultivated lands from flooding or intentional recharge. We recommend that the GSAs investigate opportunities that can allow habitat areas to function both for habitat and to provide recharge or temporary storage. Knowing that water for recharge likely comes in large quantities over short timeframes, the existing configurations of managed habitat areas can make for useful retention areas, without risking the flooding on irrigated crops such as trees and vines. Audubon is interested in helping the GSAs investigate these potential opportunities.

P. 6-9: Table 6-3 – Projects Shortlist. Of the 12 projects on the short list only one has identified "water for habitat" as an expected benefit. However, recharge and temporary storage projects can also provide habitat benefits through low-effort design and management actions targeting wildlife needs. We recommend evaluating the opportunities for the following three projects to provide "water for habitat": *Project 1: Planada Groundwater Recharge Basin Pilot Project*, *Project 4*: *Merquin County Water District Recharge Basin*, and *Project 10: Vander Woude Dairy Offstream Temporary Storage*. We would like to continue bringing forward project ideas that can benefit groundwater and habitat, and work with you in the future to develop and identify funding for these multiple benefit projects.

Thank you for your consideration of Audubon California's comments. If you would like to discuss this matter further, please do not hesitate to contact me at (916) 737-5707 or via email at sarthur@audubon.org.

Sincerely,

Samantha Arthur
Working Lands Program Director
Audubon California


GRASSLANDS ECOLOGICAL AREA
MERCED COUNTY, CALIFORNIA
0 2.5 5 10 Miles
0 2.5 5 10 15 Kilometers
U.S. Fish & Wildlife Service's acquisition boundary
U.S. Fish and Wildlife Service fee title
U.S. Fish and Wildlife Service easement
Eligible for easement program(s)
Natural Resources Conservation Service easement
Bureau of Reclamation land
California Dept. of Fish and Wildlife land or easement
California Dept. of Parks and Recreation land
Private habitat conservation
Date:
October 23, 2015
Produced by:
San Luis NWR Complex
Los Banos, California
CALIFORNIA
Area enlarged

August 19th, 2019

[sent via email]

Hicham Eltal, Merced GSP Contact
744 W 20th St., Merced, CA 95340
mercedsgma@woodardcurran.com

Re: Comments on Draft Merced Subbasin Groundwater Sustainability Plan

Dear Merced Groundwater Sub-basin GSAs:

Leadership Counsel for Justice and Accountability works alongside low income communities of color in the San Joaquin Valley and the Eastern Coachella Valley. We work in partnership with community leaders in the communities of Planada and South Merced to advocate for local, regional and state government entities to address their communities' needs for the basic elements that make up a safe and healthy community: clean, safe, reliable and affordable drinking water, affordable housing, effective and safe transportation, efficient and affordable energy, green spaces, clean air, and more.

We have been engaged in the Sustainable Groundwater Management Act (SGMA) implementation process because many of the communities with whom we work are dependent on groundwater for their drinking water supplies, and have already experienced groundwater quality and supply issues. Historically, communities we work with have not been included in decision-making about their precious water resources, and their needs have not been at the forefront of such decisions. In 2012, California recognized the Human Right to Drinking Water as a statewide goal. Additionally, state law requires that GSAs avoid disparate impacts on protected classes. Now, because of SGMA's requirements for a transparent and inclusive process, groundwater management under the new law has the opportunity to include disadvantaged communities in decision-making and create groundwater management plans that understand their unique vulnerabilities, are sensitive to their drinking water needs, and avoid causing a disparate impact on low income communities of color.

We submit these comments to elevate our concerns that the Merced Subbasin's (GSAs) Draft Groundwater Sustainability Plan (Draft GSP) provide for public review is incomplete, does not adequately analyze drinking water impacts and does not incorporate drinking water impacts into the management plan. Additionally, the Draft GSP neither adequately analyzes nor incorporates input from disadvantaged communities, and will create a disparate impact on protected classes unless modified to protect drinking water resources for disadvantaged communities. We include herein our comments with respect to deficiencies in the Draft GSP and as well as recommendations for improvements.

Draft GSP is Incomplete

The Draft GSP omits critical data regarding the water budget, drinking water impacts, projects and management actions. For example, there has been no analysis of how many wells will go dry or become potentially contaminated from the policies proposed in the Draft GSP, including the proposed sustainable management criteria. Additionally, as explored below the GSP's description of the water budgets lacks the necessary data, assumptions and approaches used to determine the water budgets. The GSP also lacks information on the impact of and timelines for key projects and management actions.

The GSP cannot be adopted until all information on data and assumptions used in the development of the water budget, drinking water impacts from all sustainable management criteria, and details about projects and management actions, are made available to the public for public review during a new review period. In re circulating the GSP for public review, the GSA must analyze the drinking water impacts of setting sustainable management criteria, follow a concrete methodology for considering those impacts in creating new sustainable management criteria, and include that impacts analysis and methodology in the revised Draft GSP.

Inadequate Transparency, Public Process, Consideration of Public Input and Representation Undermine the Value and Efficacy of the Draft GSP

SGMA requires that a GSA "shall consider the interests of all beneficial uses and users of groundwater," which expressly includes "[h]olders of overlying rights" and "[d]isadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems."[1] The emergency regulations similarly require that a Draft GSP summarize and identify "opportunities for public engagement and a discussion of how public input and response will be used."[2] The GSA thus must engage "diverse social, cultural, and economic elements of the population within the basin."[3]

We dispute the Draft GSP's statement that the Stakeholder Committee represented "the broad interests and geography of the region."[4] The Stakeholder Committee was composed mainly of members representing agricultural interests. With only one disadvantaged community (DAC) and one Urban Water District representative on the Committee, it was often difficult for our organization's and others' advocacy for drinking water concerns to be fully considered and incorporated into the Plan. Because of the disproportionate number of agricultural representatives on the committee, the Stakeholder Committee cannot be considered to be adequately representative of all beneficial user groups in the subbasin. Given this unbalanced representation of Stakeholders in the Committee and lack of other avenues for representatives of other beneficial uses to provide input throughout the development of the Draft GSP, the GSAs have not fulfilled their requirements under SGMA to seek out and fully consider all beneficial users' interests in the Draft GSP formation process. Accordingly, the GSAs should conduct a fully accessible public workshop on

[1] Water Code § 10723.2.
[2] 23 CCR 354.10(d).
[3] Guidance Document for Groundwater Sustainability Plan; Stakeholder Communication and Engagement, p. 1.
[4] Draft Merced Subbasin GSP pg. 1-12, dated July 2019.

the Draft GSP during a public comment period wherein community feedback can be received, addressed, and incorporated into the final Plan.

To our knowledge, the GSAs have no plans to hold public workshops to explain the Draft GSP to the public and allow for questions, answers and public feedback in real time. Upon releasing the 339 page Draft GSP with 416 pages of appendices on July 19th, 2019, the GSAs made the decision to only allow 30 days for the public to submit comments on the GSP. Of the 12 GSP development processes in which we are engaged, this GSP is the only one with a public comment period shorter than 45 days. While the GSAs plan to have a joint meeting to review written comments with the other basin GSAs, a separate public workshop or hearing focused on discussing the Draft GSP would have allowed for the GSAs to inform the public about the contents of Draft GSP, answer stakeholder questions about the Draft GSP, and facilitate informed comments and feedback on the Draft GSP. The short review period further inhibits input from all beneficial users. Furthermore, the Draft GSP is not complete as released and should therefore be taken back to the public for more time with complete information regarding drinking water impacts.

To address concerns over public engagement, transparency, and inclusivity, the GSAs must:

- Release to the public information about drinking water impacts and the methodology used to consider those impacts in the creation of sustainable management criteria and other policy decisions.
- Hold a robust public comment period by re-opening the comment period for at least 60 days before a public hearing to adopt the Draft GSP.
- Hold at least one public workshop to discuss the Draft GSP prior to GSP adoption, and incorporate public input received at that workshop into an updated GSP.
- Accurately describe the stakeholder interests represented on the Stakeholder Committee by listing each representative and which beneficial user group they represented.
- Plan to obtain and meaningfully consider public input from all beneficial user groups in the implementation of the GSP. The GSAs should host public workshops and present at meetings with all types of beneficial user groups before decisions are made regarding GSP updates or projects and management actions. To reach disadvantaged groups, GSA staff and consultants should present relevant information and solicit feedback at meetings in disadvantaged communities regularly. Public workshops must provide interpretation in any languages needed, and should follow robust and effective community outreach to ensure that the most vulnerable drinking water users are informed and included. Public engagement may be funded through SGMA-related fees and/ or state grants if necessary.

The Data and Assumptions Underlying the Water Budgets are Unclear, Inadequate and Incomplete

SGMA defines the term "water budget" to mean "an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored."[5]The SGMA emergency regulations similarly require that every GSP include a water budget "that provides an accounting and assessment of the total annual volume of groundwater

[5] Water Code Section 10721(y).

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."[6] In developing a water budget, the GSP must utilize the "best available information and best available science."[7]

In calculating the current water budget, the GSP must "quantify current inflows and outflows for the basin *using the most recent hydrology, water supply, water demand, and land use information*."[8] In contrast to this requirement, the data utilized to estimate the projected water budget is out-of-date, incomplete and inaccurate.

First, the Draft GSP does not accurately explain or include all urban water users, or rely on the most recent information. According to the Draft GSP, urban water demand is based on the 2015 Urban Water Management Plan (UWMP) and municipal pumping records. However, no information is provided on the magnitude of the urban demand, population information, or per capita water use specified in the model. The Draft GSP does not identify which municipal water providers provided data and which required estimation of water demand. Nor does it discuss how estimated water use from rural domestic water users or small community water systems was represented in the model or the magnitude of these values.

Second, the Draft GSP does not adequately factor in population growth and expanded development in cities and communities in the subbasin. SGMA requires that a "groundwater sustainability plan shall take into account the most recent planning assumptions stated in local general plans of jurisdictions overlying the basin."[9] The regulations also require that projected water demand must take into account, among other things, population growth.[10] Accounting for future growth within the water budget must also include accounting for reasonable growth in DACs. This information is critical to incorporated into the water budget to ensure that communities have a stable source of water when the GSP is implemented. The GSAs must look to General Plans, Community Plans, Specific Plans, Regional Transportation Plans, LAFCO Municipal Service Reports, Regional Housing Needs Assessments, and Department of Finance population estimates to accurately assess future drinking water needs in disadvantaged communities in the subbasin. If such documents do not contain information about population projections in DACs, the GSAs should communicate directly with residents of DACs and community-based nonprofits working with local communities to estimate future population growth.

To form its projected land use conditions baseline, the GSAs list direct communication on future projections with local agencies and farmers.[11] Because SGMA requires that the interests of all beneficial users and uses to be considered in developing GSPs,[12] there must be direct communication with all relevant stakeholders and representatives of all beneficial uses, including

[6] 23 CCR 354.18(a).
[7] 23 CCR 354.18(e).
[8] 23 CCR 354.18(c)(1) [emphasis added].
[9] Water Code § 10726.9.
[10] 23 CCR 354.18(c)(3)(B).
[11] Draft Merced Subbasin GSP pg. 2-118, dated July 2019.
[12] Water Code section 10723.2.

people reliant on domestic wells. This communication should be through meetings held in communities, facilitated where possible by collaboration with community-based nonprofits.

Lastly, it is unclear why the GSAs chose the historical baselines that they did. The methodology that the GSAs used to choose the historical baseline of 1969 to 2018 should be clarified.[13] It should also be explained why the GSAs chose a different period as their baseline for their current and projected water budget.[14]

As the attached technical report highlights other deficiencies with the water budgets, and development thereof:

- The Draft GSP presents only a brief listing of the data sources used to specify conditions for the model periods used to develop the water budgets. There is very little discussion on how the model input relative to the water budget was developed from the listed sources. It is noted in the text that additional data used for model development is included in Appendix D (MercedWRM Model Documentation), but Appendix D is still under development and was not included in the Draft GSP. Therefore, any additional data related to the water budget could not be reviewed by the public during this comment period. The Draft GSP made available to the public is incomplete, and a full evaluation of the model and assumptions cannot be made.
- According to the Draft GSP, urban water demand is based on the 2015 Urban Water Management Plan (UWMP) and municipal pumping records.[15] However, no information is provided on the magnitude of the urban demand, population information, or per capita water use specified in the model. The Draft GSP does not identify which municipal water providers provided data and which required estimation of water demand. Nor does it discuss how estimated water use from rural domestic water users or small community water systems was represented in the model or the magnitude of these values. Therefore, based on the limited data provided in the Draft GSP, the public cannot review the drinking water demand estimates for domestic users, community water systems, or large urban water suppliers and make an assessment as to the appropriateness of the demands considered in the historical, current, or future water budgets.
- There is no specific information included in the Draft GSP on how historical land use was determined or how it varies over the historical water budget period. According to the Draft GSP, the current water budget uses 2013 CropScape data and the projected water budget uses the 2013 CropScape data, 2015 agricultural water management plan projections, and information from local agencies and farmers. No summary of acreages by land use type is provided so the accuracy of the representation of urban and agricultural areas cannot be assessed by the public. Without this information the public cannot assess how domestic well users and small community water systems are represented in the land use data.
- The majority of the Draft GSP section discussing the water budget focuses on the results of the water budget. These results are presented as average annual values for the entire subbasin which limit the ability for the public to evaluate and understand the impacts to DACs and small community water systems. Time series graphs of the water budget results

[13] Draft Merced Subbasin GSP pg. 2-136, dated July 2019
[14] Draft Merced Subbasin GSP Table 2-3 pg. 2-119, dated July 2019
[15]

are needed to evaluate if the water budget adequately represents the temporal variability and trends in drinking water demand. By presenting only subbasin-level water budget results and only as average annual values, the presented results are opaque with respect to drinking water use by DACs, as well as demands by other types of beneficial users.

- The Draft GSP does not include any discussion of the uncertainty in the data used for the model and its potential effects on the water budget results. The GSP should include an uncertainty analysis to identify the plausible range in water budget results and an indication of the magnitude of the effects these inherent uncertainties may have on the water budget results.
- The estimate of sustainable yield for the subbasin was determined using the Projected Conditions Baseline scenario. According to the Draft GSP, in this scenario, agricultural and urban demand is reduced across the model domain to achieve a net storage change of zero. Agricultural demand was reduced by reducing agricultural land use. Urban demand was reduced by reducing the per capita water use. However, the Draft GSP does not present information on how per capita water use reductions were determined or if they were applied equally to all drinking water users (municipal users, rural domestic users, small community waters systems, etc.). The document also does not include a discussion of how these reductions would affect domestic water users or small community water systems. Therefore, based on this, it is not clear how demands by drinking water users were considered in the sustainable yield calculation.

The Monitoring Network Is Inadequate With Respect to Groundwater Levels and Groundwater Quality.

The GSA's Monitoring Network is insufficient because its representative monitoring wells do not cover the entirety of the Subbasin. The GSAs must consider the interests of beneficial users including domestic well owners and disadvantaged communities,[16] and must avoid disparate impacts on protected groups pursuant to state law.[17] The Draft GSP lacks representative monitoring wells in areas of the subbasin where drinking water users may be particularly vulnerable to groundwater supply and quality issues, leaving the GSAs with no ability to measure and avoid significant and unreasonable impacts to those users. The GSAs must prioritize measures to address these data gaps and add more representative monitoring wells. The insufficiency of the

[16] Water Code sec. 10723.2.

[17] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

representative monitoring network poses a significant threat to the validity of the Plan at large, and therefore must be addressed immediately.

Representative Monitoring Wells

The GSAs have proposed a monitoring network of 50 wells, out of which only 25 have been designated as representative wells.[18] As the attached technical report notes, this represents only one well for over 153 square miles of groundwater subbasin, or 0.65 wells per 100 square miles. This monitoring well density is just barely within the established DWR guidance for monitoring well densities of between 0.2 and 10 wells per 100 square miles.[19] In addition, representative wells are generally located in the center of the subbasin, while domestic wells are distributed widely across the subbasin;[20] this results in approximately 1,100 out of approximately 3,600 domestic wells in the subbasin being located outside of the two-mile radius areas used to establish the Draft GSP's minimum thresholds as highlighted in the attached technical report. In particular, the domestic wells located in and around the DACs of El Nido, Planada, Le Grand, and south of the City of Merced are located outside of the areas being monitored for water levels. As such, there are no representative wells for groundwater levels or groundwater quality in the vicinity of these beneficial users. Furthermore, the areas not covered by the monitoring network are where the subbasin's shallowest wells are located, as indicated by the Merced County tanked water program, which tanked water out to many communities in the areas without monitoring wells.[21]

Consultants for the GSAs have cited this lack of data to justify why it cannot protect drinking water users from wells going dry at several subbasin meetings.[22] This stance is alarming, given that state law recognizes drinking water as the "highest use of water."[23] As such, it is imperative for the GSAs to include a plan for a robust monitoring network to fill those data gaps. In their Draft GSP, the GSAs have only proposed to install four more representative wells to fill in data gaps in groundwater levels in the three large data gap regions they have identified,[24] and plans to wait until a year after GSP approval by DWR (which may not be for another two years) to create a plan to fill data gaps.[25] Additionally, the GSA proposes to fill two of their data gap areas by relying on monitoring wells and data from existing programs such as the East San Joaquin Water Quality Coalition Groundwater Quality Trend Monitoring and Public Water System,[26] which is concerning as ESJWQC is still phasing in their groundwater trend monitoring network.[27] It is also unclear whether the additional wells will be at the correct groundwater depth to detect impacts to domestic wells.

[18] Draft Merced Subbasin GSP pg. 4-8, dated July 2019.
[19] DWR, 2016. Best Management Practices for the Sustainable Management of Groundwater, Monitoring Networks and Identification of Data Gaps (BMP #2), December 2018.
[20] Draft Merced Subbasin GSP pg. 4-3, dated July 2019.
[21] Draft Merced Subbasin GSP pg. 3-5, dated July 2019.
[22] Merced Subbasin Stakeholder Committee meeting, July 22, 2019, in which consultants stated that data is limited in some SDAC areas so they cannot include them in representative wells.
[23] Water Code § 106.
[24] Draft Merced Subbasin GSP pg. 4-15, dated July 2019.
[25] Draft Merced Subbasin GSP pg. 4-26, dated July 2019.
[26] Draft Merced Subbasin GSP pg. 4-26, dated July 2019.
[27] East San Joaquin Water Quality Coalition Groundwater Quality Trend Monitoring Workplan: Phase III.

To ensure that the representative wells within the monitoring network accurately monitor impacts to groundwater management for drinking water beneficial users, and does not create a disparate impact on protected groups, we make the following recommendations:

- Include all MAGPI wells in the representative monitoring network in order to include DACs such as Planada and Winton, so that those wells can measure compliance with goals for groundwater quality and quantity.
- Include a plan in the GSP to fill data gaps, and include an aggressive timeline to ensure prompt implementation of the plan. This plan should include installation of representative monitoring wells measuring groundwater quality and levels in DAC areas not currently covered by the monitoring network. These representative monitoring wells should also be designed to measure impacts at the level of community water system wells and domestic wells. In particular, new representative monitoring wells should be installed in or near the DACs of Planada, El Nido, and Le Grand to detect groundwater quality and supply impacts to those communities.
- All 50 wells in the monitoring network must be properly retrofitted as representative monitoring wells. Currently, only 25 of the 50 existing wells in the monitoring network are representative.
- Add the monitoring well proposed to be installed in El Nido to the representative monitoring well network by ensuring that it meets the requirements of being a representative monitoring well.

The Draft GSP Sustainable Management Criteria for Groundwater Levels are not Adequate

The Draft GSP's proposed minimum thresholds and undesirable results with respect to groundwater levels are not tied to sufficient information and criteria about their impact on beneficial users including drinking water users, and its measurable objective does not comply with its sustainability goals. The GSAs have not shown how they have considered the interests of beneficial users including domestic well owners and disadvantaged communities.[28] The resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups pursuant to state and federal law.[29]

The Proposed Minimum Threshold is not Sufficiently Protective

[28] Water Code sec. 10723.2.

[29] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

The Draft GSP does not set forth a clear methodology by which the GSAs arrived at the decision to set the minimum threshold for groundwater levels at the level of the shallowest well in a 2-mile radius around each representative monitoring well, or at 2015 levels if the shallowest well has been dewatered. The groundwater levels sustainable management criteria set by the GSAs must have the purpose of avoiding "significant and unreasonable" impacts on beneficial users caused by declining groundwater levels. The Draft GSP states that stakeholders identified "significant and unreasonable number of shallow domestic wells going dry" as an undesirable results.[30] However, the GSAs make no determination as to how many dry wells constitute a "significant and unreasonable" number, and this determination was not made at any public meetings.

Under the SGMA regulations, the GSAs should provide "the information and criteria relied upon to establish minimum thresholds," an explanation of how the proposed minimum thresholds will "avoid undesirable results," and "how minimum thresholds may affect the interests of beneficial uses and users of groundwater."[31] The only type of "information and criteria" that will show whether a proposed minimum threshold will cause dry wells is an analysis of how many wells will go dry throughout the subbasin, based on the best available data. We were able to commission a quick analysis comparing proposed minimum thresholds with domestic well depths using available data. However, such an explanation was not written in the Draft GSP, and was not taken into account in creating the proposed minimum thresholds.

Once such an analysis has been conducted, the GSAs should consider that drinking water use has been recognized as the "highest use of water" by the California legislature, and should consult with stakeholders to ensure that the minimum threshold is set is such a way as to guarantee the human right to drinking water to all individuals in the subbasin.

Additionally, the attached technical report notes that nearly one-third of all domestic wells in the subbasin were not considered in the establishment of minimum thresholds: given the limited spatial distribution of the 25 representative monitoring wells, as described above, approximately 1,100 out of approximately 3,600 domestic wells in the subbasin are located outside of the two-mile radius areas used to establish these minimum thresholds. Therefore, even if all representative monitoring wells were to set the minimum threshold at the level of the shallowest well, this still puts a third of the subbasin's domestic wells at risk of going dry. Additionally, there are no information or criteria justifying why 2015 levels were chosen as the alternative minimum threshold in cases where shallow wells have gone dry in a 2-mile radius around representative monitoring wells, or why a radius of 2 miles was chosen.[32]

The minimum thresholds further do not avoid the significant and unreasonable impact of dry wells, because they are set at the level of the bottom 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, as highlighted in the attached technical report. Therefore, many domestic wells within the two-mile

[30] Draft Merced Subbasin GSP pg. 3-4, dated July 2019
[31] 23 CCR § 354.28.
[32] Draft Merced Subbasin GSP pg. 3-6, dated July 2019

radius of each representative monitoring well may be impacted before the minimum threshold is exceeded.

Therefore, the GSAs must do the following:

- Conduct a drinking water impacts analysis that clearly shows the impact of the proposed minimum thresholds on drinking water users
- Modify the minimum threshold to avoid the significant and unreasonable impact of dry wells. In order to protect drinking water users, the GSAs should place the minimum threshold at a level above where the shallowest domestic well is *screened*.
- Provide a full explanation of the information and criteria that was used to set the minimum threshold.

The Proposed Measurable Objectives for Groundwater Levels is Inadequate

The Draft GSP sets measurable objectives at levels that do not protect against the significant and unreasonable impact of wells going dry. In areas where the minimum threshold is set at the level of the shallowest well, the minimum threshold should be at a buffer of 25 feet above where the shallowest domestic well is *screened*.

