

# Groundwater Sustainability Assessments

A REVIEW OF THE DEPARTMENT OF WATER RESOURCES' DETERMINATIONS ON GROUNDWATER SUSTAINABILITY PLANS IN CRITICALLY OVERDRAFTED BASINS

AUGUST 2022







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## ACKNOWLEDGEMENT

The Groundwater Leadership Forum is grateful to The Water Foundation for the generous support and funding to review the determinations for 2020 Groundwater Sustainability Plans and comment letters from state and federal agencies and groundwater stakeholders. We are grateful to American Rivers, Audubon California, California Alliance with Family Farmers, CivicWell, Clean Water Action/Clean Water Fund, Community Water Center, Leadership Counsel for Justice and Accountability, Self-Help Enterprises, Sustainable Conservation, the Nature Conservancy, and Union of Concerned Scientists for their support and contribution to this report.

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## RECOMMENDED CITATION

Arthur, S., N. Atume, J.P. Ortiz-Partida, M.M. Rohde. 2022. Groundwater Sustainability Assessments: A Review of the Department of Water Resources' Determinations on Groundwater Sustainability Plans in Critically Overdrafted Basins. Groundwater Leadership Forum.





## ABOUT

The Groundwater Leadership Forum (GLF) is a coalition of environmental justice and conservation organizations, all grantees of the Water Foundation, deeply engaged in and committed to the successful implementation of the Sustainable Groundwater Management Act (SGMA). The GLF works together to advance the just and sustainable use of groundwater in California to ensure a healthy and thriving future for all.





# Executive Summary



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## An Evaluation of the Department of Water Resources' Determinations on 2020 Groundwater Sustainability Plans in Critically Overdrafted Basins

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 critical for the resilience of California's water portfolio, particularly in light of climate change. We reviewed 31 Groundwater Sustainability Plans (GSPs) in 2020 and 64 GSPs in 2022 to evaluate how well drinking water users, disadvantaged communities, the environment, stakeholder involvement, and climate change were addressed in GSPs. Collectively, these issues are true indicators of sustainability. 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.

Of the 46 GSPs submitted in January 2020, the Department of Water Resources (DWR) determined eight GSPs to be adequate and 34 