The same problem of lack of representative monitoring well coverage also means that, even where the proposed measurable objective is 25 feet above the shallowest well, there are still many domestic wells at risk of dewatering in areas without representative monitoring wells. This does not comply with the obligations under the SGMA regulations to set measurable objectives and interim milestones that "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." Subbasin stakeholders identified a significant and unreasonable number of wells going dry as an undesirable result, and this measurable objective will not achieve that goal.[33]

The Proposed Undesirable Result for Groundwater Levels is Inadequate

The GSAs propose to wait until 25% of representative wells fall below the minimum threshold for two consecutive wet, above normal, or below normal years, before an UR is triggered. The SGMA regulations require GSAs to justify their undesirable results by including the "[p]otential effects on the beneficial uses and users of groundwater."[34] The GSAs have included no information or criteria to explain how many shallow domestic wells will go dry if this undesirable result is reached, and therefore does not set forth adequate information to justify this decision. Given the amount of wells outside of the representative monitoring well 2-mile radius zone, and the wells that are screened above the minimum threshold, this could put thousands of domestic users' drinking water access at severe risk. 25% percent of the subbain seems too high to protect drinking water users, and the GSAs should consult with stakeholders to determine whether the number of wells that will go dry is "significant and unreasonable." Lastly, adding a hydrological condition of

[33] 23 CCR § 354.30.
[34] 23 CCR § 354.26.

two consecutive wet, above normal or below normal years to the undesirable result adds an unnecessary and unfair constraint considering California's highly variable regional climate.[35]

Recommendations for Modifying the Sustainable Management Criteria for Groundwater Levels

To ensure that drinking water users are protected from impacts to groundwater level declines:

- At minimum, the Merced GSAs must do a drinking water impact analysis with a focus on identifying how many wells are at risk of dewatering from the proposed minimum threshold and the proposed undesirable result. This analysis needs to be considered by stakeholders and the GSAs as part of decision-making about sustainable management criteria, included in the GSP, and all data and methodology for this analysis should be made available to the public. This request has been made several times at various community meetings, as well as our previous comment letter.
- The Merced GSAs must consider the dewatering of *any* well that is currently in use to be a significant and unreasonable result. It should therefore place minimum thresholds at a level that protect all drinking water wells from going dry or becoming contaminated in the subbasin. If the Merced subbasin GSAs decide to define and reach their sustainability goal in a way that allows for the dewatering of drinking water wells, they must provide a robust drinking water protection program to prevent impacts to drinking water users and mitigate drinking water impacts that occur.
- The Merced GSAs must show how its measurable objectives and interim milestones for groundwater levels will avoid a significant and unreasonable number of shallow domestic wells going dry. Once the GSAs have conducted an analysis of how the proposed levels will affect shallow domestic wells, they can determine alongside stakeholders whether the number of wells is significant and unreasonable, and modify their measurable objective accordingly. Additionally, the requirement for minimum threshold violations for two similar consecutive hydrological years need to be removed and replaced with much more aspirational criteria and objectives that better protect drinking water access.

The GSAs Should Set Sustainable Management Criteria for Groundwater Storage

The GSAs did not set any sustainable management criteria for groundwater storage based on the premise that "unreasonable depletions of groundwater storage are not present and not expected to occur in the Subbasin".[36] However, the GSAs use an incorrect standard to assess the impact of this sustainability indicator on beneficial users. The GSAs state that there will not be a significant *percent* change in storage, citing to the vast depths of the aquifer in the Subbasin. However, the GSAs should instead focus on beneficial users' ability to *access* stored groundwater. Should groundwater storage be depleted to the extent that the aquifer is no longer accessible to the beneficial users in the Subbasin, then beneficial users will see significant and unreasonable impacts from not being able to access the stored groundwater. This inability to access stored groundwater may be the result of technological and/or economic barriers relating to loss of groundwater storage,

[35] Bell, Jason L., Lisa C. Sloan, and Mark A. Snyder. "Regional changes in extreme climatic events: a future climate scenario." *Journal of Climate* 17.1 (2004): 81-87.
[36] Draft Merced Subbasin GSP pg. 3-10, dated July 2019.

among other challenges.[37] Therefore the GSAs have not shown how they have considered the interests of beneficial users including domestic well owners and disadvantaged communities,[38] and the resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups pursuant to state and federal law.[39]

We strongly urge the GSAs to do the following:

- Set sustainable management criteria for groundwater storage.
- In setting sustainable management criteria for groundwater storage, the GSAs must consider the impacts that loss in access to groundwater storage will have on drinking water users, specifically around increased costs in accessing lower groundwater.

The Draft GSP Fails to Adequately Address Groundwater Quality

The Draft GSP leaves drinking water users in the subbasin vulnerable to increased drinking water contamination from the GSAs' groundwater management activities or from the lack of adequate groundwater management in the subbasin. The GSAs have not shown how they have considered the interests of beneficial users including domestic well owners and disadvantaged communities in shaping groundwater quality sustainable management criteria.[40] Instead of fully incorporating protection of all drinking water quality standards into the Draft GSP, the GSAs limit their goals for groundwater quality to Total Dissolved Solids (TDS), a constituent far less harmful to human health than many others identified in the Draft GSP including nitrates, arsenic, 123-TCP, and

[37] McGuire VL, Johnson MR, Schieffer RL, Stanton JS, Sebree SK, Verstraeten IM (2003) Water in storage and approaches to groundwater management, High Plains aquifer, 2000. US Geol Surv Circ 1243.
Konikow, Leonard F., and Eloise Kendy. "Groundwater depletion: A global problem." *Hydrogeology Journal* 13.1 (2005): 317-320.
Handa, Divya, et al. "The Efficiencies, Environmental Impacts and Economics of Energy Consumption for Groundwater-Based Irrigation in Oklahoma." *Agriculture* 9.2 (2019): 27.
Wilkinson, Robert, and W. Kost. "An analysis of the energy intensity of water in California: providing a basis for quantification of energy savings from water system improvements." *California Institute for Energy Efficiency, California* (2006).
[38] Water Code sec. 10723.2.
[39] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].
[40] Water Code sec. 10723.2.

hexavalent chromium. The resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups, in conflict with state and federal law.[41]

The California legislature has stated that the use of water for domestic purposes is the highest use of water[42] and SGMA charged GSAs with the responsibility to protect water quality through groundwater management.[43] Despite several mentions of the importance of protecting drinking water resources in the draft GSP, the minimum threshold, measurable objective, and undesirable result are wholly inadequate.

The GSAs only proposed to establish sustainable management criteria for water quality that consider, measure, and protect against increasing salinity levels.[44] They further assert that they do not need to establish minimum thresholds for other constituents because there is no demonstrated correlation between water quality and water elevations.[45] They do not, however, present the data or analysis to support this claim. The water quality trend data presented in Appendix E only provides data through 2012 for selected water quality constituents (TDS, arsenic, nitrate, hexavalent chromium, DBCP, 1,2,3-TCP, etc.) and therefore does not present temporal trend data that would be associated with the lowered groundwater levels during the drought. In fact, there is almost no post-2012 drinking water quality data included in the Draft GSP. This represents an incomplete analysis of groundwater conditions that could have significant impacts to the sustainability and usability of the groundwater resource by drinking water users. The Draft GSP makes a key conclusion relevant to the long term management of water quality in the subbasin based on a conclusion that is unsupported by the analysis presented in the Draft GSP.

The Draft GSP also states that "[t]he 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)."[46] Of these constituents, nitrates are the most widespread contaminant with a direct impact on public health. The Merced County Department of Public Health considers nitrate to be an adverse groundwater quality parameter for most regions in the subbasin.[47] Despite its impacts to human health and prevalence in the area, the Draft GSP

[41] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].
[42] Water Code § 106.
[43] Water Code sec. 10721(w)(4); 23 CCR sec. 354.28(c)(4).
[44] Draft Merced Subbasin GSP pg. 3-11, dated July 2019.
[45] Draft Merced Subbasin GSP pg. 3-10, 3-11, dated July 2019.
[46] Draft Merced Subbasin GSP pg. 2-76, dated July 2019
[47] Draft Merced Subbasin GSP pg. 2-77, dated July 2019.

does not set minimum thresholds for nitrate, or for any water quality constituent other than TDS. The GSAs attempt to justify this decision, explaining that "[t]hresholds are not set for these constituents as the GSAs have no authority to limit the loading of nutrients or agrochemicals."[48] This justification is flawed as groundwater management actions will have a direct and indirect impact on the transport of nitrates, for example through groundwater recharge activities, groundwater pumping and management can impact the migration of contaminant plumes, and decreased water resources can increase concentrations of contaminants.

Groundwater quality protection is a requirement of SGMA.[49] This Draft GSP fails to incorporate performance measures and management criteria with respect to contaminants that impact human health including those contaminants with established primary drinking water standards, and in so, fails to conform with the requirements of SGMA. Furthermore, the minimum threshold for TDS itself is inadequate. A minimum threshold will only be triggered after seven representative wells show increasing levels of salinity consecutively for two years.[50] This is an unreasonably lax contamination threshold, especially given the sparseness of the monitoring network. In other words, since there are significant geographic gaps in the Merced Subbasin monitoring network (as discussed above), by the time seven of the 25 representative wells show increases in salinity for two consecutive years, it is more than likely that a high percentage of vulnerable drinking water users will be experiencing severe, long-term drinking water contamination problems before a minimum threshold is triggered. Therefore, this minimum threshold does not protect access to safe drinking water.

In order to set the minimum threshold, measurable objectives, and undesirable result, that are protective of groundwater quality for all beneficial users in the basin, the GSP must include the following:

- All representative monitoring wells must monitor constituents with established primary drinking water standards, hexavalent chromium, and PFOSs/PFOAs which has been identified as emerging contaminants in the basin.[51] We have raised this point at several committee meetings and through written correspondence.
- Set a protective minimum threshold, measurable objective, and undesirable result for all constituents with primary drinking water standards,hexavalent chromium, and PFOSs/PFOAs that may be impacted by groundwater management activities, or failure to manage groundwater in a way that does not negatively impact groundwater quality.
- A detailed explanation as to how the groundwater quality minimum threshold will result in the protection of groundwater for DACs and other drinking water users in the subbasin.

The GSP Should Ensure No Further Land Subsidence

The GSP should establish the measurable objective for land subsidence as zero change in subsidence resulting from groundwater management actions. While we are aware land subsidence happens naturally, the increase in pumping during the recent drought has led to an acceleration in

[48] Draft Merced Subbasin GSP pg. 3-12, dated July 2019.
[49] Water Code §§ 10727.2(d)(2); 10721(x)(4)
[50] Draft Merced Subbasin GSP Executive Summary, Table ES-1.
[51] Draft Merced Subbasin GSP pg. 2-76, dated July 2019.

land subsidence.[52] Because the basin is in critical overdraft, the GSAs should aim to prevent any subsidence as a result of groundwater management activities, or from failure to manage groundwater in a way that does not aggravate land subsidence.

One concern that has not been taken into consideration while setting the minimum thresholds, measurable objectives, and undesirable result, has been the impact of land subsidence on critical infrastructure, including roads, homes, piping, and wells. The only infrastructure that the Merced GSA considered to be of relevance for land subsidence in the Draft GSP is the Eastside Bypass.[53] While it is important to consider impacts of land subsidence on the Eastside Bypass, it is not the only critical infrastructure in the basin. In many parts of the world land subsidence due to groundwater extraction has caused surface deformation resulting in disturbances to water distribution networks and sewer systems.[54] We want to make sure we avoid such potential harms by making sure the minimum threshold, measurable objectives, and undesirable result, take into consideration the impacts of land subsidence on roads, homes, piping, and wells.

Projects and Management Actions are Inadequate

The projects and management actions set forth in the Draft GSP does not demonstrate a path towards achieving the sustainability goals in the plan, as significant management actions will not be fully implemented until five years before the GSAs must achieve their sustainability goals. Projects and Management Actions are also insufficient because they disproportionately benefit agricultural water users over other users, and disadvantaged communities will be benefited disproportionately less than other users. The GSAs have not shown how they have considered the interests of beneficial users including domestic well owners and disadvantaged communities.[55] The resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups pursuant to state and federal law.[56] Additionally, the Projects

[52] Faunt, Claudia C., et al. "Water availability and land subsidence in the Central Valley, California, USA." *Hydrogeology Journal* 24.3 (2016): 675-684.
[53] Draft Merced Subbasin GSP pg. 3-15, dated July 2019.
[54] Pacheco-Martínez, Jesús, et al. "Land subsidence and ground failure associated to groundwater exploitation in the Aguascalientes Valley, México." Engineering Geology 164 (2013): 172-186; Abidin, H. Z., et al. "Land subsidence in coastal city of Semarang (Indonesia): characteristics, impacts and causes." Geomatics, Natural Hazards and Risk 4.3 (2013): 226-240; Hernández-Espriú, Antonio, et al. "The DRASTIC-Sg model: an extension to the DRASTIC approach for mapping groundwater vulnerability in aquifers subject to differential land subsidence, with application to Mexico City." Hydrogeology Journal 22.6 (2014): 1469-1485; Zektser, S., Hugo A. Loáiciga, and J. T. Wolf. "Environmental impacts of groundwater overdraft: selected case studies in the southwestern United States." Environmental Geology 47.3 (2005): 396-404.
[55] Water Code sec. 10723.2.
[56] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the

and Management Actions section does not describe clear timelines and commitments for projects that specifically benefit disadvantaged communities.

Management Actions

The GSAs selected two management actions to achieve sustainability: an initial groundwater allocation framework and groundwater demand reduction. These two actions will be pivotal to reaching basin wide sustainability by 2040. However, the Draft GSP does not set a clear timeline for implementation of an allocation framework. The Draft GSP states that the GSAs will only implement the demand reduction strategy "as needed," that demand reduction does not begin until 2025, and will not be fully implemented until 2035. We are concerned that the GSAs will not achieve their sustainability goals if water use is not limited through both an allocation framework (established within one year of GSP adoption) and a fully implemented demand reduction requirements within ten years of plan adoption.

In order to protect drinking water resources and avoid a disparate impact on protected groups, the GSAs must:

- Implement a demand reduction strategy immediately in order to avoid impacts to drinking water users, and define a concrete timeline for implementation of the strategy.
- Define an allocation framework within a year of submittal of the GSP, ensure that the allocation framework adequately protects groundwater to meet the drinking water needs of domestic well owners and disadvantaged communities in the subbasin, and implement the allocation framework proactively to avoid wells going dry.

Projects

The GSAs should prioritize more projects geared towards water efficiency in the agricultural sector and reduction in agricultural water use, since irrigation is the primary cause of overdraft in the Subbasin. Several of the projects in both the shortlist and on the projects running list focus more on increasing import of water supplies and water efficiency in urban water use. However, water efficiency in the urban sector, while important, only makes up a small portion of water use in the basin. Vastly less groundwater usage would be gained from water efficiency in urban water use than can be achieved through water conservation in irrigation.[57]

Basin-wide metering, with a focus on agricultural metering, should be prioritized under "Projects and Management Actions." With data available from basin wide-metering the GSAs will be better equipped to create an equitable allocation framework, as well as have stronger data to help understand what a sustainable yield in the basin should be and the amount of demand reduction that should be enforced each year in order to achieve sustainability. Without metering, the GSAs will not have accurate information about groundwater use.

---

enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

[57] Ward, Frank A., and Manuel Pulido-Velazquez. "Water conservation in irrigation can increase water use." Proceedings of the National Academy of Sciences 105.47 (2008): 18215-18220.

The Merced subbasin GSAs must avoid creating a disparate impact on low-income communities of color. As written, only one of the proposed projects protects a disadvantaged community's drinking water supply, while the majority of the projects in the Draft GSP benefit agricultural users. The lack of projects that protect disadvantaged communities' drinking water supplies, combined with the sustainable management criteria that will allow for many domestic wells to go dry and become contaminated, will cause a disparate impact to low income communities of color that live in disadvantaged communities in the subbasin. The GSAs should therefore include more projects and management actions specifically geared towards protecting drinking water resources in disadvantaged communities.

The GSAs should use their operational budget to pay for these DAC projects, instead of relying on other state drinking water programs or grants. State drinking water programs like the Safe and Affordable Drinking Water Fund are not meant to substitute GSA investments in drinking water sustainability pursuant to their responsibilities under SGMA.

The following must be incorporated into the Projects and Management Actions section of the GSP in order to avoid a disparate impact on low income communities of color in the Merced subbasin:

- Projects benefiting disadvantaged communities such as the Planada recharge basin must contain specific timelines and commitments to ensure achievement of sustainability and protection of drinking water resources for disadvantaged communities.
- Detailed information on projects must be available to the public online, as appendices to the GSP, and in a public workshop during a public comment period. In reading the shortlist projects descriptions, we had several questions about project details, which could be easily answered by providing more information on the projects. In order to better inform stakeholders on these projects and why they are being prioritized over others, more information on these projects needs to be made available, both in the plan and through more opportunities for in-person public comment.
- Establish basin wide metering to accurately assess the amount of groundwater being pumped in the basin, and where such pumping is occurring.
- Improvements in the representative monitoring well network must be prioritized, particularly for currently uncovered areas where DACs are located
- Implement projects to benefit disadvantaged communities in a reasonably timely manner, and concurrently with projects that benefit other beneficial users, so as to avoid disparate impacts on low income communities of color.
- More projects must be included that specifically benefit DACs. These projects and management should include:
    - Management areas that set more protective sustainable management criteria in areas where vulnerable communities and DACs are located, particularly where data gaps and no representative monitoring wells are located. Such areas should contain a buffer around communities to avoid localized impacts.
    - Implementing a warning system so that the GSAs are aware of when wells are going dry, or when wells are going to become contaminated from groundwater management activities, so it can take action to prevent drinking water impacts. If drinking water wells are at risk of impacts, the GSAs should help connect communities and individual homes to nearby reliable water systems. If

consolidation is not possible, the GSAs should deepen wells, install treatment facilities or POE/POU treatment in homes. In the interim, the GSA should provide emergency bottled water.
- Incentives for demand reduction strategies.
- A mitigation fund for increased cost of accessing safe and reliable drinking water for low income families. We will gladly speak with you more in detail about how such a program could be structured, financed and how residents would qualify.
- Implement more recharge basins in and around DACs, with clear implementation timelines and a clear plan for community leadership of the project
- Stormwater drainage ponds that would eliminate flooding and increase groundwater recharge in DACs
- Funds for private well testing for low income families

Plan Implementation Must Include Robust Public Participation, Allow Amendments to the GSP Upon Availability of New Information, and Implement Drinking Water Protection Programs

We have several concerns regarding plan implementation, specifically concerns over public outreach, the potential to make amendments to the GSP, metering requirements, and future mitigation strategies.

In the public outreach section for plan implementation, the GSA did not include translation services for DACs in which the predominant language is not English. The Merced basin is home to a large Latino population, many of whose first language is Spanish.[58] In order to be able to include all beneficial users in the GSP implementation process, material needs to be made available in the appropriate language. Additionally, GSA should not rely on email as the primary mode of relaying information and conducting outreach since many of the most vulnerable drinking water users may not have access to internet services.

As the draft plan is currently written, it is unclear if reconsidering elements of the GSP is only possible at the 5-year update or if reconsiderations can be proposed and made at any other time. Through its GSP, the GSA must establish processes by which it will seek and incorporate feedback from the public on an ongoing basis through direct outreach to disadvantaged communities and public workshops that are held at convenient locations and times and accessible in multiple languages. Additionally, proposed reconsiderations must be publicly noticed and circulated for public review and comment prior to final adoption.

Under the "Establishing Metering Program" section, the GSA states that on advisement from the stakeholders and coordination committees, the GSA should take a "flexible approach" to metering. Without full metering across the basin we will not have an accurate view of how much water is entering and exiting the aquifer. As stated above, basin-wide metering, with a focus on agricultural metering, should be prioritized under "Projects and Management Actions."

[58] United States Census Bureau. "QuickFacts, Merced County, California" census.gov. 16 Aug. 2019. Web https://www.census.gov/quickfacts/mercedcountycalifornia#qf-headnote-b.

Last, at the end of this chapter the Merced GSA briefly discusses mitigation for possible future domestic well dewatering.[59] As has been stated previously in this letter, the California legislature has stated that the use of water for domestic purposes is the highest use of water[60], as such, a single domestic shallow well being dewatered should be considered significant and unreasonable. The attached technical report highlights that a significant proportion of domestic wells have the potential to be partially or fully dewatered if water levels reach the proposed minimum threshold levels. Establishing mitigation for shallow domestic wells that might be dewatered by declining water levels during the GSP implementation period should be of the highest priority.

To ensure that the GSP is implemented properly, the GSA must do the following:

- The GSA should include translation services as part of their public outreach plan in order to meaningfully consult with and consider the interest of all beneficial users. Workshops and meetings must be at an accessible time and locations for all stakeholders. Additionally, notifications should also be sent out via mail to those who have limited or no access to internet services.
- Clarify in the GSP that the plan may be modified as data becomes available, and that the GSA will seek and accept feedback from the public on an ongoing basis throughout plan implementation.
- Clarify that any modification to the GSP must be in writing, noticed and provide sufficient time for public review and feedback.
- Establish a plan for drinking water protection and a plan for improving the representative well monitoring network within this GSP.

The Draft GSP Threatens to Infringe on Water Rights

In enacting SGMA, the legislature found and declared that "[f]ailure to manage groundwater to prevent long-term overdraft infringes on groundwater rights."[61] The test of SGMA further notes that "[n]othing in this part, or in any groundwater management plan adopted pursuant to this part, determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights."[62] As discussed in detail above, the Draft GSP allows continued overdraft above the safe yield of the basin, such that drinking water wells (especially domestic wells) will continue to go dry, infringing on the rights of overlying users of groundwater. The Draft GSP must be revised to protect the rights of residents of disadvantaged communities and/or low-income households who hold water rights to groundwater.

The Draft GSP Conflicts with the Reasonable And Beneficial Use Doctrine

The "reasonable and beneficial use" doctrine, to which SGMA expressly must comply,[63] is codified in the California Constitution. It requires that "the water resources of the State be put to

[59] Draft Merced Subbasin GSP pg. 7-11, dated July 2019.
[60] Water Code § 106.
[61] AB 1739 (2014).
[62] Water Code § 10720.5(b).
[63] Water Code § 10720.1(a).

beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare." (Cal Const, Art. X § 2; *see also United States v. State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 105 ["…superimposed on those basic principles defining water rights is the overriding constitutional limitation that the water be used as reasonably required for the beneficial use to be served."].)

The reasonable and beneficial use doctrine applies here given the negative impacts of the draft GSP on groundwater supply and quality, which are likely to unreasonably interfere with the use of groundwater for drinking water and other domestic uses. As the Draft GSP authorizes waste and unreasonable use, it conflicts with the reasonable and beneficial use doctrine and the California Constitution.

The Draft GSP Conflicts with the Public Trust Doctrine

The "public trust" doctrine applies to the waters of the State, and establishes that "the state, as trustee, has a duty to preserve this trust property from harmful diversions by water rights holders" and that thus "no one has a vested right to use water in a manner harmful to the state's waters."[64]

The "public trust" doctrine has recently been applied to groundwater where there is a hydrological connection between the groundwater and a navigable surface water body.[65] In *Environmental Law Foundation*, the court held that the public trust doctrine applies to "the extraction of groundwater that adversely impacts a navigable waterway" and that the government has an affirmative duty to take the public trust into account in the planning and allocation of water resources.[66] The court also specifically held that SGMA does not supplant the requirements of the common law public trust doctrine.[67]

The Draft GSP proposes to use groundwater levels as a proxy for depletion of interconnected surface water "due to the challenges associated with directly measuring streamflow depletions and because of the significant correlation between groundwater levels and depletions.[68] The Draft GSP further notes interaction between surface water and groundwater in discussing the losing and gaining streams that will be impacted.[69] The draft GSP thus concedes that there is a hydrological connection between groundwater and surface water in the regulated area. As such, *Audubon* and its progeny require the GSAs to consider the impacts of the draft GSP on public trust resources and to attempt, so far as feasible, to avoid or minimize any harm to those interests.

[64] *United States v. State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 106; *see also Nat'l Audubon Soc'y v. Superior Court* (1983) 33 Cal.3d 419, 426 ["before state courts and agencies approve water diversions they should consider the effect of such diversions upon interests protected by the public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests."].
[65] *Environmental Law Foundation v. State Water Resources Control Bd.* (2018) 26 Cal.App.5th 844, 844.
[66] *Id.* at 856-62.
[67] *Id.* at 862-870.
[68] Draft Merced Subbasin GSP, p. ES-6, dated July 2019.
[69] GSP, p. 2-14, 2-15.

In contrast to these requirements, the Draft GSP does not consider impacts on public trust resources, or attempt to avoid insofar as feasible harm to the public's interest in those resources.

The Draft Groundwater Sustainability Plan Will Have Disparate Negative Impacts On Protected Classes.

State law provides that no person shall, on the basis of race, national origin, ethnic group identification, and other protected classes, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state.[70] Furthermore, the state's Fair Employment and Housing Act guarantees all Californians the right to hold and enjoy housing without discrimination based on race, color, or national origin.[71]

Small disadvantaged communities of color within the San Joaquin Valley are disproportionately impacted by unsustainable groundwater use, falling groundwater tables, dry drinking water wells, subsidence, and water quality degradation.[72] The negative impacts discussed in this letter, which will be allowed by the GSP, will be disproportionately felt by communities of color, and are thus discriminatory on the basis of race, color, ancestry, and national origin.

~ ~ ~ ~ ~ ~ ~ ~ ~

The GSP must protect subbasin's most vulnerable drinking water users. We welcome the opportunity to discuss our recommendations to ensure compliance with state law. We are also in communication with the Department of Water Resources about current GSP development activities in the San Joaquin Valley, and hope to successfully work with GSAs, communities and DWR to ensure that groundwater management is equitable and sufficiently protective of vital drinking water resources.

[70] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

[71] Gov. Code § 12900 et seq.

[72] Feinstein et al., "Drought and Equity in California" (January 2019); Balazs et al., "Social Disparities in Nitrate Contaminated Drinking Water in California's San Joaquin Valley," Environmental Health Perspectives, 19:9 (September 2011); Balazs et al., "Environmental Justice Implications of Arsenic Contamination in California's San Joaquin Valley," Environmental Health Perspectives, 11:84 (November 2012); Flegel et al., "California Unincorporated: Mapping Disadvantaged Communities in the San Joaquin Valley" (2013).

Sincerely,

/s/
Amanda Monaco
Leadership Counsel for Justice and Accountability

CC:

Amanda Peisch-Derby
Senior Engineer
Department of Water Resources

Encl:

Technical Review, July 2019 Merced Subbasin Draft Groundwater Sustainability Plan (GSP)

Focused Technical Review:
July 2019 Merced Subbasin Draft Groundwater Sustainability Plan (GSP)

Water Levels

The draft GSP sets the minimum thresholds (MTs) for groundwater levels as the shallower of: (1) the construction depth of the shallowest well in a two-mile radius of each representative monitoring well, or (2) the minimum pre-January 2015 elevation. The GSP further defines the undesirable result (UR) as being when greater than 25% of the representative monitoring wells (RMWs) are below their respective MT for two consecutive years. This approach to setting water level MTs leaves key beneficial users in the subbasin, specifically domestic well users and in particular members of disadvantaged communities (DACs), potentially vulnerable to impacts.

- The water level MTs are set relative to the bottom 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 two-mile radius may be impacted before this MT is exceeded or URs are triggered**.
- Given the limited spatial distribution of the RMW network, a substantial proportion of domestic wells within the subbasin appear to have not been considered in the development of these MTs. **Figure 1** shows the location of domestic wells within the subbasin. Each dot is scaled to represent the number of wells located within a given PLSS Section (i.e., approximately a 1-square mile grid cell). Based on this assessment, approximately 1,100 out of approximately 3,600 domestic wells in the subbasin are located outside of the two-mile radius areas used to establish these MTs. **Nearly one-third of all domestic wells in the subbasin were therefore not considered in the establishment of MTs.**
- The RMWs are generally located in the center of the subbasin, while domestic wells are distributed widely across the subbasin. In particular, as shown in **Figure 1**, the domestic wells located in and around the DACs of El Nido, Planada, Le Grand, and south of the City of Merced are located outside of the areas being monitored for water levels. **As such, there are no water level RMWs, or SGMA compliance points, for water levels in the vicinity of these beneficial users.**
- **Figure 1** also shows the location of community water systems in the subbasin. As you can see in this figure, the **RMW network does not provide adequate coverage for the Planada Community Services District (CSD), Planada Elementary School, or Le Grand CSD; combined, these systems serve a population of over 6,800 people.**
- In order to improve the RMW network, we recommend that additional *representative* monitoring wells (with MTs) be established to be protective of the DACs of Planada, El Nido, and Le Grand.
- **Figure 2** shows the approximate elevations of the domestic well depths (as estimated elevations) with an inset of Figure 3-3 from the draft GSP, which presents the groundwater levels at the proposed MTs for the RMW network. Domestic well depths are shown using the same color

scheme as in the GSP figure, with red representing the shallowest wells and blue representing the deepest wells. Based on this assessment, it appears that many domestic wells are completed to shallower depths than the proximate water level MTs. We acknowledge that this assessment is a "quick and dirty" assessment of well elevations; however, the GSP does not clearly and transparently present the domestic well data used for the establishment of these MTs, nor does it present an assessment of how many and which domestic wells are expected to go dry if the MTs are reached. **Per 23 CCR § 354.28, these assessments should be included in the GSP in order for the public and DWR to able to fully evaluate the ability of the proposed sustainable management criteria and monitoring program to protect beneficial users within the subbasin.**

Water Quality

The draft GSP includes limited analysis of water quality constituents and defines URs for water quality as a "reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP." For the reasons identified below, the water quality monitoring network and analysis presented in the draft GSP appears to be inadequate, and the sustainable management criteria do not appear to be sufficient to ensure that the stated water quality UR of impacting the long-term viability of the groundwater resource, particularly for domestic water users including DACs, will be avoided.

- The draft GSP sets MTs for groundwater quality for only five *representative* monitoring wells within the subbasin.[1] This represents only one well for over 153 square miles of groundwater subbasin, or 0.65 wells per 100 square miles. This monitoring well density is just barely within the established DWR guidance for monitoring well densities of between 0.2 and 10 wells per 100 square miles.[2] Further, the DWR guidance provides a range of recommended monitoring density and notes that the frequency of monitoring wells depends on local geology, extent of groundwater use, and how the GSP defines undesirable results. **Given the complexity of this subbasin and the geographic distribution of sensitive beneficial users, this proposed network of water quality RMWs appears to be insufficient to monitor impacts to groundwater for drinking water beneficial users, particularly domestic well users and DACs.**

- **Figure 3** shows the location of domestic wells within the subbasin. Each dot is scaled to represent the number of wells located within a given PLSS Section (i.e., approximately a 1-square mile grid cell). **Figure 3** also shows the location of the five water quality RMWs. Over 2,600 out of 3,600 domestic wells in the subbasin are located outside of a two-mile radius of these RMWs. **Over 70% of all domestic wells in the subbasin are therefore located more than two miles from RMW locations where water quality sustainability will be evaluated against MTs.**

- As shown in **Figure 3**, nearly 70 community water systems are located in the subbasin, most of which are located far from the water quality RMWs, including Planada CSD, Le Grand CSD, and many systems supplying schools in the area. The proposed water quality representative monitoring network appears to be inadequate for measuring and quantifying the sustainability of

[1] It is noted that the GSP acknowledges that water quality data from additional wells will be included for annual reporting purposes, but not compliance purposes under SGMA.

[2] DWR, 2016. *Best Management Practices for the Sustainable Management of Groundwater, Monitoring Networks and Identification of Data Gaps (BMP #2),* December 2018.

the groundwater resource for these systems. The GSP explains that community water systems are required to conduct periodic water quality monitoring on their systems; however, this does not prevent the systems from being impacted by degraded water quality resulting from groundwater use and management actions in the subbasin. **At a minimum, the draft GSP should explain how the data from the community water systems will be incorporated into subsequent GSP evaluations and decisions. Further, the draft GSP should describe how the proposed RMWs will ensure that the groundwater used by these community water systems will be managed to avoid significant and unreasonable negative water quality impacts to these beneficial users.**

- In order to improve the monitoring network for water quality, we recommend that additional *representative* monitoring wells (with MTs) be established to be protective of the DACs of Planada, El Nido, and Le Grand, as well as in the western portion of the subbasin.
- The draft GSP states that "The primary naturally-occurring water quality constituents are arsenic and uranium." However, despite being a primary water quality constituent, uranium data are not reviewed and included in the document. Based on data listed as available in Data Management System (DMS; described in Appendix E), uranium data are available to the GSAs for review and analysis. **In order to characterize the water quality conditions in the subbasin and evaluate sustainability management criteria, uranium concentrations, including temporal and spatial trends, should be analyzed, in particular with respect to use of groundwater by drinking water users.**[3,4]
- Arsenic is also identified in the draft GSP as a primary water quality constituent. The draft GSP presents a five-year average of arsenic concentrations (2007-2012) as a contoured map, with no explanation as to the methodology used to contour the map. This methodology of presenting the data has the potential to obscure "hot spots" and localized trends. Appendix E presents time plots of arsenic concentrations from 1984 – 2012, and based on the data presented, areas of higher arsenic concentrations are present in the subbasin. The draft GSP also does not present any analysis comparing the change in arsenic concentrations to the change in water levels. Further, the draft GSP does not include any arsenic data post 2012, which is an omission of the evaluation of possible change in water quality as a result of the lowered water levels experienced during the recent drought. In addition, arsenic concentrations haven been shown in some areas to have a relationship to the dewatering of the Corcoran Clay.[5] This spatial trend should also be evaluated, with data presented clearly with respect to the presence of the clay. **The analysis of arsenic concentrations in groundwater are therefore incomplete with respect to 1) recent data, 2) correlation to changing water levels, and 3) relationship to the presence of the Corcoran Clay.**[3,4]
- The draft GSP provides the following justification for not establishing MTs for naturally occurring constituents, including arsenic and uranium: "Thresholds are not set for these constituents as there is no demonstrated local correlation between fluctuations in groundwater elevations

[3] DWR, 2017. *Best Management Practices for the Sustainable Management of Groundwater, Sustainable Management Criteria (BMP #6),* Draft November 2017.
[4] Stanford, 2019. *A Guide to Water Quality Requirements Under the Sustainable Groundwater Management Act,* Spring 2019.
[5] Smith, Ryan et al. "Overpumping leads to California groundwater arsenic threat." *Nature communications* vol. 9,1 2089. 5 Jun. 2018, doi:10.1038/s41467-018-04475-3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5988660/

and/or flow direction and concentrations of these constituents at wells."(Section 3.6.2). The draft GSP makes the conclusion that there is no demonstrated correlation between water quality and water elevations, but does not present the data or analysis to support this claim. In particular, the draft GSP omits all water quality data collected after 2012 for arsenic. The water quality trend data presented in Appendix E only provides data through 2012 for selected water quality constituents (TDS, arsenic, nitrate, hexavalent chromium, DBCP, 1,2,3-TCP, etc.) and therefore does not present temporal trend data that would be associated with the lowered groundwater levels during the drought. This is an incomplete analysis of groundwater conditions that could have a significant impact to sustainability and the usability of the groundwater resource by drinking water users. [3,4] **The draft GSP makes a key conclusion relevant to the long term management of water quality in the subbasin based on a conclusion that is unsupported by the analysis presented in the draft GSP.**

- The draft GSP also states that "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. [Emphasis added.*] 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." Table 2-8 indicates that the Merced County Department of Public Health considers nitrate to be an adverse groundwater quality parameter for most regions in the subbasin. Despite its widespread importance and impacts to drinking water the GSP does not set MTs for nitrate, or for any water quality constituent other than TDS. The justification given for this is that "Thresholds are not set for these constituents as the GSAs have no authority to limit the loading of nutrients or agrochemicals." Per 23 CCR § 354.28**, the draft GSP should provide a detailed explanation as to how this approach will result in protection of groundwater for DACs and other drinking water beneficial users in the subbasin.**

Other Monitoring Network Comments

- The GSP proposes a project to install two monitoring well clusters in and near the community of El Nido, a severely disadvantaged community (SDAC) for the purposes of "understanding of stratigraphy and groundwater conditions in the area and improve ongoing monitoring of water elevation and water quality" primarily to "understand water movement and causes of land subsidence in this area." The GSP also purports that this project "also directly benefits a SDAC." However, the GSP makes no mention that these new wells will be come *representative* monitoring wells or that MTs will be established for these wells. **To ensure that these new wells will provide a benefit to the community of El Nido, these should be established as RMWs with established water level and water quality MTs, as quantifiable measurements of sustainability. Setting these as RMWs will better support the GSAs to manage groundwater sustainably in this area and thus protect these beneficial users.**

Well Mitigation Program

Based on our assessment of the water levels, a significant proportion of domestic wells have the potential to be partially or fully dewatered if water levels reach the proposed MT levels. However, the draft GSP

does not include or describe any plans to develop a well impact mitigation program. Such a program could include a combination of replacing impacted wells with new, deeper wells and/or connecting domestic users to a public water system. A plan to reestablish the emergency tanked water program may be an appropriate short-term solution, but would not be a good long-term solution for community members. Key considerations for establishing such a program should include:

- A strong preference for connecting current domestic well users to a public water system, whenever possible. Public water systems have an obligation to test water quality for water served, and although the public water systems in this area typically have limited resources, they do have a greater ability to install treatment systems to address water quality impacts, recoup funds for litigated contamination such as 1,2,3-TCP, and apply for and receive grant funding for beneficial projects. Because of this, public water systems, including small community water systems, provide a more reliable drinking water source than privately-owned domestic wells.
- A secure and reliable funding source and mechanism for implementation of such a mitigation program needs to be identified. While grant or emergency funding could potentially be available for such a program when needed, the availability of these funds is not certain. A more secure funding mechanism could be the establishment of a reserve fund that is paid into on an annual basis and accrues funds that would then available as water levels drop in the future.
- The implementation of a mitigation program should be triggered before wells begin to become unusable, so that funding will be available, and the necessary planning and contracting will be completed such that the necessary construction will be implemented without unnecessarily leaving community members without access to drinking water. Thus, the program should be designed to be proactive, rather than reactive.
- A well mitigation program should not be established only in case of emergency, such as the tanked water program during the last drought. Droughts are said to be becoming more and more frequent and severe, and as such should be included as part of the long-term sustainability planning for the subbasin.

Water Budget

The Water Budget section (2.3) and Climate Change Analysis section (2.4) of the draft GSP were reviewed to identify approaches and assumptions used in the water budget development that may not be protective of domestic water users and small community water systems. Water budgets for the subbasin were developed for historic, current, and projected conditions using the Merced Water Resources Model (MercedWRM). The MercedWRM produces water budgets for the Stream & Canal System, Land Surface System, and Groundwater System. Comments regarding the adequacy of the assessment and projections of conditions relevant to DACs are provided below.

- The draft GSP presents only a brief listing of the data sources used to specify conditions for the model periods used to develop the water budgets. There is very little discussion on how the model input relative to the water budget was developed from the listed sources. It is noted in the text that additional data used for model development is included in Appendix D (MercedWRM Model Documentation), but Appendix D is still under development and was not included in the draft GSP. Therefore, any additional data related to the water budget could not be reviewed at this time.

The draft GSP made available to the public is incomplete, and a full evaluation of the model and assumptions cannot be made at this time.

- According to the draft GSP, urban water demand is based on the 2015 Urban Water Management Plan (UWMP)[6] and municipal pumping records. However, no information is provided on the magnitude of the urban demand, population information, or per capita water use specified in the model. The draft GSP does not identify which municipal water providers provided data and which required estimation of water demand. Nor does it discuss how estimated water use from rural domestic water users or small community water systems was represented in the model or the magnitude of these values. **Therefore, based on the limited data provided in the draft GSP, the public cannot review the drinking water demand estimates for domestic users, community water systems, or large urban water suppliers and make an assessment as to the appropriateness of the demands considered in the historical, current, or future water budgets.**
- There is no specific information included in the draft GSP on how historical land use was determined from available data or how it varies over the historical water budget period. According to the draft GSP, the current water budget uses 2013 CropScape data and the projected water budget uses the 2013 CropScape data, 2015 agricultural water management plan projections, and information from local agencies and farmers. No summary of acreages by land use type is provided so the accuracy of the representation of urban and agricultural areas cannot be assessed by the public. **Without this information the public cannot assess how domestic well users and small community water systems are represented in the land use data.**
- The majority of the draft GSP section discussing the water budget focuses on the results of the water budget. These results are presented as average annual values for the entire subbasin which limit the ability for the public to evaluate and understand the impacts to DACs and small community water systems. Time series graphs of the water budget results are needed to evaluate if the water budget adequately represents the temporal variability and trends in drinking water demand. **By presenting only subbasin-level water budget results and only as average annual values, the presented results are opaque with respect to drinking water use by DACs, as well as demands by other types of beneficial users.**
- The draft GSP does not include any discussion of the uncertainty in the data used for the model and its potential effects on the water budget results. **The GSP should include an uncertainty analysis to identify the plausible range in water budget results and an indication of the magnitude of the effects these inherent uncertainties may have on the water budget results.[7]**
- The estimate of sustainable yield for the subbasin was determined using the Projected Conditions Baseline scenario. According to the draft GSP, in this scenario, agricultural and urban demand is reduced across the model domain to achieve a net storage change of zero. Agricultural demand was reduced by reducing agricultural land use. Urban demand was reduced by reducing the per capita water use. However, the draft GSP does not present information on how per capita water

[6] The water budget section of the GSP refers to a singular UWMP – but does not specify if the UWMP used was for the City of Merced, City of Livingston, or both.

[7] DWR, 2016. *Best Management Practices for the Sustainable Management of Groundwater, Modeling (BMP #5),* December 2016.

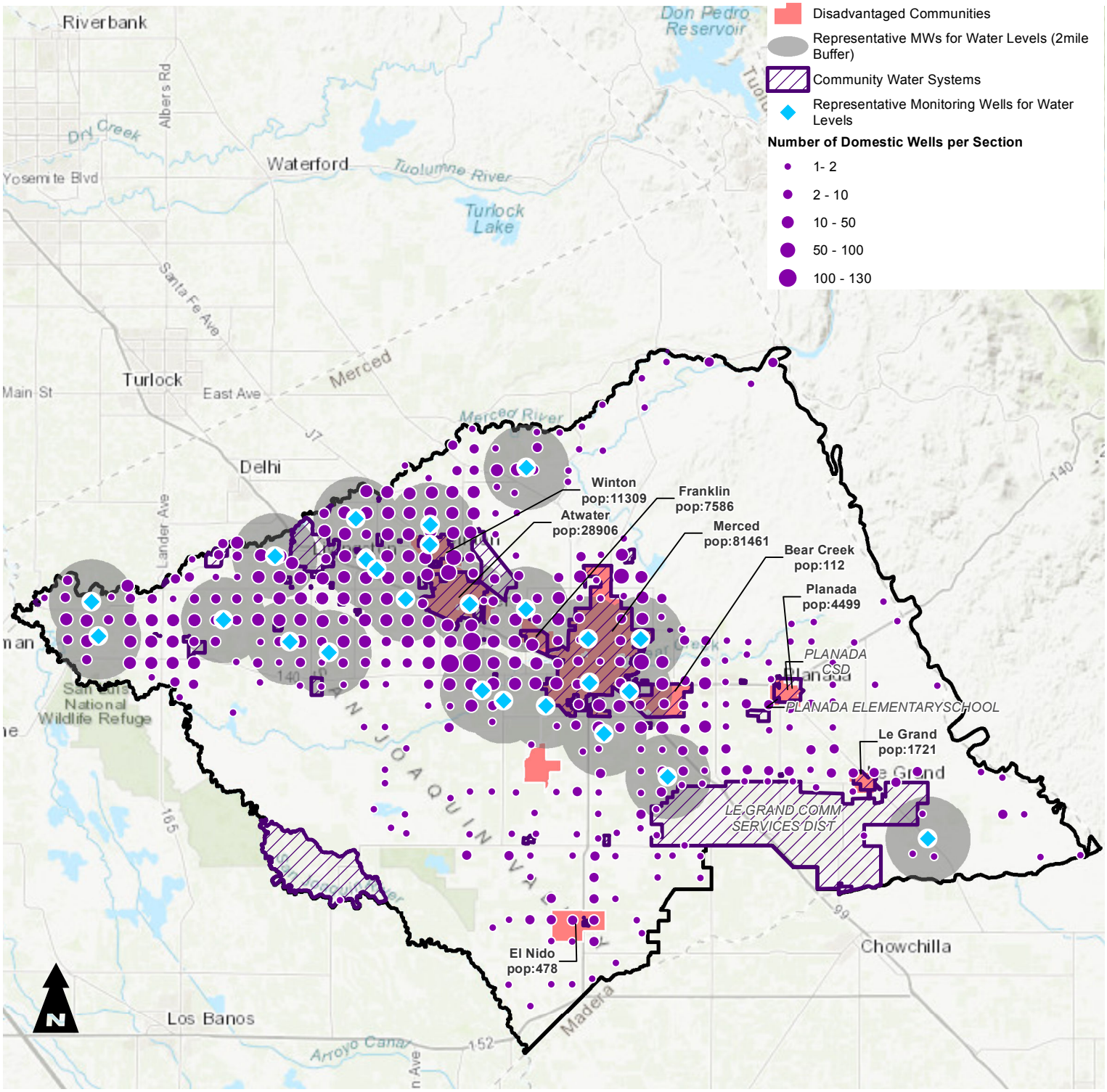
use reductions were determined or if they were applied equally to all drinking water users (municipal users, rural domestic users, small community waters systems, etc.). The document also does not include a discussion of how these reductions would affect domestic water users or small community water systems. **Therefore, based on this, it is not clear how demands by drinking water users were considered in the sustainable yield calculation.**

Attachments

Figure 1 - Representative Monitoring Network for GW Levels Relative to Domestic Wells, DACs, and Community Water Systems
Figure 2 - Water Level MTs and Domestic Wells
Figure 3 - Representative Monitoring Network for Water Quality Relative to Domestic Wells, DACs, and Community Water Systems

Figure 1 - Representative Monitoring Network for GW Levels Relative to Domestic Wells, DACs, and Community Water Systems

Merced Subbasin



Notes

1. All locations are approximate.

References

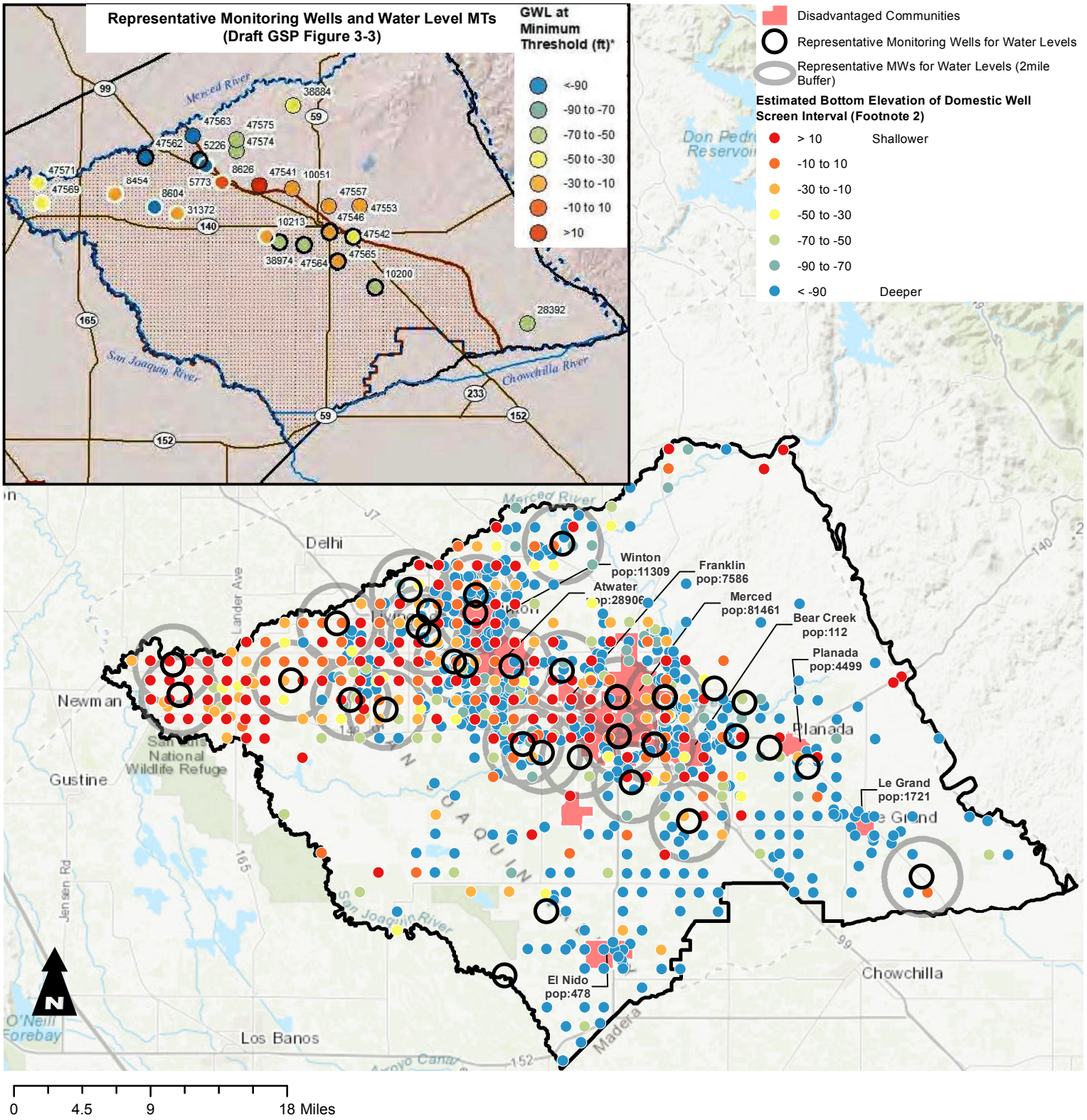
1. Domestic Well Densities: CWC draft Vulnerability Tool as of August 6, 2019.
2. Disadvantaged community data: downloaded on August 6, 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Community Water System data: downloaded on August 6, 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
3. Groundwater level monitoring well information are from Draft Merced Subbasin GSP dated July 2019.

Self-Help ENTERPRISES

LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY

Figure 2 - Water Level MTs and Domestic Wells

Merced Subbasin



Notes

1. All locations are approximate.
2. In order to estimate the domestic well elevations, the depth of domestic wells is subtracted from the ground surface elevation. For purposes of this assessment, the ground surface elevation is assumed to be 100 ft above sea level for the entire Merced Subbasin area. Where available, bottom of screen interval was used for this assessment, and bottom of well depth was used for the remaining wells.

References

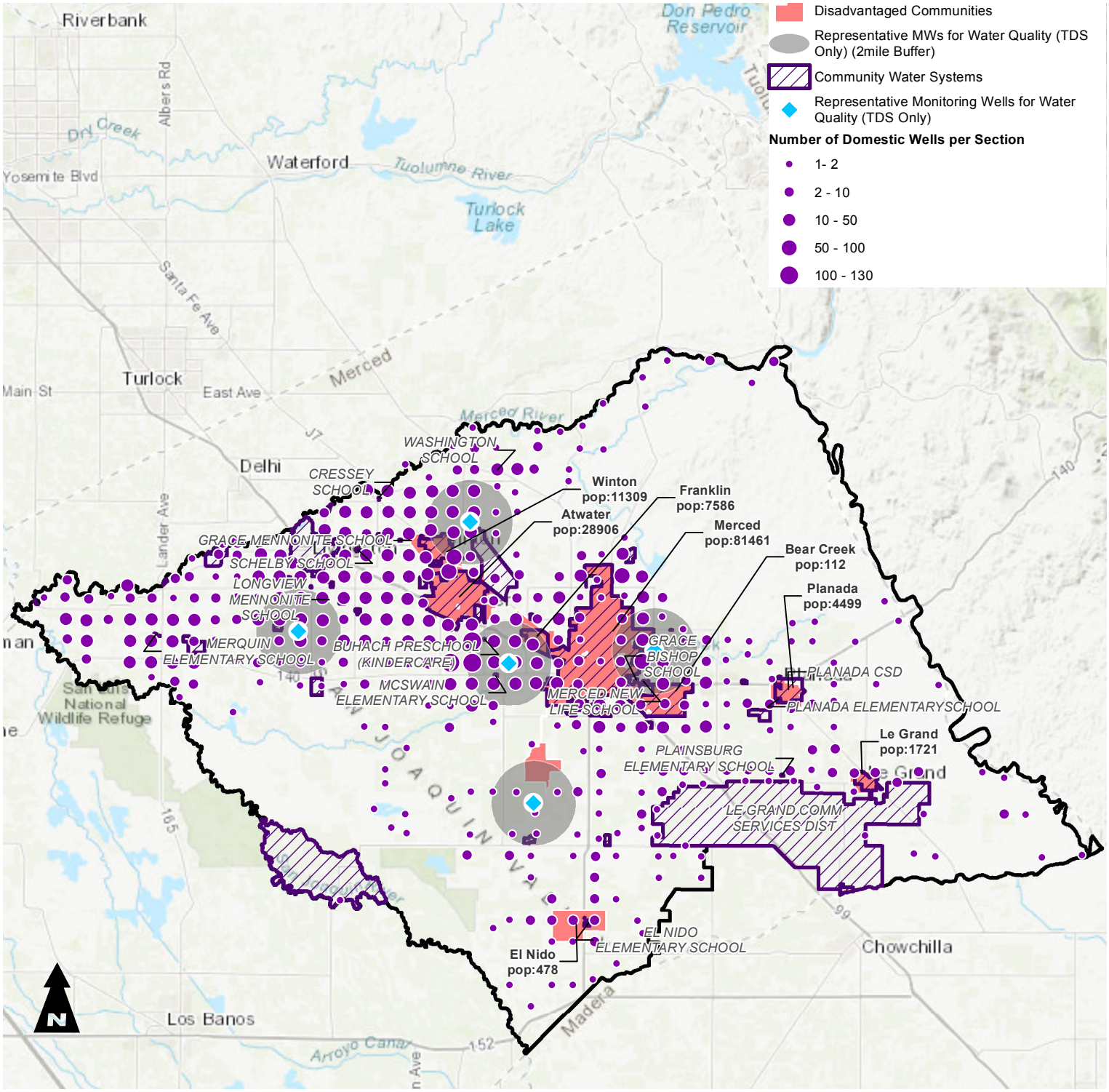
1. Domestic Well data: CWC draft Vulnerability Tool as of May 16, 2019.
2. Disadvantaged community data: downloaded on August 6, 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/. Last updated in 2016.
3. Groundwater monitoring well information are from Draft Merced Subbasin GSP, dated July 2019.

Self-Help ENTERPRISES

LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY

Figure 3 - Representative Monitoring Network for Water Quality Relative to Domestic Wells, DACs, and Community Water Systems

Merced Subbasin



Notes

1. All locations are approximate.

References

1. Domestic Well Densities: CWC draft Vulnerability Tool as of August 6, 2019.
2. Disadvantaged community data: downloaded on August 6, 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Community Water System data: downloaded on August 6, 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
3. Groundwater level monitoring well information are from Draft Merced Subbasin GSP dated July 2019.

Self-Help ENTERPRISES

LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY

NICKEL FAMILY LLC

August 19, 2019

Mr. Hicham Eltal
Merced CSP Contact
Merced Irrigation District
744 W 20th Street
Merced, CA 95340

RE: Groundwater Sustainability Plan

Dear Sirs:

As a landowner located just west of your Merced Sub Basin GSA, along the San Joaquin River, we strongly object to your Sustainable Management criteria for land subsidence of a minimum threshold of minus 0.75 feet per year. It is ludicrous to state, as your GSP does, that ".....while land subsidence has been recognized by the GSA's as an area of concern, it is not considered to have caused a significant and unreasonable reduction in the viability of the use of infrastructure." The subsidence we have experienced in our area over the past 10 years has accelerated at an ever-increasing rate over what we experienced in the prior 100 years. The capacity of the Eastside Bypass as well as the capacity of the San Joaquin River has been reduced by over 40%, which will result in flooding of our properties in high runoff years. The capacity of our irrigation canals has been greatly reduced as well. There can be no question that the infrastructure has been adversely affected.

The solution your GSP proposes: "ongoing monitoring and management in the Merced Sub Basin", is not a solution. The only solution is to immediately reduce pumping below the Corcoran Clay to a sustainable level, which we estimate to be no more than 0.15 acre feet per acre.

Sincerely,

James L. Nickel
President

15701 Highway 178 • P.O. Box 60679 • Bakersfield, CA 93386-0679
Phone: 661-872-5050 • Fax: 661-872-7141

Olam
Edible Nuts

205 E. Riverpark Circle Suite 310
Fresno, CA 93720

August 19, 2019

Merced Irrigation District
Attention: Mr. Hicham Eltal
GSP Contact
744 W. 20th St.
Merced, CA 95340
mercedsgma@woodardcurran.com

Dear Mr. Eltal,

Thank you for the opportunity to provide comments on the Draft Merced Subbasin Groundwater Sustainability Plan (GSP) dated July 19, 2019. Our Nevada Ranch is 1,000-acres and is located at the northeast corner of Santa Fe Ave. and White Rock Road and is considered "White Area". We want to thank you for the opportunity to provide these comments and show our appreciation for the hard work the various Board members, staff, consultants, and the general public have put into this State mandated document.

We understand that the Merced Subbasin is in overdraft by approximately 150,000 AF/Y and that agricultural must step up to the plate to close the gap. We are encouraged that several of the projects listed in the GSP would provide infrastructure so that surface water supplies to the White Areas of the Subbasin could be augmented. We are a willing partner for these sorts of projects so please contact me during the scoping of any of the projects near our ranch if you have any financing, engineering, and/or right-of-way acquisition needs.

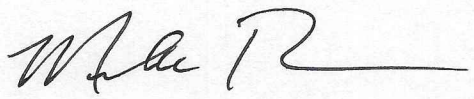
In addition to the list of projects, the GSP describes several demand management options that are being considered by the Groundwater Sustainability Agencies, including groundwater allocations, water credit market, fallowing, and/or groundwater extraction fees. Olam believes a tiered groundwater extraction fee program where the first volume of water is cheaper than the last is the least bureaucratic and quickest way to begin to incentivize farmers to pump less groundwater. A groundwater fee program also avoids the contentious matters involved with allocating groundwater, such as irrigated vs. non-irrigated, deep percolation from developed water, water market framework, etc. The money generated from the program could be used to fund projects and/or retire marginal farm ground.

I also want to emphasize that all demand management programs need to recognize the need to slowly transition from overdraft to sustainability during the 20-year implementation period. Any sort of hard and fast pumping restrictions would unnecessarily devastate the local economy by not allowing farmers to thoughtfully adjust their practices.

Olam
Edible Nuts

Thank you again for your hard work and please don't hesitate to contact me if you have any questions or comments. Your consideration is greatly appreciated.

Best Regards,



Mike Richardson
General Manager Farm Operations
Olam Farming Inc.

(559) 633-0946

Sandy Mush Mutual Water Co.
P.O. Box 1232 · Merced, CA 95341
209.723.3001

August 19, 2019

Merced Irrigation District
Attention: Mr. Hicham Eltal
GSP Contact
744 W. 20th St.
Merced, CA 95340
mercedsgma@woodardcurran.com

Dear Mr. Eltal,

Thank you for the opportunity to provide comments on the Draft Merced Subbasin Groundwater Sustainability Plan (GSP) dated July 19, 2019. As a Representative Agency within the Merced Subbasin Groundwater Sustainability Agency (MSGSA), as well as active participants in the Stakeholder Advisory and Coordinating Committees, we appreciate the hard work the various Board members, staff, consultants, and the general public have put into this document.

Our comments are limited at this time and we anticipate a more detailed review of the GSP during the upcoming Public Comment period provided by Department of Water Resources (DWR). We would appreciate the opportunity to meet with you and the GSP consultant team to discuss the GSP.

The GSP states that the Merced Subbasin is in overdraft by approximately 150,000 AFY. In order to preserve our regions' economy, the agricultural community must fully utilize all available surface water for both direct irrigation and groundwater recharge. Merced Irrigation District (MID) has out-of-district surface water available in most years and there needs to be an incentive for both MID and Merced Subbasin out-of-district growers to purchase this water. Sandy Mush Mutual Water Company (SMMWC) is committed to entering into a long-term transfer agreement to purchase this water, even in the shoulder season, and will build the necessary infrastructure to convey it.

We have been participating in the Stakeholder Committee for many months and had become comfortable with the project list in previous iterations of Chapter 6. We were surprised that the El Nido Improvement Canal project was removed. The El Nido Canal is the main artery to bring MID water to the El Nido area, where subsidence is a very real concern. Although MID owns and operates the El Nido Canal, they did not cause the subsidence, and should not necessarily have to pay for the needed improvements. The El Nido Canal Improvement Project should be re-instated into the GSP and the Merced Subbasin GSA should cost-share with MID on improvements to increase the peak capacity downstream of Mariposa Creek.

Sandy Mush Mutual Water Co.
P.O. Box 1232 · Merced, CA 95341
209.723.3001

There are many Demand Management programs described in the GSP, including groundwater allocations, water market, metering, and fallowing programs. These types of programs will have long lasting impacts on our members, as well as our community. We encourage the GSAs to conduct a thorough hydrogeological AND economic evaluation of all demand management programs considered. It is imperative that SMMWC and the public be informed of all future discussions regarding demand management in the Merced Subbasin.

SMMWC has begun establishing an internal demand management program and would like to have the opportunity to opt-out of any demand management program established by the GSAs.

Thank you for the opportunity to participate in the GSP process and provide these comments. As stated above, we would appreciate the opportunity to meet at your earliest convenience.

Sincerely,

Simon Vander Woude
President

A Nonprofit Housing and Community Development Organization

August 19, 2019

Merced Groundwater Sustainability Agencies
Merced Irrigation District
744 W. 20th Street
Merced, CA 95340

Re: Comments/Recommendations on the July 2019 Merced Subbasin Draft Groundwater Sustainability Plan (GSP)

Sent via email: mercedsgma@woodardcurran.com

In response to the July 2019 Merced Subbasin Draft Groundwater Sustainability Plan (GSP) released for a 30-day public comment period on July 19, 2019, Self-Help Enterprises (SHE) would like to offer several comments and recommendations.

Detailed comments on various sections of the GSP are included in a more detailed comment letter/attachment titled SHE Comments – July 2019 Merced Subbasin GSP. Moreover, SHE partnered with Leadership Counsel for Justice and Accountability (LCJA) to conduct a focused technical review of certain sections of the GSP. Findings of this review are included as Appendix 1. Appendix 1 includes three Figures: Figure 1 - Representative Monitoring Network for GW Levels Relative to Domestic Wells, DACs, and Community Water Systems, Figure 2 - Water Level MTs and Domestic Wells and Figure 3 - Representative Monitoring Network for Water Quality Relative to Domestic Wells, DACs, and Community Water Systems. Please note that some of these findings have been incorporated and/or referenced in our detailed comment letter. Lastly, our comments and recommendations also reflect comments, concerns and suggestions provided by groundwater users that attended our August 2019 community GSP review workshops in Planada and El Nido.

Comments and recommendations are provided in an effort to protect the drinking water sources of the vulnerable and often underrepresented groundwater users that SHE works with and in order to assist the Merced Subbasin Groundwater Sustainability Agencies (GSAs) in better achieving the objectives ascribed by the GSP regulations and increase the chances of GSP approval by the Department of Water Resources (DWR).

Given that our comments are long and detailed, we have summarized a few key comments and recommendations below:

Short 30-Day Public Comment Period and lack of Community Outreach and Public Workshops

We would like to express concern with the short public comment period of just 30 days for such a technical, lengthy, yet important plan and lack of public workshops to present the draft GSP. While a 30-day comment period is allowed under the Sustainable Groundwater Management Act (SGMA), it is important to recognize that this short public comment period and lack of community outreach/public workshops is not conducive for effective public engagement and does not meet the specific engagement needs of vulnerable and often underrepresented groundwater stakeholders, e.g. Severely, Disadvantaged and Communities (S/DACs), low income water system users and households relying on shallow domestic wells. Most other GSAs within the San Joaquin Valley are providing or are planning to provide longer comment review periods (a minimum 45 days and most of them 90 days). Please make sure to properly consider the needs of underrepresented stakeholders as you move into GSP adoption and implementation.

Upon release of the draft GSP, SHE staff cumulatively held two (2) community GSP review workshops in Planada (residents from Le Grand were invited) and El Nido. At these workshops, participants were provided information about SGMA, their local GSA and presented general information about the draft GSP. The workshops also included small and large group discussions. During these group discussions, participants were asked to identify when, how often and how they would like to be notified and engaged during GSP implementation. Recommendations offered by these participants include but are not limited to: utilizing existing community venues, e.g. community board meetings, workshops and events to provide information, identifying community social media (Facebook,

NeighborWorks® HomeOwnership Center Chartered Member
8445 W. Elowin Court • P.O. Box 6520 • Visalia, CA 93290
Phone (559) 651-1000 • Fax (559) 651-3634 • info@selfhelpenterprises.org • www.selfhelpenterprises.org

Instagram, etc.) groups, pages and websites and post information, conducting site visits, door-to-door outreach. Recommendations also included identifying and working with key community leaders and trusted messengers to distribute information /encourage community participation. In addition, the importance of providing bilingual (English and Spanish) information and materials on the website, via email and inserting short notices (notices must include key messages, visuals and information that is relevant to the average water user in water bills was noted. Attendees also expressed interest in obtaining information during key GSP milestones and prior to the approval of important decisions, e.g. during public comment periods, plan updates and during the development and approval of the Merced Groundwater Allocation Framework and Merced Groundwater Reduction Plan.

Water Budget

We believe the draft GSP made available to the public is incomplete, and a full evaluation of the model and assumptions cannot be made at this time. Without a complete GSP draft that thoroughly explains the assumptions and methods used for the development of the Water Budget, the public is unable to provide meaningful comments and recommendations. The majority of the draft GSP section discussing the water budget focuses on the results of the water budget. These results are presented as average annual values for the entire subbasin, which limits the public's ability to evaluate and understand the impacts to DACs and small community water systems in a particular GSA. Time series graphs of the water budget results are needed to evaluate if the water budget adequately represents the temporal variability and trends in drinking water demand. By presenting only subbasin-level water budget results and only as average annual values, the presented results are hard to interpret with respect to drinking water use by DACs, as well as demands by other types of beneficial users. The draft GSP does not include any discussion of the uncertainty in the data used for the model and its potential effects on the water budget results. The GSP should include an uncertainty analysis to identify the plausible range in water budget results and an indication of the magnitude of the effects these inherent uncertainties may have on the water budget results.

Sustainable Management Criteria

Sustainability Goal

We are concerned that degradation of groundwater quality has not been incorporated into the Merced Subbasin Sustainability Goal. This is particularly concerning given that the protection of water quality for drinking and for agricultural uses has been identified as a priority for users in the basin as mentioned in subsection 3.6, and documented in several meeting minutes of the Merced GSP Stakeholder Advisory Committee. During the previously mentioned community GSP review workshops, participants were asked to share their vision for sustainability and provide recommendations for what should be included in the subbasin's sustainability goal. Feedback provided at these workshops included preserving drinking water supplies, promoting water conservation and identifying equitable solutions for all groundwater users. Based on participant's feedback, we recommend consideration of revising the current sustainability goal in order to fully integrate stakeholders' vision for groundwater management.

Minimum Thresholds (MTs) for groundwater levels

The current approach to setting water level Minimum Thresholds (MTs) leaves key beneficial users in the subbasin, specifically domestic well users and in particular members of DACs potentially vulnerable to impacts. Based on the findings of the focused technical review conducted by SHE and LCJA of the water level sustainable management criteria and representative monitoring wells, nearly one-third of all domestic wells in the subbasin and important disadvantaged communities such as Planada, Le Grand, and El Nido, were not considered in the establishment of minimum thresholds. As a result, a significant proportion of drinking water wells have the potential to be partially or fully dewatered if water levels reach the proposed minimum thresholds levels.

For these reasons, the proposed approach for setting sustainable management criteria for groundwater levels appears to be inadequate, and does not sufficiently consider the groundwater issues that may affect the supply and beneficial uses of groundwater as required by GSP Regulations Section 354.16. To avoid the risk of having DWR deem the Plan incomplete or inadequate, we are recommending the following:

- Reconsider the proposed approach to setting water level MTs that leave key beneficial users in the subbasin, specifically domestic well users and in particular members of disadvantaged communities (DACs), potentially vulnerable to impacts.
- Expand the current representative monitoring well (RMW) network to include additional RMWs, particularity near vulnerable communities and groundwater stakeholders. Incorporate the new wells planned for El Nido and Planada as RMWs with established water level and water quality minimum thresholds, as quantifiable measurements of sustainability, as soon as they are constructed.

- Conduct an assessment of how many and which domestic wells are expected to go dry if the MTs are reached and the number of wells that could go dry outside of the 2-mile radius of the proposed RMW. The analysis should also provide an estimate of how many well could go dry with the undesirable result definition proposal of when greater than 25% of the RMWs are below their respective MT for two consecutive years. Per 23 CCR § 354.28, these assessments should be included in the GSP in order for the public and DWR to able to fully evaluate the ability of the proposed sustainable management criteria and monitoring program to protect beneficial users within the subbasin.

Minimum Thresholds (MTs) for groundwater quality

The current proposal of only defining sustainable management criteria for salinity is not protective of the human right to safe and affordable water, does not properly reflects input provided by stakeholders, and is dissonant with the groundwater quality conditions presented in the GSP Basin Setting Chapter.

The draft GSP includes limited analysis of water quality constituents and defines Undesirable Results (URs) for water quality as a "reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP." The water quality monitoring network and analysis presented in the draft GSP appears to be inadequate, and the sustainable management criteria do not appear to be sufficient to ensure that the stated water quality UR of impacting the long-term viability of the groundwater resource, particularly for domestic water users including DACs, will be avoided. We strongly believe that the proposed approach will not be allowed under SGMA and could lead DWR to deem the Plan incomplete or inadequate. To avoid this risk, Merced GSAs should reconsider their approach to set sustainable management criteria for groundwater quality. All drinking water contaminants of concern as identified in the GSP Basin Setting section should be consider (e.g. nitrate, hexavalent chromium, arsenic, uranium, perchlorate, petroleum hydrocarbons, pesticides, solvents, and emerging contaminants).

Projects and Management Actions - Well Impact Mitigation Program

The draft GSP does not include a well impact mitigation program but rather only mentions that GSAs will evaluate during the first five years if a mitigation for shallow domestic wells that might be dewatered by declining water levels during the GSP implementation is needed. We suggest that the Merced GSAs not delay such an evaluation given that a significant proportion of domestic wells have the potential to be partially or fully dewatered if water levels reach the proposed minimum thresholds levels. That is particularly important considering the significant gaps in the groundwater levels sustainable management criteria and the proposal of postponing to after 2025 the implementation of any actions regarding groundwater allocation and pumping reduction. It is also suggested that a mitigation program be considered that could include a combination of replacing impacted wells with new, deeper wells and/or connecting domestic users to a public water system. A plan to reestablish the emergency tanked water program may also be an appropriate short-term solution, but would not be a good long-term solution for community members. Such a program is important especially if the region faces another drought.

Lastly, it is important to acknowledge that DWR, as one of the relevant state agencies identified in AB 685 - Human Right to Water of 2012, will be considering this policy when reviewing and approving GSPs. Consequently, GSPs that do not support access to sufficient and affordable quantities of quality drinking water may require costly and time-consuming revisions prior to approval from DWR.

Thank you for the opportunity to review and provide comments on the draft GSP. We look forward to working with all three GSAs in the Merced Subbasin to ensure that the GSP is protective of the drinking water sources of vulnerable and often underrepresented groundwater stakeholders. Feel free to contact our Community Development Manager for Community Engagement and Planning Maria Herrera or myself regarding any questions or comments you may have.

Sincerely,

Thomas J. Collishaw
President/CEO

Enclosure

SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GROUNDWATER SUSTAINABILITY AGENCY

Post Office Box 2115
Los Banos, CA 93635
(209) 827-8616

August 16, 2019

Mr. Hicham Eltal
Merced Subbasin GSP
Merced Irrigation District
744 W 20th Street
Merced, CA 95340

RE: ***Comments on the Draft Merced Subbasin Groundwater Sustainability Plan***

Dear Mr. Eltal:

The San Joaquin River Exchange Contractors Groundwater Sustainability Agency (SJREC GSA) participated in a joint workshop between the Delta-Mendota Subbasin and the Merced Subbasin. The purpose of the meeting was to review groundwater conditions along the adjoining basin boundary and evaluate the draft proposed Sustainable Management Criteria and the potential impacts to the adjacent subbasin.

During this workshop, the Merced Subbasin presented an executive summary of the proposed SMC. The proposed SMC has the potential to directly impact the ability of the Delta-Mendota Subbasin to achieve its sustainability goal. We raised concerns in this meeting about the potential impacts to the SJREC GSA and the Delta-Mendota Subbasin. This letter serves as a formal response to the issues raised during the workshop. The following is a summary of the areas of concern.

1. The proposed SMC for land subsidence is unacceptable to the SJREC GSA. The land subsidence Minimum Threshold (MT) is defined as -0.75 ft/year. An Undesirable Result (UR) is defined as exceeding a MT at 3 or more representative sites for 2 consecutive years. The representative sites were presented during the workshop and located proximal to the Delta-Mendota Subbasin in a known area of significant inelastic land subsidence. Land subsidence in this area has proven to reduce the ability to convey flood flows through the area and also reducing the capacity of irrigation delivery facilities.

2. An UR for groundwater levels is defined as "greater than 25% of representative wells fall below MT in 2 consecutive wet, above normal, or below normal years." Chronic lowering of groundwater levels is most likely to occur during dry periods. Additional information would be helpful on why the Merced Subbasin has decided to ignore groundwater level during dry and critically dry water year types.

3. The Merced Subbasin has determined that a change in groundwater storage is "not present and not expected to occur in the subbasin due to the significant volumes of freshwater in storage". We anticipate that managing groundwater levels and groundwater storage in the upper aquifer (above the Corcoran clay) would follow similar procedures where a significant and unreasonable change in groundwater storage would not occur so long as water levels are managed appropriately. Additional information on how water levels will remain at/above historic levels is requested particularly in regard to our comment #2 above. Additionally, any land subsidence in the area will directly reduce the groundwater storage in the lower aquifer (below the Corcoran Clay) and should be monitored and managed accordingly. If there is predicted loss of storage due to subsidence, additional information is necessary to define whether or not that loss is significant and unreasonable. The SJREC GSA does not agree that depletion of groundwater storage will not occur solely because there is "significant volumes of freshwater in storage".

4. During the workshop the SJREC GSA provided the Merced Subbasin with lateral groundwater flows for both the upper and lower aquifers. We request the lateral groundwater flow information used in the historical/current/projected water budgets.

This letter serves as a continuation of the regional coordination the SJREC GSA has pursued with neighboring subbasins and GSP's adjacent to the Delta-Mendota Subbasin. Please feel free to contact us with any questions or concerns you have so we can collectively and collaboratively manage our groundwater sustainability in the future.

Yours truly,

Chris White,
Executive Director

The Nature Conservancy
Protecting nature. Preserving life.

CALIFORNIA WATER | **GROUNDWATER**

555 Capitol Mall, Suite 1290
Sacramento, California 95814
[916] 449-2850

nature.org
GroundwaterResourceHub.org

August 19, 2019

Woodard Curran
101 Montgomery Street | Suite 1850
San Francisco, California 94104

Submitted via Email at mercedsgma@woodardcurran.com

Re: Merced Groundwater Subbasin Groundwater Sustainability Plan

Dear Basin Representatives,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the Merced Subbasin Groundwater Sustainability Plan being prepared under the Sustainable Groundwater Management Act (SGMA).

TNC as a Stakeholder Representative for the Environment

TNC is a global, nonprofit organization dedicated to conserving the lands and waters on which all life depends. We seek to achieve our mission through science-based planning and implementation of conservation strategies. For decades, we have dedicated resources to establishing diverse partnerships and developing foundational science products for achieving positive outcomes for people and nature in California. TNC was part of a stakeholder group formed by the Water Foundation in early 2014 to develop recommendations for groundwater reform and actively worked to shape and pass SGMA.

Our reason for engaging is simple: California's freshwater biodiversity is highly imperiled. We have lost more than 90 percent of our native wetland and river habitats, leading to precipitous declines in native plants and the populations of animals that call these places home. These natural resources are intricately connected to California's economy providing direct benefits through industries such as fisheries, timber and hunting, as well as indirect benefits such as clean water supplies. SGMA must be successful for us to achieve a sustainable future, in which people and nature can thrive within Merced Subbasin region and California.

We believe that the success of SGMA depends on bringing the best available science to the table, engaging all stakeholders in robust dialog, providing strong incentives for beneficial outcomes and rigorous enforcement by the State of California.

Given our mission, we are particularly concerned about the inclusion of nature, as required, in GSPs. 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.

Addressing Nature's Water Needs in GSPs

SGMA requires that all beneficial uses and users, including environmental users of groundwater, be considered in the development and implementation of GSPs (Water Code § 10723.2).

The GSP Regulations include specific requirements to identify and consider groundwater dependent ecosystems [23 CCR §354.16(g)] when determining whether groundwater conditions are having potential effects on beneficial uses and users. GSAs must also assess whether sustainable management criteria may cause adverse impacts to beneficial uses, which include environmental uses, such as plants and animals. The Nature Conservancy has identified each part of the GSP where consideration of beneficial uses and users are required. That list is available here: https://groundwaterresourcehub.org/importance-of-gdes/provisions-related-to-groundwater-dependent-ecosystems-in-the-groundwater-s.
Please ensure that environmental beneficial users are addressed accordingly throughout the GSP. 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 decision, and using data collected through monitoring to revise decisions in the future. Over time, GSPs should improve as data gaps are reduced and uncertainties addressed.

To help ensure that GSPs adequately address nature as required under SGMA, The Nature Conservancy has prepared a checklist (**Attachment A**) for GSAs and their consultants to use. The Nature Conservancy believes the following elements are foundational for 2020 GSP submittals. For detailed guidance on how to address the checklist items, please also see our publication, *GDEs under SGMA: Guidance for Preparing GSPs*[1].

1. Environmental Representation

SGMA requires that groundwater sustainability agencies (GSAs) consider the interests of all beneficial uses and users of groundwater. To meet this requirement, we recommend actively engaging environmental stakeholders by including environmental representation on the GSA board, technical advisory group, and/or working groups. This could include local staff from state and federal resource agencies, nonprofit organizations and other environmental interests. By engaging these stakeholders, GSAs will benefit from access to additional data and resources, as well as a more robust and inclusive GSP.

2. Basin GDE and ISW Maps

SGMA requires that groundwater dependent ecosystems (GDEs) and interconnected surface waters (ISWs) be identified in the GSP. We recommend using the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) provided online[2] by the Department of Water Resources (DWR) as a starting point for the GDE map. The NC Dataset was developed through a collaboration between DWR, the Department of Fish and Wildlife and TNC.

3. Potential Effects on Environmental Beneficial Users

SGMA requires that potential effects on GDEs and environmental surface water users be described when defining undesirable results. In addition to identifying GDEs in the basin, The

[1]GDEs under SGMA: Guidance for Preparing GSPs is available at: https://groundwaterresourcehub.org/public/uploads/pdfs/GWR_Hub_GDE_Guidance_Doc_2-1-18.pdf

[2] The Department of Water Resources' Natural Communities Commonly Associated with Groundwater dataset is available at: *https://gis.water.ca.gov/app/NCDatasetViewer/*

Nature Conservancy recommends identifying beneficial users of surface water, which include environmental users. This is a critical step, as it is impossible to define "significant and unreasonable adverse impacts" without knowing *what* is being impacted. For your convenience, we've provided a list of freshwater species within the boundary of the Merced Subbasin in **Attachment C**. Our hope is that this information will help your GSA better evaluate the impacts of groundwater management on environmental beneficial users of surface water. We recommend that after identifying which freshwater species exist in your basin, especially federal and state listed species, that you contact staff at the Department of Fish and Wildlife (DFW), United States Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Services (NMFS) to obtain their input on the groundwater and surface water needs of the organisms on the GSA's freshwater species list. Because effects to plants and animals are difficult and sometimes impossible to reverse, we recommend erring on the side of caution to preserve sufficient groundwater conditions to sustain GDEs and ISWs.

4. Biological and Hydrological Monitoring
If sufficient hydrological and biological data in and around GDEs is not available in time for the 2020/2022 plan, data gaps should be identified along with actions to reconcile the gaps in the monitoring network.

The Nature Conservancy has thoroughly reviewed the Merced Subbasin Draft GSP, and considers it to be **incomplete** under SGMA since beneficial uses and users are not adequately identified and considered.

Our specific comments related to the Merced Subbasin Draft GSP are provided in detail in **Attachment B** and are in reference to the numbered items in **Attachment A. Attachment C** provides a list of the freshwater species located in the Merced Subbasin. **Attachment D** describes six best practices that GSAs and their consultants can apply when using local groundwater data to confirm a connection to groundwater for DWR's Natural Communities Commonly Associated with Groundwater Dataset[2]. **Attachment E** provides an overview of a new, free online tool that allows GSAs to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data.

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

Best Regards,

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

Attachment A

Environmental User Checklist

The Nature Conservancy is neither dispensing legal advice nor warranting any outcome that could result from the use of this checklist. Following this checklist does not guarantee approval of a GSP or compliance with SGMA, both of which will be determined by DWR and the State Water Resources Control Board.

GSP Plan Element*		GDE Inclusion in GSPs: Identification and Consideration Elements	Check Box
Admin Info	**2.1.5 Notice & Communication** *23 CCR §354.10*	**Description of the types of environmental beneficial uses of groundwater that exist within GDEs and a description of how environmental stakeholders were engaged throughout the development of the GSP.**	1
Planning Framework	**2.1.2 to 2.1.4 Description of Plan Area** *23 CCR §354.8*	**Description of jurisdictional boundaries, existing land use designations, water use management and monitoring programs; general plans and other land use plans relevant to GDEs and their relationship to the GSP.**	2
		Description of instream flow requirements, threatened and endangered species habitat, critical habitat, and protected areas.	3
		Summary of process for permitting new or replacement wells for the basin, and how the process incorporates any protection of GDEs	4
Basin Setting	**2.2.1 Hydrogeologic Conceptual Model** *23 CCR §354.14*	**Basin Bottom Boundary:** Is the bottom of the basin defined as at least as deep as the deepest groundwater extractions?	5
		Principal aquifers and aquitards: Are shallow aquifers adequately described, so that interconnections with surface water and vertical groundwater gradients with other aquifers can be characterized?	6
		Basin cross sections: Do cross-sections illustrate the relationships between GDEs, surface waters and principal aquifers?	7
	2.2.2 Current & Historical Groundwater Conditions *23 CCR §354.16*	**Interconnected surface waters:**	8
		Interconnected surface water maps for the basin with gaining and losing reaches defined (included as a figure in GSP & submitted as a shapefile on SGMA portal).	9
		Estimates of current and historical surface water depletions for interconnected surface waters quantified and described by reach, season, and water year type.	10
		Basin GDE map included (as figure in text & submitted as a shapefile on SGMA Portal).	11

		If NC Dataset *was* used:	Basin GDE map denotes which polygons were kept, removed, and added from NC Dataset (Worksheet 1, can be attached in GSP section 6.0).	12
			The basin's GDE shapefile, which is submitted via the SGMA Portal, includes two new fields in its attribute table denoting: 1) which polygons were kept/removed/added, and 2) the change reason (e.g., why polygons were removed).	13
			GDEs polygons are consolidated into larger units and named for easier identification throughout GSP.	14
		If NC Dataset *was not* used:	Description of why NC dataset was not used, and how an alternative dataset and/or mapping approach used is best available information.	15
		Description of GDEs included:		16
		Historical and current groundwater conditions and variability are described in each GDE unit.		17
		Historical and current ecological conditions and variability are described in each GDE unit.		18
		Each GDE unit has been characterized as having high, moderate, or low ecological value.		19
		Inventory of species, habitats, and protected lands for each GDE unit with ecological importance (Worksheet 2, can be attached in GSP section 6.0).		20
	2.2.3 Water Budget *23 CCR §354.18*	Groundwater inputs and outputs (e.g., evapotranspiration) of native vegetation and managed wetlands are included in the basin's historical and current water budget.		21
		Potential impacts to groundwater conditions due to land use changes, climate change, and population growth to GDEs and aquatic ecosystems are considered in the projected water budget.		22
Sustainable Management Criteria	**3.1 Sustainability Goal** *23 CCR §354.24*	**Environmental stakeholders/representatives were consulted.**		23
		Sustainability goal mentions GDEs or species and habitats that are of particular concern or interest.		24
		Sustainability goal mentions whether the intention is to address pre-SGMA impacts, maintain or improve conditions within GDEs or species and habitats that are of particular concern or interest.		25
	3.2 Measurable Objectives *23 CCR §354.30*	**Description of how GDEs were considered and whether the measurable objectives and interim milestones will help achieve the sustainability goal as it pertains to the environment.**		26
	3.3 Minimum Thresholds *23 CCR §354.28*	**Description of how GDEs and environmental uses of surface water were considered when setting minimum thresholds for relevant sustainability indicators:**		27
		Will adverse impacts to GDEs and/or aquatic ecosystems dependent on interconnected surface waters (beneficial user of surface water) be avoided with the selected minimum thresholds?		28
		Are there any differences between the selected minimum threshold and state, federal, or local standards relevant to the species or habitats residing in GDEs or aquatic ecosystems dependent on interconnected surface waters?		29
	3.4 Undesirable Results *23 CCR §354.26*	**For GDEs, hydrological data are compiled and synthesized for each GDE unit:**		30
		If hydrological data *are available* within/nearby the GDE	Hydrological datasets are plotted and provided for each GDE unit (Worksheet 3, can be attached in GSP Section 6.0).	31
			Baseline period in the hydrologic data is defined.	32

			GDE unit is classified as having high, moderate, or low susceptibility to changes in groundwater.	33
			Cause-and-effect relationships between groundwater changes and GDEs are explored.	34
		If hydrological data *are not available* within/nearby the GDE	Data gaps/insufficiencies are described.	35
			Plans to reconcile data gaps in the monitoring network are stated.	36
		For GDEs, biological data are compiled and synthesized for each GDE unit:		37
		Biological datasets are plotted and provided for each GDE unit, and when possible provide baseline conditions for assessment of trends and variability.		38
		Data gaps/insufficiencies are described.		39
		Plans to reconcile data gaps in the monitoring network are stated.		40
		Description of potential effects on GDEs, land uses and property interests:		41
		Cause-and-effect relationships between GDE and groundwater conditions are described.		42
		Impacts to GDEs that are considered to be "significant and unreasonable" are described.		43
		Known hydrological thresholds or triggers (e.g., instream flow criteria, groundwater depths, water quality parameters) for significant impacts to relevant species or ecological communities are reported.		44
		Land uses include and consider recreational uses (e.g., fishing/hunting, hiking, boating).		45
		Property interests include and consider privately and publicly protected conservation lands and opens spaces, including wildlife refuges, parks, and natural preserves.		46
Sustainable Management Criteria	**3.5 Monitoring Network** *23 CCR §354.34*	Description of whether hydrological data are spatially and temporally sufficient to monitor groundwater conditions for each GDE unit.		47
		Description of how hydrological data gaps and insufficiencies will be reconciled in the monitoring network.		48
		Description of how impacts to GDEs and environmental surface water users, as detected by biological responses, will be monitored and which GDE monitoring methods will be used in conjunction with hydrologic data to evaluate cause-and-effect relationships with groundwater conditions.		49
Projects & Mgmt Actions	**4.0. Projects & Mgmt Actions to Achieve Sustainability Goal** *23 CCR §354.44*	Description of how GDEs will benefit from relevant project or management actions.		50
		Description of how projects and management actions will be evaluated to assess whether adverse impacts to the GDE will be mitigated or prevented.		51

* In reference to DWR's GSP annotated outline guidance document, available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/GD_GSP_Outline_Final_2016-12-23.pdf

Attachment B

TNC Evaluation of the
Merced Subbasin Groundwater sustainability Plan

A complete draft of the Merced Subbasin GSP has been provided for public review. The following comments are in order of the Checklist given in Attachment A.

Section 1.2.5 Beneficial Uses and Users p. 1-40
(Checklist Item 1)

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.

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**:

- Natural Communities Commonly Associated with Groundwater dataset (NC Dataset) - https://gis.water.ca.gov/app/NCDatasetViewer/
- The list of freshwater species located in the Merced. Subbasin in **Attachment C** of this letter. Please take particular note of the species with protected status.
- 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.

The stakeholder outreach process is described, and include outreach to federal, state, and local agencies, but did not appear to engage environmental groups. **Please note if any environmental groups were contacted and were enlisted in the GSP development process.**

Section 1.2 Plan Areas p. 1-13 through 1-38
(Checklist Item 2)

The jurisdictional boundaries and water use management and existing monitoring programs are adequately described. The land use designations do not show types of crops. Only federal and state parks are shown on Figure 1-7 (p. 1-20). The general and land use plans are adequately described. **Surface water gauging is described for the three major creeks; a map showing the locations would be helpful. Habitat Conservation Plans (HCPs) or Natural Community Conservation Plans (NCCPs) within the Subbasin should be added and noted if they are associated with critical, GDE and/or ISW habitats.**

Section 2.1.3.3 Surface Water p. 2-9 through 2-12
(Checklist Item 3)

The regulation of surface waters by dams and reservoirs is described for each of the major rivers in Section 2.1.3.3 Surface Waters. Past examples of in-stream flows are given on page 1-40 for the Merced River, by the Merced Irrigation District. In-stream flow requirements in each of the rivers/streams including the amount, time of year when the flow minimum is specified, the duration, the freshwater fish species for which it applies, associated permits that set forth the requirements, and the regulating agency setting forth the compliance requirements. **Please provide a list of the current in-stream flow requirements for chinook salmon and other threatened and endangered fish species and other requirements to protect habitat on the Merced and San Joaquin Rivers and the other creeks.**

Section 1.2.3.3 Well Permitting p.138
Checklist Item 4

Merced County established a well permitting system for new, replacement, back-up, and De Minimus wells in 2015. It is not clear if this requirement covers monitoring wells, unless they are classified as De Minimus wells. The permit includes property setback distances, which may apply to surface water. The City of Merced also enforces well standards that apply to all new and existing water wells, monitoring wells, cathodic protection wells, test wells and those exploratory holes deeper than twenty feet within the jurisdictional boundaries of the city. The City of Merced directs permittees to DWR standards for wells. **Please clarify the permitting requirements for monitoring wells and how they will be coordinated with the GSP.**

Section 2.1.6.2 Bottom of the Merced Basin p. 2-39
(Checklist Item #5)

The base of freshwater, defined as specific conductance > 3,000 micromhos/cm, is used as the bottom of the basin. Because the depth varies with location, a map is provided as Figure 2-28 (p. 2-40). The depth of this boundary is provided in some areas of the geologic cross-sections, but not others. As noted on page 9 of DWR's Hydrogeologic Conceptual Model BMP (https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_HCM_Final_2016-12-23.pdf) "the definable bottom of the basin should be at least as deep as the deepest groundwater extractions". **Thus, groundwater extraction well depth data should also be included in the definition of the basin bottom.** This will prevent the possibility of extractors with wells deeper than the basin boundary (defined by the base of freshwater) from claiming exemption from SGMA due to a well residing outside the vertical extent of the basin boundary. **Please check that active wells used for domestic or public water supply or agricultural wells are not deeper than the base of freshwater.**

Section 2.2.1.2 Current Groundwater Conditions p. 2-63 through 2-29
(Checklist Item #6)

The number of wells used to describe the groundwater elevations for each aquifer is sparse. For example, there were only eight wells used for the spring 2017 elevation measurements (Figure 2-44 p. 2-64) for the Above the Corcoran Clay aquifer and six

for fall 2017 elevation for the Above the Corcoran Clay aquifer (Figure 2-47 p. 2-67). Additional wells have been included in the GSP Monitoring Program, as stated on p. 4-2, "The Merced Subbasin GSP groundwater level monitoring network totals 50 wells from the CASGEM program. This includes 13 wells in the Above Corcoran Clay Principal Aquifer, 16 wells in the Below Corcoran, and 21 wells in the Outside Corcoran. **Additional monitoring wells with appropriate screened intervals should be installed and added as the funding allows.**

Section 2.1.7.2 Principal Aquifers and Aquitards
(Checklist Item 6)

The three principal aquifers have been combined from the original five designations. The three aquifers are shown in a schematic diagram (Figure 2-36 p. 52) and the general characteristics are discussed (p. 2-52 and 2-53). The shallow aquifers are not described in sufficient detail to show where GDEs are likely and the places with interconnected surface water. **Please expand the discussion of shallow groundwater and discuss any information regarding vertical groundwater gradients across the principal aquifers.**

Section 2.1.4 Geologic Formations and Stratigraphy
(Checklist Item 7)

The geologic cross-sections, Figures 2-13 through 2-17 and Figure 2-19 through 2-22 (p. 2-24 and 2-27 and 2-29 and 2-32, respectively), show the full depth of the basin and do not highlight the shallow aquifers. **Cross-sections along the San Joaquin and Merced Rivers showing the relationship between the rivers and the shallow aquifers would be helpful**. **The near-surface cross sections should provide details that depict the conceptual understanding of shallow groundwater and stream interactions at different locations, including perched aquifers**.

Section 2.2.6 Interconnected Surface Waters p. 108
(Checklist Items 8, 9 and 10)

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 had been conducted to confirm the designations and the documentation of the model was not provided in this report (Appendix D). Therefore, no 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.**

Section 2.2.7 GDEs p. 2-109
(Checklist Item 10-15)

SGMA requires that all beneficial uses and users, including GDEs, be considered in the development and implementation of GSPs (Water Code §10723.2). The GSP Regulations include specific requirements to identify (map) GDEs and consider them when determining whether groundwater conditions are having potential effects on beneficial uses and users. SGMA also requires an assessment of whether sustainable management criteria (including minimum thresholds and measurable objectives) may cause adverse impacts to beneficial uses, including GDEs, and that monitoring

networks are designed to detect such impacts. Therefore, mapping GDEs is a critical first step for incorporating environmental considerations into GSPs.

- **It appears that the preliminary desktop analysis, completed by Woodard & Curran and documented in the draft GSP, resulted an excessive elimination of the NC dataset polygons mapped in the Merced Subbasin.** In particular, the methods used to confirm whether or not polygons in the NC Dataset are connected to groundwater in the Merced Subbasin are highly flawed. Here we debunk the scientific insufficiencies in the methodology used:
    1. *Areas with depth to groundwater greater than 30 feet in Spring 2015.*
        a. While depth to groundwater levels within 30 feet are generally accepted as being a proxy for confirming that polygons in the NC dataset are connected to groundwater, it is highly advised that seasonal and interannual groundwater fluctuations in the groundwater regime are taken into consideration. Utilizing groundwater data from <u>one point in time</u> (e.g., Spring 2015) can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Based on a study we recently submitted to Frontiers in Environmental Science Journal, we've observed riparian forests along the Cosumnes River to experience a range in groundwater levels between 1.5 and 75 feet over seasonal and interannual timescales. Seasonal fluctuations in the regional water table can support perched groundwater near an intermittent river that seasonally runs dry due to large seasonal fluctuations in the regional water table. While perched groundwater itself cannot directly be managed due to its position in the vadose zone, the water table position within the regional aquifer (via pumping rate restrictions, restricted pumping at certain depths, restricted pumping around GDEs, well density rules) and its interactions with surface water (e.g., timing and duration) can be managed to prevent adverse impacts to ecosystems due to changes in groundwater quality and quantity under SGMA. **We highly recommend using 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. Please 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 in the GSP <u>until</u> data gaps are reconciled in the monitoring network.**
        b. **Please confirm that wells screened in the Shallow and Leaky intermittent principal aquifers located <u>above the Corocoran Clay Layer</u> are being used to verify whether NCCAGs are actual GDEs.** According to Figure 2-39, the majority of wells in the

area in between Route 140, Route 59, and the San Joaquin River where NCCAGs were not identified as GDEs due to "depth to water" (Figure 2-86); however the wells located in this area are predominantly irrigation and domestic wells screened in the principal aquifers BELOW the Corocoran Clay Layer. Using "depth to groundwater" measurements from confined aquifers is mapping piezometric head of the confined aquifer and not detecting groundwater conditions in the principal aquifers of the unconfined aquifer that are supporting the ecosystem. If there is insufficient groundwater level data in the principal aquifers above the Corocoran Clay layers, then the NCCAGs in these areas should be included as GDEs in the GSP until data gaps are reconciled in the monitoring network.

c. Please provide more details on how depth to groundwater contour maps were developed:
    i. Are the wells used for interpolating depth to groundwater sufficiently close (<5km) to NC Dataset polygons to reflect local conditions relevant to ecosystems?
    ii. Are the wells used for interpolating depth to groundwater screened within the surficial unconfined aquifer and capable of measuring the true water table? (see comment b above)
    iii. Is depth to groundwater contoured using **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)[3] to estimate depth-to-groundwater contours across the landscape. This will provide much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found. Depth to groundwater contours developed from depth to groundwater measurements at wells assumes that the land surface is constant, which is a poor assumption to make. It is better to assume that water surface elevations are constant in between wells, and then calculate depth to groundwater using a DEM of the land surface to contour depth to groundwater.
d. Spring 2015 is after the SGMA benchmark date of January 1, 2015. **Please rely on groundwater condition data prior to the SGMA benchmark date.**
e. Please use care when considering rooting depths of vegetation. While Valley Oak (*Quercus lobata*) have been observed to have a max rooting depth of ~24 feet (https://groundwaterresourcehub.org/gde-tools/gde-rooting-

[3] 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/

depths-database-for-gdes/), rooting depths are likely to spatially vary based on the local hydrologic conditions available to the plant. Also, max rooting depths do not take capillary action into consideration, which will vary with soil type and is an important consideration since woody phreatophytes generally do not like to have their roots submerged in groundwater for extended periods of time, and hence can access groundwater at deeper depths. In addition, while it is likely to be true that shallow water availability is necessary to support the recruitment of saplings, hydraulic lift of groundwater to shallow depths has been observed in *Quercus* spp. Research on the symbiotic relationships between species and offspring is still emerging, but the assumption that a groundwater depth of 25 feet is "unlikely to support recruitment of new oak seedlings" is an unsubstantiated claim and falsely considered to be "conservative". This approach is not "conservative" and results in the elimiination of more NC polygons because it negates the fact that there may be mature tree species that are likely connected to groundwater. Regardless of life stage, if any plant or animal species in the NC polygons are connected to groundwater, then it needs to be mapped as a GDE. The evaluation of potential effects on GDEs (e.g., the likelihood that regeneration is not occuring in the GDE due to groundwater levels being to deep for saplings) is to be performed when defining undesirable results in the Sustainable Management Criteria section of GSP, not the Basin Setting section.

2. *Habitat areas with supplemental water*
    a. The application of supplemental water to managed wetlands does not preclude the possibility that NC polygons could be accessing groundwater in addition to the supplied water. In the scientific literature, it is generally acknowledged that GDEs can rely on groundwater for some or all of its requirements. GDEs can rely on multiple water sources simultaneously and at different temporal/spatial scales (e.g., precipitation, river water, reservoir water, soil moisture in the vadose zone, groundwater, applied water, treated wastewater effluent, urban stormwater, irrigated return flow). SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface". Hence, **we recommend that depth to groundwater contour maps are used to identify whether a connection to groundwater exists for the Managed Wetlands in the Merced Subbasin. Please 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.**
3. *Areas adjacent to irrigated fields*
    a. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater

occurring near the ground surface". **We recommend that depth to groundwater contour maps are used to identify whether a connection to groundwater exists for the NC Dataset polygons adjacent to irrigated fields in the Merced Subbasin. Please 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.**

b. GDEs can rely on multiple water sources – including shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields - simultaneously and at different temporal/spatial scales. Groundwater basins can be comprised of one continuous aquifer or multiple aquifers stacked on top of each other. Basins with a stacked series of aquifers 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 principal aquifers, that support springs, surface water, and groundwater dependent ecosystems. **NC polygons adjacent to irrigated land can still potentially be reliant on shallow groundwater aquifers, thus excluding them based on their proximity to irrigated fields is inadequate.**

4. *Areas depending on adjacent losing surface water bodies*
    a. While losing conditions occur when groundwater levels are lower than the stage in the stream, the degree to which losing conditions occur will depend on the groundwater level gradient between them. Losing conditions also vary in time, especially over different seasons. Even if a stream or river reach is losing, the riparian vegetation may still be accessing groundwater, and hence be identified as a GDE. **We highly recommend that depth to groundwater levels under the NC polygons be used as the evaluation criteria, since access to groundwater could be be occuring in/near losing reaches. Please 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 riparian vegetation in losing reaches are 100% of the time using surface water (especially if the groundwater is consistantly deep), it is not a GDE.
    b. 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.
5. *Areas of vernal pool complexes*

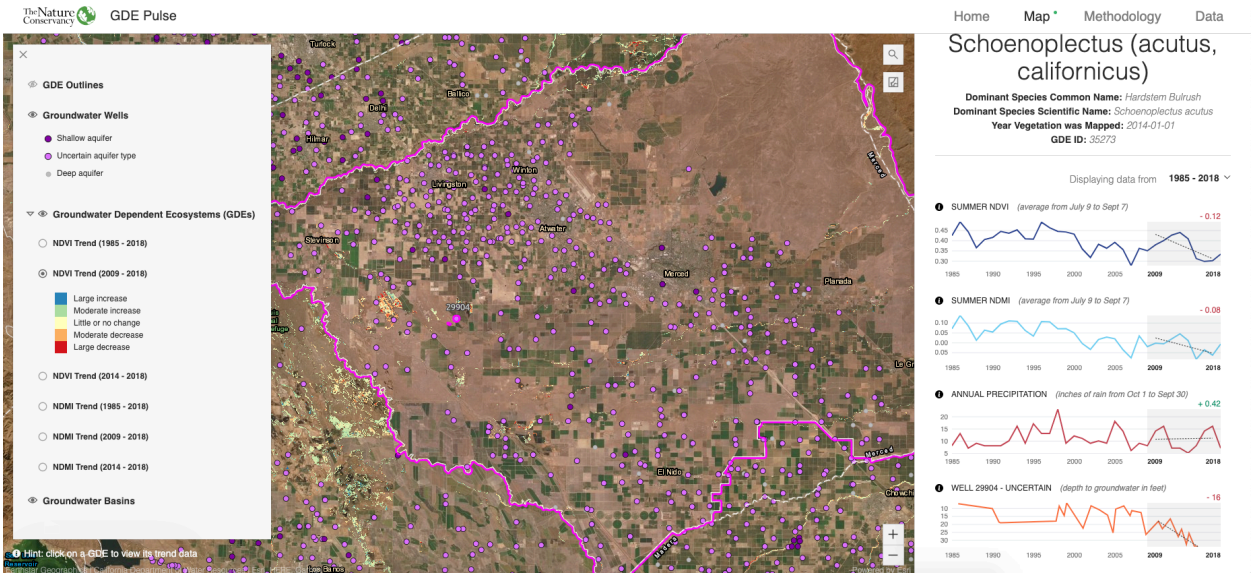
a. While we generally agree that vernal pools are shallow pockets of groundwater that are not directly connected or associated with principal aquifers, **please included a short description on whether or not the vernal pool complexes mapped in the DFW 1989-1998 dataset are consistent with information collected in the HCM and groundwater conditions in the surficial aquifers (e.g., shallow and intermittent leaky aquifers <u>above</u> the Corocoran Clay Layer).**

- The NC dataset is a starting point for GSAs to identify GDEs in their basin. **Please map the original NC dataset on Figures 2-86, 2-87, and 2-88 (p. 2-111, 2-112, and 2-113) and document which polygons were added (and what local sources were used to identify them), removed (and the removal reason), and kept (from the original NC dataset). The basin's GDE shapefile, which is submitted via the SGMA Portal, should also include two new fields in its attribute table denoting: 1) which polygons were kept/removed/added, and 2) the change reason (e.g., why polygons were removed).**

<u>Section 3.37 GDE p. 2-109 through 2-112</u>

<u>Checklist Items 16-20)</u>

- No information was given on the historical or current groundwater conditions in the GDEs or the ecological conditions present. **Please provide groundwater data for historical and current conditions near the GDEs or identify as a data gap. Refer to GDE Pulse (https://gde.codefornature.org; See Attachment E of this letter for more details) or any other locally available data to describe depth to groundwater trends in and around GDE areas, as well as trends in plant growth (e.g., NDVI) and plant moisture (e.g., NDMI).** Below is a screenshot example of data available in GDE Pulse for NC dataset polygons found in Merced Subbasin:



- 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 GDEs.** The list of freshwater species located in the Merced Subbasin in **Attachment C** of this letter.

  <u>Section 2.3 Water Budget Information p. 2-113</u>
  <u>(Checklist Item 21-22)</u>

  The water budget for the surface water components did not include an explicit evapotranspiration term, but the following footnote was included 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. **Please provide a more complete description of the budget and the full model documentation in Appendix D.**

  <u>Section 3.1 Sustainability Goal p, 3-1</u>
  <u>(checklist Items 23-25)</u>

  The sustainability goal is stated as "Achieve sustainable groundwater management on a long-term average basis by increasing recharge and / or reducing groundwater

pumping, while avoiding undesirable results" (p. 3-1). The report does not provide details on stakeholders involved in the goal selection process. The statement refers to "undesirable results" but does not mention GDEs, specifically. The goal appears to be directed toward reducing the groundwater overdraft and reducing the chance of wells going dry. The goal does not make a distinction between the pre-SGMA period and later years. **Please clarify the sustainability goal and expand it to pertain to protection of GDE, ISWs and critical habitats.**

Section 3.3.3 Measurable Objectives and Interim Milestones p, 3-4
(Checklist Item 26)

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.**

Section 3.3.2 Minimum Thresholds p. 3-4
(Checklist Item 27-29)

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." p. 3-5 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.**

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.**

Section 3.3.1 Undesirable Results p. 3-3
(Checklist Items (30-46)

- 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" (p.3-3). 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.**
- **Please provide more specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs.** The definition of 'significant and unreasonable' is a qualitative statement that is used to describe when undesirable results would occur in the basin, such that a minimum threshold can be quantified. Potential effects on all beneficial users of groundwater in the basin need to be taken into consideration.

According to the California Constitution Article X, §2, water resources in California must be "put to beneficial use to the fullest extent of which they are capable". **Please identify appropriate biological indicators that can be used to monitor potential impacts to environmental beneficial users due to groundwater conditions. Refer to Appendix E of this letter for an overview of a free, new online tool for monitoring the health of GDEs over time.**

Section 4.5.6 Data Gaps p. 4-13
(Checklist Item #47)

Three regions where monitoring wells are missing or scarce are shown in Figure 4-6 (p. 4-14). These areas include:

> "1. Data Gap #1: Located northwest of Merced and northeast of Atwater, this area contains relatively fewer existing wells, which often have limited construction information, and the wells are generally privately owned and require coordination with well owners to obtain permission and data.
> 2. Data Gap #2: Located along the western edge of the Subbasin, this area has virtually no known wells; overall well coverage needs to be enhanced through outreach to well owners to identify wells that can be used for monitoring purposes.
> 3. Data Gap #3: Located along the southern portion of the Subbasin just east of Data Gap #2, there are known potential wells to monitor but acquiring data from these wells is associated with technical or funding issues. These wells are primarily located within a federal wildlife refuge."

Aside from these areas, there are limited wells close to the Merced and San Joaquin Rivers to track conditions near potential GDEs. **Greater effort should be directed toward obtaining full well construction information in all areas, but especially in the areas with GDEs and then selecting appropriate wells for monitoring.**

Section 4.10 Depletions of Interconnected Surface Water Monitoring Network p, 4-30
(Checklist Item 48)

The stream gauges used to support interconnected stream monitoring are listed in Table 4-10 and shown in Figure 4-9 (p. 4-32 and 4-33, respectively). The GSP states on page 4-35 that "The understanding of depletions of interconnected surface water could be improved through additional depth-discrete groundwater elevation data near some rivers and streams and some NCCAGs." **The addition of clusters of multi-depth wells near the known interconnected surface waters should be given a high priority.**

Section 4.1 Monitoring Network Objectives p, 4-1
(Checklist Item 49)

One of the stated objectives of the monitoring program is "Monitoring impacts to the beneficial uses or users of groundwater." (p. 4-1) There is no reference to use of biological data for monitoring potential impacts to the GDEs or to the combined use of hydrologic and biological data. Hydrologic and biological data should be obtained around existing GDEs. Remote imaging can provide a useful tool for monitoring

ecosystem health of GDEs and ISWs. **Please clarify the potential use of imagery as a monitoring tool and expand it to monitoring surface indicators of ISW and GDE ecosystem health. Please describe how GDEs will be monitored to avoid or minimize impacts from both a hydrologic and biological standpoint.**

Section 6.3 Projects p. 6.6
(Checklist Item #50-51)

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.**

Attachment C

Freshwater Species Located in the Merced 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 Merced Subbasin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the GSA's 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[4]. 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[5] as well as on The Nature Conservancy's science website[6].

Scientific Name	mmon Name	Legally Protected Species		
		Federal	State	Other
Birds				
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Ixobrychus exilis hesperis	Western Least Bittern		Special Concern	BSSC - Second priority
Limnodromus scolopaceus	Long-billed Dowitcher			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Mergus serrator	Red-breasted Merganser			
Numenius americanus	Long-billed Curlew			
Numenius phaeopus	Whimbrel			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pandion haliaetus	Osprey		Watch list	
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority

[4] 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
[5] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS
[6] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Phalacrocorax auritus	Double-crested Cormorant			
Phalaropus tricolor	Wilson's Phalarope			
Plegadis chihi	White-faced Ibis		Watch list	
Pluvialis squatarola	Black-bellied Plover			
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Rallus limicola	Virginia Rail			
Recurvirostra americana	American Avocet			
Riparia riparia	Bank Swallow		Threatened	
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Tringa semipalmata	Willet			
Tringa solitaria	Solitary Sandpiper			
Vireo bellii	Bell's Vireo			
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
Crustaceans				
Branchinecta conservatio	Conservancy Fairy Shrimp	Endangered	Special	IUCN - Endangered
Branchinecta lindahli	Versatile Fairy Shrimp			
Branchinecta longiantenna	Longhorn Fairy Shrimp	Endangered	Special	IUCN - Endangered
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Threatened	Special	IUCN - Vulnerable
Branchinecta mesovallensis	Midvalley Fairy Shrimp		Special	
Cyzicus californicus	California Clam Shrimp			
Lepidurus packardi	Vernal Pool Tadpole Shrimp	Endangered	Special	IUCN - Endangered
Linderiella occidentalis	California Fairy Shrimp		Special	IUCN - Near Threatened
Fishes				
Mylopharodon conocephalus	Hardhead		Special Concern	Near-Threatened - Moyle 2013
Oncorhynchus mykiss - CV	Central Valley steelhead	Threatened	Special	Vulnerable - Moyle 2013
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
Acipenser medirostris ssp. 1	Southern green sturgeon	Threatened	Special Concern	Endangered - Moyle 2013
Acipenser transmontanus	White sturgeon		Special	Vulnerable - Moyle 2013

Catostomus occidentalis occidentalis	Sacramento sucker			Least Concern - Moyle 2013
Cottus asper ssp. 1	Prickly sculpin			Least Concern - Moyle 2013
Cottus gulosus	Riffle sculpin		Special	Near-Threatened - Moyle 2013
Entosphenus tridentata ssp. 1	Pacific lamprey		Special	Near-Threatened - Moyle 2013
Gasterosteus aculeatus microcephalus	Inland threespine stickleback		Special	Least Concern - Moyle 2013
Lampetra hubbsi	Kern brook lamprey		Special Concern	Vulnerable - Moyle 2013
Lavinia exilicauda exilicauda	Sacramento hitch		Special	Near-Threatened - Moyle 2013
Lavinia symmetricus symmetricus	Central California roach		Special Concern	Near-Threatened - Moyle 2013
Mylopharodon conocephalus	Hardhead		Special Concern	Near-Threatened - Moyle 2013
Oncorhynchus mykiss - CV	Central Valley steelhead	Threatened	Special	Vulnerable - Moyle 2013
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
Oncorhynchus tshawytscha - CV fall	Central Valley fall Chinook salmon	Species of Special Concern	Special Concern	Vulnerable - Moyle 2013
Oncorhynchus tshawytscha - CV late fall	Central Valley late fall Chinook salmon	Species of Special Concern		Endangered - Moyle 2013
Orthodon microlepidotus	Sacramento blackfish			Least Concern - Moyle 2013
Pogonichthys macrolepidotus	Sacramento splittail		Special Concern	Vulnerable - Moyle 2013
Ptychocheilus grandis	Sacramento pikeminnow			Least Concern - Moyle 2013
Herps				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Ambystoma californiense californiense	California Tiger Salamander	Threatened	Threatened	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Pseudacris regilla	Northern Pacific Chorus Frog			
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 gigas	Giant Gartersnake	Threatened	Threatened	
Thamnophis sirtalis sirtalis	Common Gartersnake			
Insects and Other Invertebrates				
Ablabesmyia spp.	Ablabesmyia spp.			
Berosus spp.	Berosus spp.			
Centroptilum spp.	Centroptilum spp.			
Cladotanytarsus spp.	Cladotanytarsus spp.			
Corixidae fam.	Corixidae fam.			
Cricotopus spp.	Cricotopus spp.			
Cryptochironomus spp.	Cryptochironomus spp.			
Enallagma carunculatum	Tule Bluet			
Microtendipes spp.	Microtendipes spp.			
Mideopsis spp.	Mideopsis spp.			
Nanocladius spp.	Nanocladius spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Polypedilum spp.	Polypedilum spp.			
Procladius spp.	Procladius spp.			
Psychodidae fam.	Psychodidae fam.			
Sigara spp.	Sigara spp.			
Stylurus olivaceus	Olive Clubtail			
Tanytarsus spp.	Tanytarsus spp.			
Trichocorixa spp.	Trichocorixa spp.			
Mammals				
Castor canadensis	American Beaver			Not on any status lists
Lontra canadensis canadensis	North American River Otter			Not on any status lists
Neovison vison	American Mink			Not on any status lists
Ondatra zibethicus	Common Muskrat			Not on any status lists
Mollusks				
Anodonta californiensis	California Floater		Special	
Ferrissia spp.	Ferrissia spp.			
Helisoma anceps	Two-ridge Rams-horn			CS
Margaritifera falcata	Western Pearlshell		Special	
Menetus opercularis	Button Sprite			CS
Physa spp.	Physa spp.			

Plants				
Alopecurus saccatus	Pacific Foxtail			
Ammannia coccinea	Scarlet Ammannia			
Arundo donax	NA			
Azolla filiculoides	NA			
Bacopa eisenii	Gila River Water-hyssop			
Bacopa rotundifolia	NA			
Brodiaea nana				Not on any status lists
Callitriche longipedunculata	Longstock Water-starwort			
Callitriche marginata	Winged Water-starwort			
Castilleja campestris succulenta	Fleshy Owl's-clover	Threatened	Endangered	CRPR - 1B.2
Cephalanthus occidentalis	Common Buttonbush			
Cicendia quadrangularis	Oregon Microcala			
Crassula aquatica	Water Pygmyweed			
Cyperus erythrorhizos	Red-root Flatsedge			
Cyperus squarrosus	Awned Cyperus			
Damasonium californicum				Not on any status lists
Downingia bella	Hoover's Downingia			
Downingia cuspidata	Toothed Calicoflower			
Downingia pulchella	Flat-face Downingia			
Downingia pusilla	Dwarf Downingia		Special	CRPR - 2B.2
Elatine brachysperma	Shortseed Waterwort			
Elatine californica	California Waterwort			
Eleocharis acicularis acicularis	Least Spikerush			
Eleocharis macrostachya	Creeping Spikerush			
Eleocharis quadrangulata	NA			
Elodea canadensis	Broad Waterweed			
Epilobium campestre	NA			Not on any status lists
Epilobium cleistogamum	Cleistogamous Spike-primrose			
Eryngium castrense	Great Valley Eryngo			
Eryngium racemosum	Delta Coyote-thistle		Endangered	CRPR - 1B.1
Eryngium spinosepalum	Spiny Sepaled Coyote-thistle		Special	CRPR - 1B.2

Eryngium vaseyi vaseyi	Vasey's Coyote-thistle			Not on any status lists
Euthamia occidentalis	Western Fragrant Goldenrod			
Gratiola ebracteata	Bractless Hedge-hyssop			
Gratiola heterosepala	Boggs Lake Hedge-hyssop		Endangered	CRPR - 1B.2
Hydrocotyle ranunculoides	Floating Marsh-pennywort			
Isoetes howellii	NA			
Isoetes nuttallii	NA			
Isoetes orcuttii	NA			
Juncus exiguus				Not on any status lists
Juncus uncialis	Inch-high Rush			
Juncus usitatus	NA			Not on any status lists
Lasthenia ferrisiae	Ferris' Goldfields		Special	CRPR - 4.2
Lasthenia fremontii	Fremont's Goldfields			
Lemna gibba	Inflated Duckweed			
Lemna minuta	Least Duckweed			
Limnanthes douglasii nivea	Douglas' Meadowfoam			
Limnanthes douglasii rosea	Douglas' Meadowfoam			
Ludwigia peploides peploides	NA			Not on any status lists
Lycopus americanus	American Bugleweed			
Marsilea vestita vestita	NA			Not on any status lists
Mimulus guttatus	Common Large Monkeyflower			
Mimulus latidens	Broad-tooth Monkeyflower			
Mimulus tricolor	Tricolor Monkeyflower			
Myosurus minimus	NA			
Myosurus sessilis	Sessile Mousetail			
Myriophyllum aquaticum	NA			
Navarretia leucocephala leucocephala	White-flower Navarretia			
Navarretia myersii myersii	Pincushion Navarretia		Special	CRPR - 1B.1
Navarretia prostrata	Prostrate Navarretia		Special	CRPR - 1B.1
Neostapfia colusana	Colusa Grass	Threatened	Endangered	CRPR - 1B.1

Orcuttia inaequalis	San Joaquin Valley Orcutt Grass	Threatened	Endangered	CRPR - 1B.1
Orcuttia pilosa	Hairy Orcutt Grass	Endangered	Endangered	CRPR - 1B.1
Panicum dichotomiflorum	NA			
Paspalum distichum	Joint Paspalum			
Persicaria amphibia				Not on any status lists
Persicaria hydropiper	NA			Not on any status lists
Persicaria hydropiperoides				Not on any status lists
Persicaria lapathifolia				Not on any status lists
Persicaria maculosa	NA			Not on any status lists
Phyla nodiflora	Common Frog-fruit			
Pilularia americana	NA			
Plagiobothrys acanthocarpus	Adobe Popcorn-flower			
Plagiobothrys austiniae	Austin's Popcorn-flower			
Plagiobothrys distantiflorus	California Popcorn-flower			
Plagiobothrys greenei	Greene's Popcorn-flower			
Plagiobothrys humistratus	Dwarf Popcorn-flower			
Plagiobothrys leptocladus	Alkali Popcorn-flower			
Plagiobothrys undulatus	NA			Not on any status lists
Plantago elongata elongata	Slender Plantain			
Pogogyne douglasii	NA			
Pogogyne zizyphoroides				Not on any status lists
Potamogeton nodosus	Longleaf Pondweed			
Potamogeton pusillus pusillus	Slender Pondweed			
Psilocarphus brevissimus brevissimus	Dwarf Woolly-heads			
Psilocarphus oregonus	Oregon Woolly-heads			
Psilocarphus tenellus	NA			
Ranunculus aquatilis aquatilis	White Water Buttercup			
Ranunculus bonariensis	NA			
Ranunculus sceleratus	NA			

Rorippa curvisiliqua curvisiliqua	Curve-pod Yellowcress			
Rorippa palustris palustris	Bog Yellowcress			
Rumex stenophyllus	NA			
Sagittaria sanfordii	Sanford's Arrowhead		Special	CRPR - 1B.2
Salix exigua exigua	Narrowleaf Willow			
Salix gooddingii	Goodding's Willow			
Salix laevigata	Polished Willow			
Schoenoplectus acutus occidentalis	Hardstem Bulrush			
Schoenoplectus californicus	California Bulrush			
Sidalcea calycosa calycosa	Annual Checker-mallow			
Sidalcea hirsuta	Hairy Checker-mallow			
Sparganium eurycarpum eurycarpum				
Spirodela polyrhiza	NA			
Stachys albens	White-stem Hedge-nettle			
Stuckenia striata				Not on any status lists
Triglochin scilloides	NA			Not on any status lists
Tuctoria greenei	Green's Awnless Orcutt Grass	Endangered	Rare	CRPR - 1B.1
Typha domingensis	Southern Cattail			
Zannichellia palustris	Horned Pondweed			

Attachment D

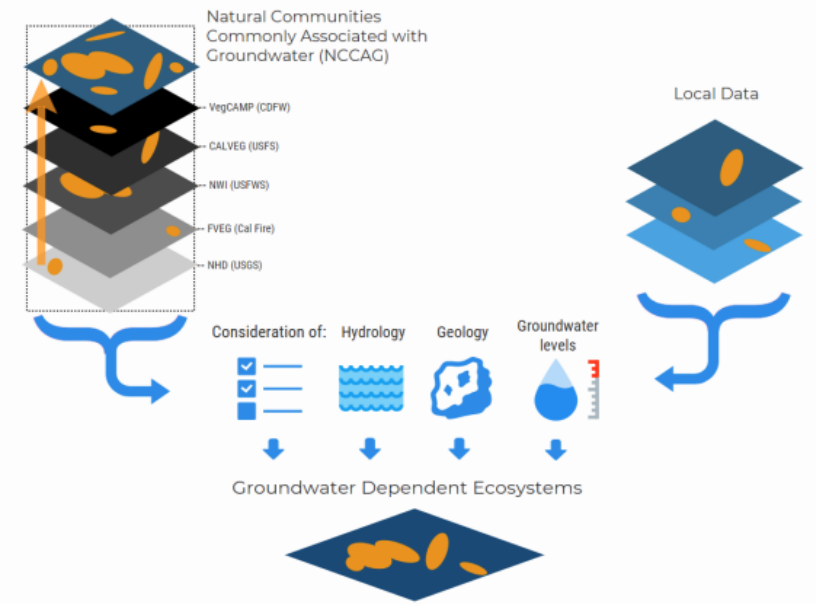
The Nature Conservancy

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[7] 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)[8]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.



[7] *NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/*

[8] 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[9]. 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[10] on the Groundwater Resource Hub[11], 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*.

[9] *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*

[10] "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/

[11] *The Groundwater Resource Hub: www.GroundwaterResourceHub.org*

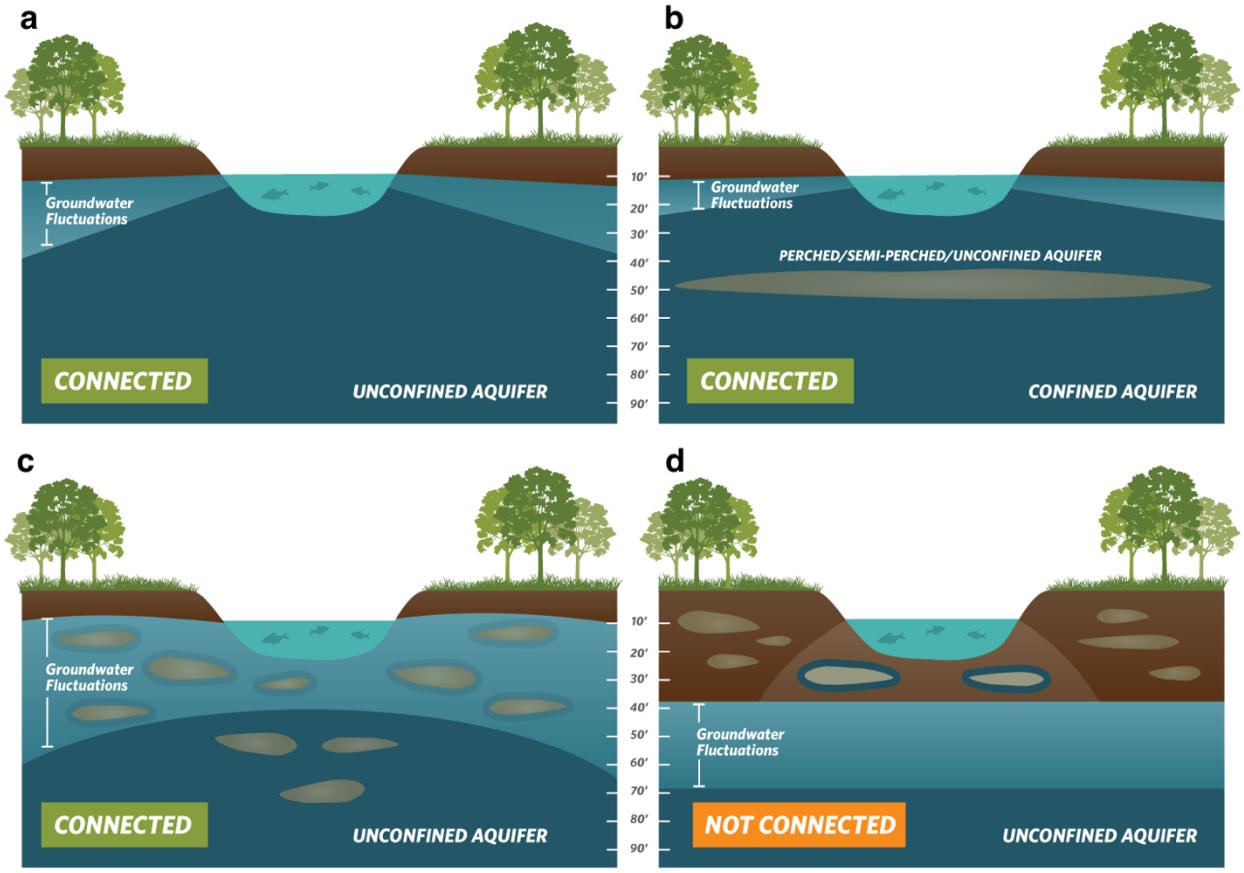


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying 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[12] 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[13] 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[14] 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[15]. 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).

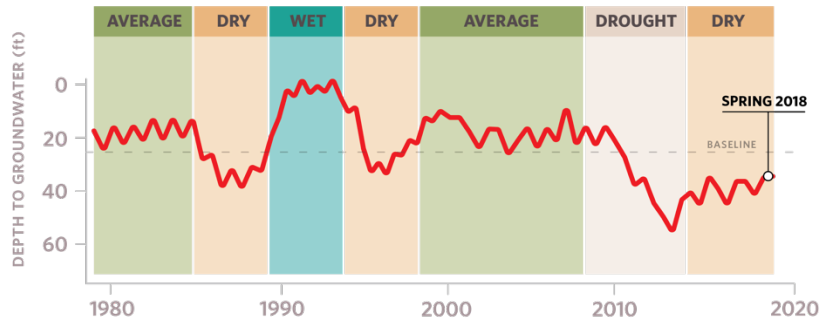


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so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

[12] 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

[13] *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)]*

[14] 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]).

[15] *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[16], 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).

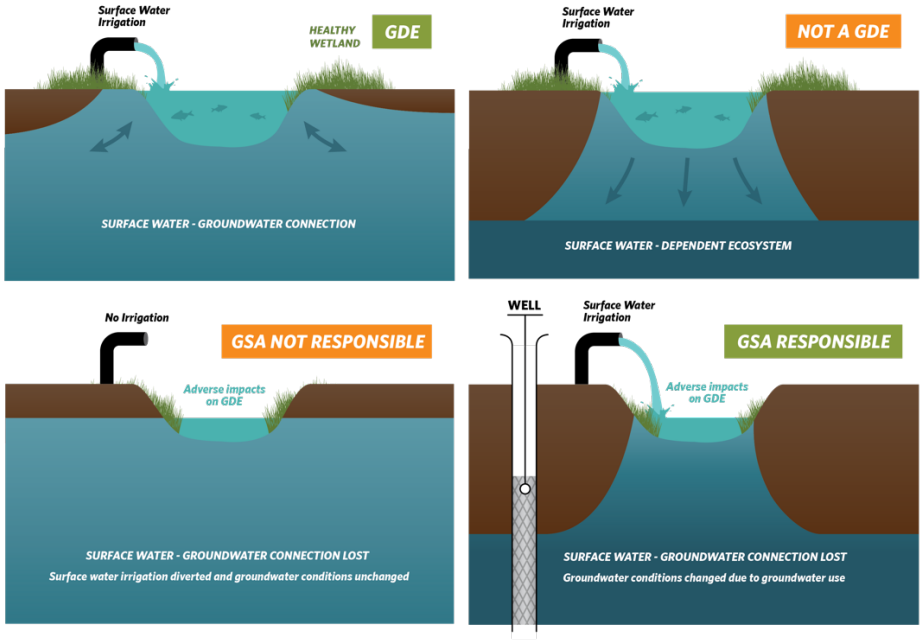


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent.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

[16] *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.

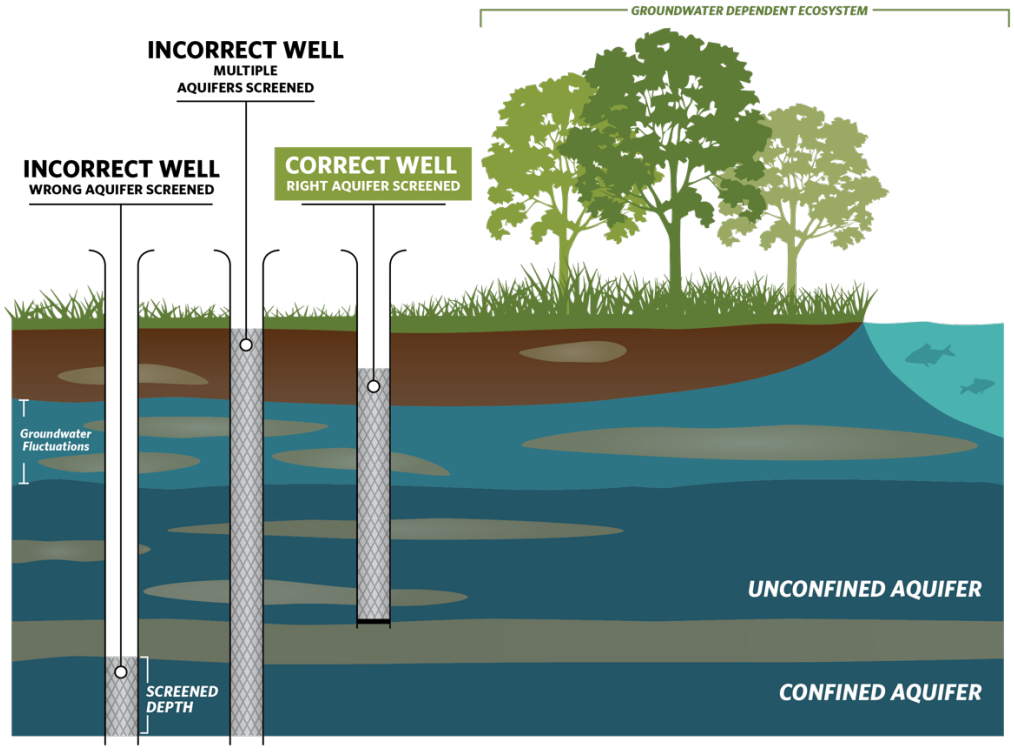


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

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)[17] 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.

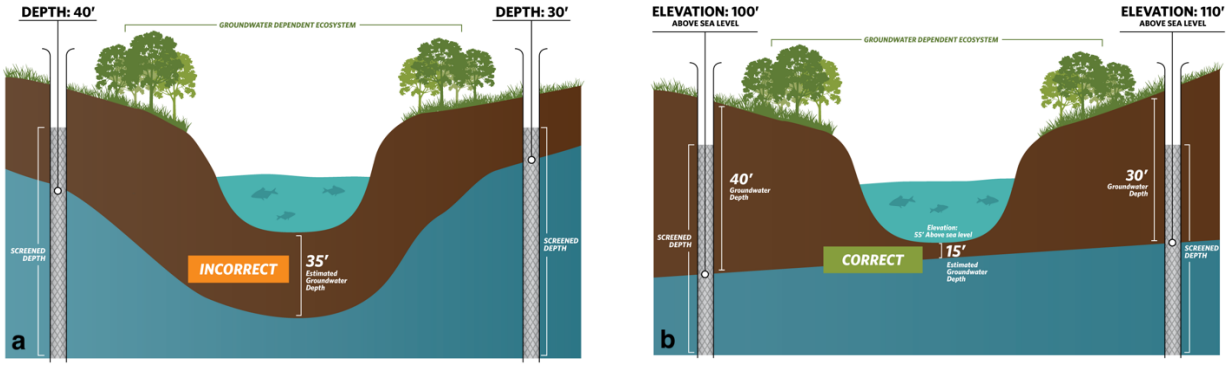


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

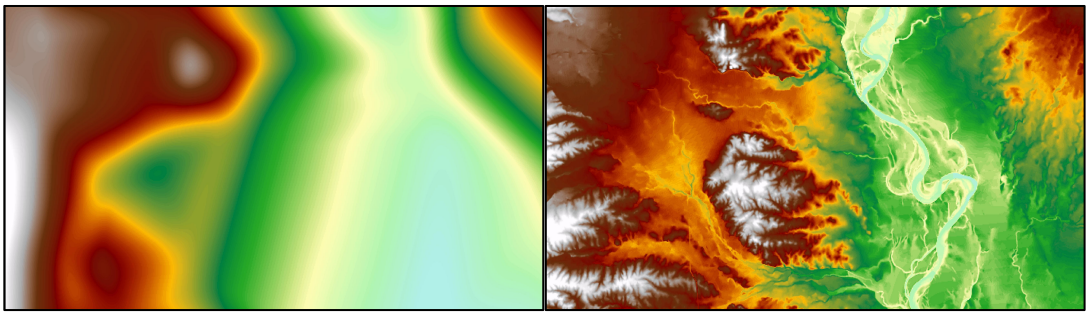


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation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

[17] 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.

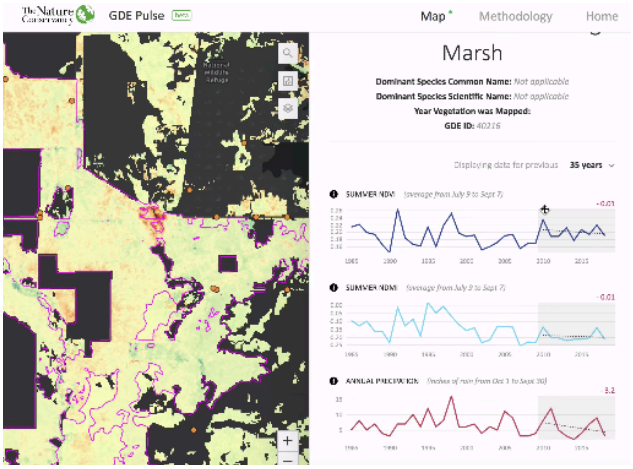
Attachment E

GDE Pulse

A new, free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data.

The Nature Conservancy
Protecting nature. Preserving life.®

Visit
https://gde.codefornature.org/



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[18]. The following datasets are included:

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[19]. 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.

[18] *The Natural Communities Commonly Associated with Groundwater Dataset is hosted on the California Department of Water Resources' website: https://gis.water.ca.gov/app/NCDatasetViewer/#*

[19] The PRISM dataset is hosted on Oregon State University's website: http://www.prism.oregonstate.edu/

United States Department of the Interior

FISH AND WILDLIFE SERVICE

San Luis National Wildlife Refuge Complex
Post Office Box 2176
7376 South Wolfsen Road
Los Banos, California 93635

01 August 2019

Via mail and email

Mr. Hicham Eltal, Merced GSP Contact
Merced Irrigation District
744 W 20th Street
Merced, CA 95340
Email: mercedsgma@woodardcurran.com

Re: Comments on Draft Groundwater Sustainability Plan for Merced Groundwater Sub-basin July 2019 Draft Report

Dear Mr. Eltal:

There are some discrepancies in the *Draft Groundwater Sustainability Plan for the Merced Sub-basin*, and the U.S. Fish & Wildlife Service has serious concerns regarding two proposed projects:

- **Pg. 1-24: "1.2.2.1.5 San Luis National Wildlife Refuge Complex** -- The San Luis NWR Complex records monthly groundwater elevation data for 25 wells in the Merced National Wildlife Refuge."
    - **Correction:** Groundwater elevation is rarely recorded for the Merced NWR wells; it is generally recorded only when well tests are performed by a contractor, which occurs less than once per decade on each well.
- **Pg. 1-40: "1.2.5.1 Beneficial Uses and Users in the Basin** -- Approximately **15,000 AFY** of water for environmental surface water flows are used at the Merced National Wildlife Refuge. "
    - **Correction:** This is inaccurate. The FERC-mandated quantity of water intended to mitigate for the loss of habitat caused by MID's operations is up to 15,000 AFY. However, annual quantities of water have been diminishing from an average of 11,000 AFY to 3,234 AF in WY2017 (a flood year) and 4,502 in WY2018 (a normal year); for an average post-drought supply of **3,868 AF.** In WY2017, the 3,234 AF delivered by MID was 22% of the water used, and 11,475 AF (78%) was pumped from wells. In WY2018, the 4,502 AF delivered by MID was 29% of the water used, and 11,219 AF (71%) was pumped from wells. Thus, post-drought, an average of only 25% of the water needed by the Refuge was surface water flows, causing the Refuge to rely on wells for the remaining 75%; the opposite of pre-drought proportions.
- **Pg. 2-110: "2.2.7 Groundwater-Dependent Ecosystems - 2. Habitat areas with supplemental water** – ... A substantial portion of this area overlaps with the Merced National

Wildlife Refuge which receives an average 11,000 AFY of surface water (2009-2013), with reduced deliveries during drought (100 to 4,000 AFY during 2014-2016)."

- **Correction:** However, post-drought deliveries have averaged only **3,868 AFY.**

- **Pg. 6-15: "Project 5: Merced Irrigation District to Lone Tree Mutual Water Company Conveyance Canal Description** -- LTMWC is seeking to establish a new 2.25 mile long canal connection from an existing MID canal to an existing canal within the LTMWC system. The capacity of the canal to be constructed would be 60 cubic feet per second (cfs) and the potential delivery would be 20-24,000 AFY. The project would benefit 1020 acres in the Sandy Mush Mutual Water Company service area that are entirely dependent on ground water by providing access to surface water from the canal which would cross the acreage in route to LTMWC. LTMWC has 11,574 acres which are significantly dependent on groundwater in all but above average rainfall years. In addition, LTMWC is situated on the northern border of acreage being annexed into the Clayton Water District and said acreage is entirely dependent upon groundwater. Given these circumstances, LTMWC could implement the project to wheel surface water into Clayton Water District for usage in lieu of groundwater use, or for groundwater recharge. The project addresses management of groundwater extraction and recharge through in lieu recharge by switching groundwater demand to surface water in a white area of the Subbasin. Measurable Objective: The project supports mitigation of chronic lowering of groundwater levels through in lieu recharge, and also benefits reduction of subsidence through reduced groundwater pumping. **Time-Table for Initiation and Completion**: The project is anticipated to run from May 2019 through November 2020. The project will be in planning and design phase from May through mid summer 2019 with the preliminary engineering of two potential routes and subsequent selection of one route. This is followed by negotiation with landowners for easements, which is expected to be complete before end of 2019. Construction is anticipated to be complete by November 2020. **Expected Benefits and Evaluation**: This project has several benefits including supporting reduction of groundwater pumping by providing in lieu recharge opportunities. Note from MID: Local project sponsors (e.g., LTMWC, LGAWD, etc.) anticipate that surface water sourced from the Merced Irrigation District may be available through temporary water purchase and sale agreements and may serve as a water supply for the project(s). It is understood that the Board of Directors for the MID has and shall retain full and absolute discretion regarding whether and when it will enter into temporary water purchase and sale agreement(s), if any, and further, nothing contained in this document creates in any party or parties any right to water controlled by the MID whether it be surface water or groundwater. Any transferred water made available by MID shall be limited by the terms and conditions contained in any respective temporary water purchase and sale agreement. **Legal Authority**: The Merced Subbasin GSA has authority per SGMA to develop and support projects for conveyance and potential in lieu recharge, as well as projects which reduce subsidence in the Subbasin. **Estimated Costs and Plans to Meet Costs**: The estimated costs for this project are between $3,000,000 - $6,000,000. Costs for this project are expected to be met through pursuit of further grant funding, private funding, and funding raised through MSGSA."

  - **Major Issue:** This action will actually contribute to the ***increase in groundwater withdrawal*** at Merced NWR, and the ***loss of wetlands*** in the Central Valley. MID has reduced deliveries to Merced NWR from approximately 11,000 AFY to 4,000 AFY, causing groundwater withdrawal by the Refuge to increase by 7,000 AFY. Spending $3 million to $6 million on this proposed project to build a canal, acquisition of easements, and establishing water purchase agreements will tend to make more permanent that loss of surface water delivery to the Refuge. ***It is simply shifting groundwater withdrawal eight miles westward.*** In addition, those well costs are paid by the U.S. Department of the Interior's Restoration Fund; diminishing funding available for creating wetlands

elsewhere in the Central Valley, which in turn causes the overall loss of 250 to 2,000 acres of seasonal wetlands elsewhere, depending on the cost of water.

- **Pg. 6-19: "Project 9: Study for Potential Water System Intertie Facilities from MID to LGAWD and CWD Description:** Under this project MID, LGAWD and Chowchilla Water District (CWD) would investigate the feasibility of improving and constructing water conveyance facilities to allow the temporary transfer of water from MID to LGAWD and CWD."
    - **Major Issue:** As with Project 5, Project 9 is also likely to aggravate groundwater withdrawal at Merced NWR and wetland loss overall.

Please don't hesitate to contact me if you have any questions or concerns (Kim_Forrest@fws.gov, 209/826-3508).

Sincerely,

Kim Forrest
Refuge Manager

Cc: Stacy Armitage, Refuge Supervisor; USFWS
Dale Garrison, CVPIA Coordinator; USFWS
Dan Welsh, Dan Welsh, Deputy Field Supervisor; USFWS
Alison Willy, Senior Fish and Wildlife Biologist; USFWS
Lacey Kiriakou, Water Resources Coordinator; Merced County
Ric Ortega, General Manager; Grassland Water District / Grassland GSA
Andy Gordus, Toxicologist; California Department of Fish & Wildlife
Amanda Peisch-Derby, Regional Coordinator; California Department of Water Resources
Amber Villalobos, Environmental Scientist; California State Water Resources Control Board
Matt Buhyoff, Ken Yu, Alan Mitchnick, Annie Jones; Federal Energy Regulatory Commission
Mark Biddlecomb, Director of Operations - Western Regional Office; Ducks Unlimited
Meghan Hertel, Director - Land and Water Conservation; Audubon California

MARSHA A. BURCH
ATTORNEY AT LAW

131 South Auburn Street
GRASS VALLEY, CA 95945

Telephone:
(530) 272-8411

mburchlaw@gmail.com

August 19, 2019

Via electronic mail:
mercedsgma@woodardcurran.com

Hicham Eltal, Merced GSP Contact
Merced Irrigation District
744 W 20th Street
Merced, CA 95340

Re: Draft Merced Subbasin Groundwater Sustainability Plan

Dear Mr. Eltal:

This office represents the Valley Land Alliance ("VLA") with respect to the above-referenced Draft Groundwater Sustainability Plan ("GSP"). We appreciate the opportunity to comment on the GSP at this stage of its development.

While the critical steps of developing allocation procedures and determining initial allocations will occur next year, there are aspects of the Draft GSP that should be emphasized and clarified at this stage.

The replacement of sub-Corcoran wells must be prioritized. The Draft GSP understates the severity and importance of land subsidence in the subbasin. It is noted as an "area of concern" but this is a rather tepid description of a grave, ongoing problem. One of the stated purposes of the GSP is to prevent "significant and unreasonable land subsidence," and yet the GSP does not include a robust analysis of this issue. VLA encourages a clearer and more aggressive approach to reducing land subsidence within the subbasin area.

The GSP planning process must also continue to take into account the evolving science and information regarding climate change. Development of the GSP will necessarily occur over a period of many years, and the rapid development of climate change science will inform the GSP in a dynamic way.

We anticipate that the GSP will include, among other things, the following: identification of optimum locations for effective recharge projects; limits on the reach of

the GSP into only areas and activities that impact groundwater; and a continued focus on projects and management actions that will either increase surface water supplies to augment the sustainable groundwater yield or will increase groundwater recharge.

We also encourage vigilant resistance to any approach that results in the unreasonable or unfair allocation of water based upon the relative power of the water users involved. The hard lessons learned in California regarding "moving" water from one area to another without deep analysis of the potential consequences should not be forgotten.

VLA looks forward to continued participation in the process, and to providing input as the GSP is developed. Thank you for considering our comments.

Very truly yours,

Marsha A. Burch
Attorney

cc: Valley Land Alliance

MEETING NOTES

Joint Meeting of the Boards of Directors of the Merced Groundwater Subbasin Groundwater Sustainability Agencies:

Merced Subbasin Groundwater Sustainability Agency (MSGSA), Merced Irrigation-Urban Groundwater Sustainability Agency (MIUGSA), and Turner Island Water District Groundwater Sustainability Agency #1 (TIWD-1)

DATE/TIME: September 18, 2019 at 6:00 PM

LOCATION: Sam Pipes Room, Merced Civic Center, 678 West 18th Street Merced, CA 95340

GSA Board Members In Attendance:

Board Members Attending	GSA
Hicham Eltal	Merced Irrigation-Urban GSA
Justin Vinson	Merced Irrigation-Urban GSA
Daniel Chavez	Merced Irrigation-Urban GSA
Leah Brown (as alternate for Ken Elwin)	Merced Irrigation-Urban GSA
Brenda Wey	Merced Irrigation-Urban GSA
Carlos Gudino	Merced Irrigation-Urban GSA
Cynthia Benavidez	Merced Irrigation-Urban GSA
Dave Nervino (as alternate for Bob Kelley)	Merced Subbasin GSA
Mike Gallo	Merced Subbasin GSA
Nic Marchini	Merced Subbasin GSA
George Park	Merced Subbasin GSA
Kole Upton	Merced Subbasin GSA
Lloyd Pareira	Merced Subbasin GSA
Lawrence S. Skinner	Turner Island Water District GSA #1
Donald C. Skinner	Turner Island Water District GSA #1
Thomas C. Skinner	Turner Island Water District GSA #1

Meeting Notes

1. Call to order
    a. Alyson Watson (Woodard & Curran) invited the chair of each board to call their meeting to order.
    b. Each board member introduced themselves.
    c. Each chair confirmed they had a quorum.
    d. Alyson (W&C) reviewed the agenda.

2. Report Items

   a. Overview of GSP Development to Date

      i. Alyson Watson (W&C) reviewed GSP development to date. This included a brief review of the 6 sustainability indicators. She described two objectives: bringing the basin into balance and doing this in a way that prevent Undesirable Results.
      ii. She also reviewed the overall GSP Development timeline and highlighted the technical foundation items including the groundwater model, hydrogeologic analysis, historical current and projected water budget, and the data management system (creating a database for existing data and to store and manage data collected in the future). She explained the process of understanding undesirable results and establishing sustainable management criteria (e.g. establishing a minimum threshold to prevent domestic wells going dry), as well as establishing a monitoring network. Projects and Management Actions are used to get us to where we need to go, and we are looking into how to fund these actions.
      iii. Question: Is this information (what is presented at the meeting) available online? A: Yes. All information including the written comments received on the draft GSP are available online at www.mercedsgma.org

   b. Public Engagement Process

      i. Charles Gardiner (Catalyst) reviewed the Public Engagement Process. Outreach was guided by a Stakeholder Engagement Strategy developed early in the GSP process. Public workshops addressed elements of the plan and were conducted around the basin in different locations. Public meetings included 19 Coordinating Committee meetings, 15 Stakeholder Committee meetings, and 5 Public Workshops coordinated with Self-Help Enterprises (SHE) and Leadership Counsel. Spanish translation was made available for the public workshops and for tonight's meeting in coordination with SHE.
      ii. Charles explained that the regulatory timeline drives the plan. The plan is due by 2020, the deadline for implementation is 2040. This GSP should be considered a first effort at what is needed for sustainable groundwater management in this basin and there will be regular updates. All of this is subject to update as we understand how the basin responds to actions that are taken.
      iii. Charles explained the purpose of the Joint Board Meeting, and that the meeting provides the opportunity for the public to provide additional, supplemental comments. The consultant team will provide an overview of the comments received on major topics, provide an opportunity for additional public comments on the GSP, and provide an opportunity for a joint Board discussion and input to GSA staff who will guide the consultant team in revising the GSP for adoption. The meeting also includes a status update on the Prop 1 funded SDAC projects and consideration of authorization of funds for preparation of a Prop 68 grant application on behalf of the basin.

   c. Summary of Public Comments Received (Opportunity for public comment following each topic)

      i. Samantha Salvia (Woodard & Curran) provided a summary of the public comment process. She noted that SGMA does not require that GSAs hold a public comment period on the draft GSP, in part because DWR will hold a 60-day public comment period during their review process. However, the coordinating and stakeholder committees felt this was important and so time was built into the schedule for a 30-day review. She described how the public draft GSA was made available. She reviewed the list of NGOs, water agencies, State and Federal Agencies, and other entities who provided public comment to the draft GSP. All comments are available on the mercedsgma.org website. All comments were provided to each Board member in advance of tonight's meeting. She explained the

approach to responding to comments will involve placing the comments into 3 groups:: minor corrections/clarifications will be addressed directly by edits within the GSP), substantive comments will be responded to with a master responses and edits to GSP under direction from GSAs, and comments on future considerations for GSP implementation will be noted for GSA Board consideration and future Coordinating Committee meeting discussions).

ii. Comments were received on many parts of GSP. Given time constraints, for tonight's meeting, discussion will be focused on the following seven areas of comments: water level, subsidence, demand management, water allocation, water quality, groundwater dependent ecosystems, and stakeholder outreach. Samantha described the meeting format for the review of public comments: she will describe the relevant GSP section, background on the approach taken in the GSP, who commented, key concerns raised, and the potential response. Readers are encouraged to see presentation slides available on the mercedsgma.org website for full summary details (link to Meetings page: http://www.mercedsgma.org/meetings). After each comment the public will be invited to comment, with a limit of 3 minutes per person, per topic. This will be followed by an opportunity for Board discussion and/or comment.

iii. Water Level: Samantha (W&C) explained the approach in the GSP. The GSP took the approach of setting sustainable management criteria to be protective of the most sensitive beneficial use – shallow domestic wells. The GSAs will manage the basin to measurable objectives. The minimum thresholds are not the threshold for action, they are used to define undesirable conditions and they are the trigger for state intervention. Samantha reported that the GSP team has heard both from stakeholders and the coordinating committee a strong desire to manage groundwater locally and avoid state intervention. The representative monitoring network was developed based on previous CASGEM (California Statewide Groundwater Elevation Monitoring) monitoring. (Since 2009, the CASGEM Program has tracked seasonal and long-term groundwater elevation trends in groundwater basins statewide.) Included in the implementation plan is action to develop a Data Gaps Plan in first year. Data gaps are largely within southwestern portion of basin and to lesser degree in Northeastern area.

- Written comments were received from environmental organizations and organizations representing disadvantaged areas.

1. **Public Comments:**

   a. **Keith Ensminger (Merced resident, small business owner):** Keith is glad we have finally come to the point where we are starting to regulate our aquifers. We are the last western state to do this. Keith attended a farm show and folks there were surprised that it took until now for CA to regulate groundwater. Keith has been involved in the technical committee late in the process, used to be a farmer, had teaching as second career, translation now as the third (he and his wife have a local translation business). Explained that surface water (SW) has been a strong influence on groundwater (GW), a strong approach with will need to be taken with SW/GW interaction. The folks using irrigation systems with SW should use the SW first before pumping the GW. Keith also stated that Prop 68 funding should be used to bring SW into areas that are fallow or would have to go out of operation. He has talked to a few folks in the irrigation districts but there needs to be money to do this activity. Keith thinks it's important that those in the irrigation districts should use all of the SW

rights first before using GW. He stated all the pumps today need to be regulated whether that's through GSP, meters, or other means.

b. **Nataly Garcia (Leadership Counsel):** Nataly asked that the groundwater level comments provided by Leadership Counsel in their letter be considered, as they do not see this on the summary. They want to make sure that this has been documented and considered.

2. Board Comments:

a. Dave Nervino (MSGSA): In response to the comments, Dave stated that with the Minimum Thresholds (MTs) there was a comment that the MTs should be based on the best water quality and not just the level. Dave agrees with this comment and commented: what's the point if the water quality is not good.

iv. **Subsidence:** Samantha (W&C) explained the approach for subsidence. The measurable objectives for subsidence were based on recent measured subsidence levels. The coordinating committee considered using groundwater level as a proxy and decided it was most appropriate to set targets based on direct measurements of subsidence. She reiterated that the minimum thresholds are not where the basin wants to be. The GSP acknowledges that there has been subsidence and some loss of flood capacity, but the CC did not consider those significant and unreasonable. The objectives were set with the objectives of balancing the desire to reduce subsidence, avoid state intervention, and focus on ways to reduce stress on the deep aquifer while allowing some economic activity and beneficial use to continue.

v. Samantha identified who submitted written comments and summarized them: concerns raised on whether adequate protection is provided, acknowledgement of undesirable results related to subsidence, and request for immediate reduction in sub-Corcoran pumping. A potential response including clarifying and adding information for the El Nido area and continued coordination with neighboring basins was described.

1. Public Comments:

a. Keith Ensminger (Merced resident, small business owner): Keith stated the key issue to discuss is the water trading. There are essentially three key aquifers in the basin, and sometimes these flow in different directions. First, our water should not be traded outside of this district at all. When it comes to trading, this should be done and limited to trade amongst adjacent properties as much as possible. It does not make sense for folks in Stevinson to be trading with folks in Planada because they are in a different environment. This relates to subsidence. This could create problems for the irrigation districts, the canals and different entities. Mr. Ensminger stated that water trading is an important part of managing the aquifers

2. Board Comments:

a. Kole Upton (MSGSA): SW is the key to GW sustainability. There needs to be trade, but like Keith said, this needs to be done with one land next to another.

b. Dave Nervino (MSGSA): Stated we should not waste time trading outside the basin or discussing this.

vi. **Demand Management:** Samantha explained that because the basin is in overdraft, there is a recognition that pumping in the basin must be reduced. Demand management is discussed in the Projects and Management Actions section of the GSP both generally and as a specific action proposed by Merced Subbasin GSA. Many of the comments were about managing pumping reductions in general and not necessarily specific to Merced's proposed action. Comments were provided by water districts, NGOs, individuals, and businesses and the CA Poultry Federation. Conflicting comments on timing of implementation were submitted. Concerns also included encouraging public participation in decisions potentially excluding some users from reductions. This topic is still a work in progress with GSAs, more detail and refinement may be added prior to adoption as information becomes available.

1. Question from SHE: Is this (the potential response) what is going to be put forward? Answer (W&C): The potential response is a starting point. The consultant team will be working with the Board and the GSA staff on in developing the responses to comments.

2. **Public Comments:**

   a. **David Hobbs (Merquin County Water District):** Appreciates the work that has gone into creating the GSP. He was surprised that at the first stakeholder meeting residents of areas of subsidence said they recognized they were responsible for the issue. Merquin County Water District is asking for consideration that the resolution be equitable. If the decision upon implementation is that every pumper gets the same reduction, this is not equitable. That is subsidizing sustainability. Merquin is located in the Stevinson area. Stevinson has historically had high GW in part because they are the bathtub of basin and in part because of surface water they import. Merquin brings in over 14,000 AF annually, and asks that when the implementation decisions be made that this be taken into account. They also want to look into enacting management zones and not have a one-size-fits-all approach to the basin. There is a joke in Stevinson that there are some parts of year that you can't dig a posthole. It is not equitable or fair to cut pumping back the same for everyone in the basin as someone who has overpumped.

   b. **Keith Ensminger (Merced resident, small business owner):** Keith stated that we are overdrafting over 175K AF/yr and we need to deal with this. As far as land use goes, we need to cut back on the amount of farm land that's there and one way to do that is to fallow land, and another way to do that is to pay farmers to fallow land from time to time and make this part of their rotational schedule with their crops. Perhaps with Prop 68 and other legal structures we have we can support this and also help the irrigation districts to run water through their canals on those fallow lands in order to recharge those basins. There are differences in places like Stevinson and Planada. Pasture land on the east side of the Santa Fe railroad should probably remain pasture land and once orchards that are out there have reached end of useful life, they should go back to pasture land. The key is to create a water storage program that helps everyone.

3. **Board Comments:**

a. **George Park (MSGSA):** General discussions have been in the MSGSA that we would like to see some form of demand management and that this will be the subject of some of the next meetings.
b. **Dave Nervino (MSGSA):** In implementing demand management, we need to have an adequate time considered how to implement infrastructure needed for this.

vii. **Allocation Framework:** Samantha (W&C) explained that the allocation framework refers to the way that the GSAs are going to determine how much water to allocate throughout the basin. The coordinating and stakeholder committees have been discussing this topic since last October. This is one of the most challenging part of the GSP and it is understandable that it is taking time to develop. The draft document includes estimates of sustainable yield and developed supply for illustrative purposes. Comments received included the need to consider non-irrigated lands, economics, equity, and incentives. There was a comment to include habitats in the framework and a request to have more information in the GSP and opportunity to comment. More specifics may be added to the GSP prior to adoption. It is likely the full details of the allocation will be finalized after the GSP is submitted to DWR.

1. **Public Comments:**

a. **Eric Swenson (Shannon Pump, on behalf of Merquin Water District):** Requested and strongly encouraged that the MSGSA area establish a minimum of 3 management zones for the 2020-2025 update. Believes that there are risks faced by DACs, natural habitats, and others. The first zone could be a subsidence zone centered around El Nido. The second zone, which would be east of subsidence zone, is significantly different than the other two zones. Natural GW recharge rates appear to be significantly different in this area. There is greater potential for domestic and small water wells to go dry, and not adequate water for nut production. The third zone has different habitats with significantly greater recharge occurring in this area. He would like to also request that GW recharge from canals be included in the model developed by W&C. Mr. Swenson stated that he has maps of the three zones that can and has provided those to officials in the past.

2. **Board Comments:**

a. **Nic Marchini (MSGSA):** Agrees with comments from Eric. The zones will inevitably and likely be more than 3, but generally agrees with the comments.
b. **Dave Nervino (MSGSA):** Stated we could also consider that these are priority zones and could move resources from wet areas to where this they are needed.

viii. **Water Quality:** Samantha (W&C) provided a summary of the GSP approach, reiterating that drinking water is an important issue and has been the subject of discussions during Stakeholder and Coordinating Committee meetings. The GSP developed sustainable management criteria for water quality constituents where there is a clear causal nexus between groundwater activities and water quality - salinity. The GSAs sought input from the Merced County Environmental Health Division and set management criteria for salinity based on drinking water standards. The other key part of the GSP approach is coordination with agencies already tasked with monitoring water quality. Board members strongly agreed that the GSAs should avoid duplicating efforts with programs already underway by agencies tasked with protecting drinking water quality. Comments were

received from SHE, LC, and environmental organizations with main concerns including: MTs do not adequately address drinking water quality, need more regulation and monitoring of wider range of constituents, and not enough monitoring wells. The potential response includes clarifying and better defining coordination with other monitoring programs, ensuring GSP related projects evaluate water quality impacts, and incorporating the under development IRWM DAC Water Needs Assessment when available.

1. **Public Comments:**
    a. **Nataly Garcia (LC):** Believes the responses do not address what Leadership Counsel provided in the comment letters.
    b. **Maria Herrera (SHE and SC member):** Wants to encourage the board to consider the comments they have submitted because the current plan does not address drinking water for communities. She is concerned that there is not enough content connected to constituents with the MTs section and is concerned that the plan is at risk of not being deemed adequate by DWR. She also reminded Board members that SGMA requires input and participation from stakeholders in this region. States that the GSP as written would not respect the human right to drinking water.
    c. **Keith Ensminger (Merced resident, small business owner):** Used to live in Southeastern Montana, where lot of wells were non-potable. His wells were not potable, and neither were his neighbors' wells. Nearest potable well was 5 miles away. Maybe one way to find a solution is to provide potable water to folks now to ensure that they have what they need if they currently do not have potable water from their wells. This could be a potential solution.
2. **Board Comments:**
    a. **Kole Upton (MSGSA):** Is also concerned with water quality and testing and thinks we could expand coordination with the existing agencies and make use of the data that is out there.
    b. **Lloyd Pareira (MSGSA):** We should coordinate with existing agencies.
    c. **Hicham Eltal (MIUGSA):** This is our first cut of the GSP, a lot is not known. His concern is unless you have information that leads the way, effort is made in vain. There are pumpers where there are no monitoring wells. It is difficult to know what the implications will be in making things stricter or not stricter for pumping. He does not disagree with anything that has been said, but states that the Subbasin will need to proceed with caution. All of these things have to be vetted, especially when there is missing data.

ix. **Groundwater Dependent Ecosystems:** Samantha (W&C) explained that the approach assessed Natural Communities Commonly Associated with Groundwater (NCCAG) dataset against groundwater depth, supplemental water, irrigated fields, losing streams, and vernal pools to identify potential GDEs in subbasin. GDEs were considered as beneficial users of groundwater. She noted that the relationship between groundwater levels and GDEs is not well understood. Most of the areas that were identified as potential GDEs are near the San Joaquin River and in areas with clay layers – how, if at all, deep aquifer pumping affects them is not well understood. All comments received were from environmental organizations. Concerns raised were expanding areas considered GDEs and making the GSP more protective of GDEs. Potential responses include considering

GDE locations in developing plan to fill data gaps for shallow groundwater monitoring and evaluating incorporation of The Nature Conservancy's GDE Pulse Tool into GSP annual report process.

1. **Public Comments:** None.
2. **Board Comments:** None.

x. **Stakeholder Outreach:** Samantha (W&C) explained the consulting team believes the approach made good use of time and resources available. Because Charles Gardiner (Catalyst) described the outreach approach in detail earlier in the meeting, she focused on plans for future outreach. The implementation plan describes the current plan for ongoing outreach and involvement. Comments were received from environmental orgs, LC, and SHE. Concerns included inadequate outreach to disadvantaged communities and environmental interests and a lack of balance on SC of all stakeholders especially for environmental representation. Potential response includes adding SC membership and who they represent in GSP and including the Stakeholder Engagement Strategy in appendix, as well as updating the Stakeholder Engagement Strategy for the implementation phase.

1. **Public Comments:**
   a. **Maria Herrera (SHE and SC member):** Maria thanked the Boards members and said that the letter of support from the GSAs enabled her organization to access state funding to cover translation services at this and other key meetings. It also paid for SHE in translating documents and conducting outreach in the basin. The State funding for their services is coming to an end early next year. She encouraged the boards to consider including funding in their operating budgets for translation services. She also encouraged using consultants with connection to local communities and providing adequate time for comments (30 days was not enough).
   b. **Nataly Garcia (LC):** Nataly states that it is great that there is a joint meeting, but there should have been a public workshop where the GSP was walked through with the public. This should have taken place prior to this meeting.
2. **Board Comments:**
   a. **Dave Nervino (MSGSA):** In getting the public involved, we also have the farm bureaus and other groups who will and have circulated information.

d. Next Steps in GSP Adoption Process

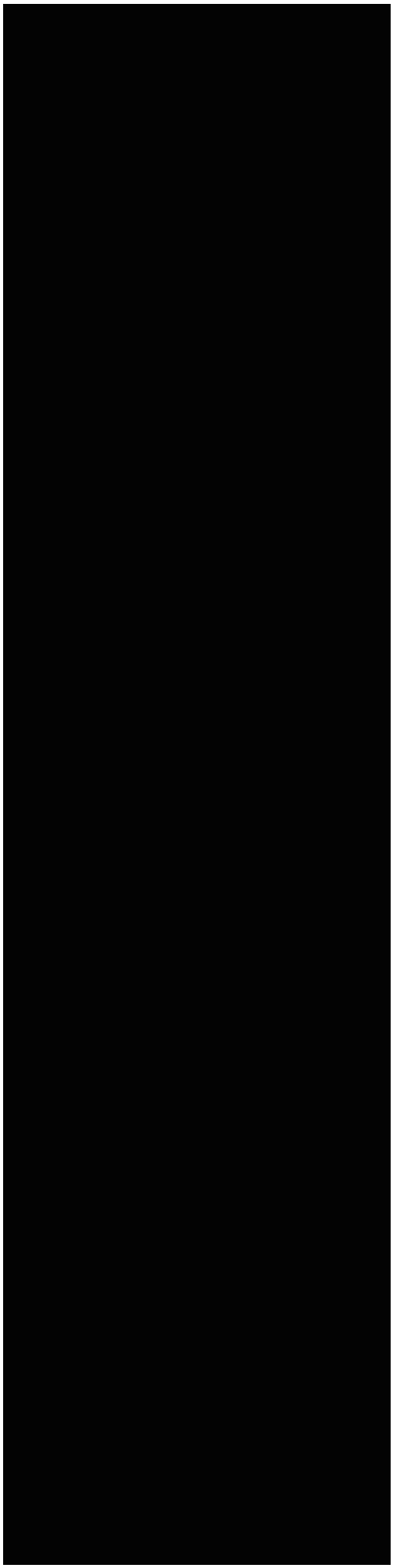
i. Alyson Watson (W&C) described the next steps and timeline for review & submission of the GSP to DWR. W&C will be working with GSA staff on revising the GSP in response to comments, including those received this evening.). The earliest the GSP can be adopted is late October, because the adoption hearings cannot begin until 90 days after filing a Notice of Intent to adopt (filed in July). Hearings are anticipated to take place Nov./Dec. Submission in January 2020 to DWR.

e. Update on progress of the Severely Disadvantaged Community grant projects.

i. Hicham Eltal (MIUGSA) described the funding source for the DAC projects and provided an overview of the locations of the projects (see slides for map of projects). The updates were as follows:

1. Planada Groundwater Recharge Pilot Basin & Monitoring Well: We have secured a parcel of land and are moving forward with experimenting with certain soils in this area. We are honing in on the best soils. The location is not far from Mariposa Creek.
2. El Nido Groundwater Monitoring Wells: The other project is supposed to have two wells, the first well we are still working on. We are still working with the owner of the land. The other monitoring well likely be at the fire station. The County has given the approval to install the well.
3. Meadowbrook Intertie Feasibility Study: This project looks into providing a connection to the Franklin-Beechwood area. We are hoping in the next few months to have the results of the study.
4. Questions from Dave Nervino (MSGSA): How deep are the monitoring wells. Answer (Hicham): each of these are deep wells. They will be multiple completion wells. They will go to almost 600 ft.

3. Action Item
    a. Prop 68 Funding Opportunity – Consider authorization of funding of $50,000 for consultant support to prepare Prop 68 Grant Application
        i. Alyson (W&C) explained that the funding used for the SDAC projects and the GSP development were under Proposition 1. There is a new Proposition 68 and the basin is eligible for up to $500K and should qualify for a DAC wavier meaning no local match. The application is due on November 1, 2019. The Planning Grants Proposal Solicitation Package (PSP) and final guidelines have now been released by DWR. The updated timeline was also provided by DWR. The final review and funding award are anticipated in the March 2020 timeframe.
        ii. In their last meeting the CC recommended that the Boards authorize up to $50K for W&C to prepare the application for Prop 68 funding.
        iii. MSGSA motions and approves of the action.
        iv. TIWD GSA-1 makes a motion, the motion is seconded, and approved.
        v. MIUGSA makes a motion, the motion is seconded, and approved.
4. Public Comments
    a. Question from Maria Herrera (SHE and SC member): Has the working group for Prop 68 content started? When are those meetings? Answer (W&C): They are just starting this process. We understand SHE (Maria) has expressed interest in this and she will be included in working group.
    b. Nataly Garcia (LC): Will the updated GSP also be provided to the public? Answer (Catalyst): Yes, it will go to each GSA board and they will do their own public process. It will also be available on the website.
5. Meeting Adjournment
    a. Meeting is adjourned by the GSA chairs in accordance with their boards' protocols.



Woodard & Curran

woodardcurran.com

Prepared by:

Woodard & Curran
801 T Street
Sacramento, CA 95811
916.999.8700

Image courtesy: Veronica Adrover/UC Merced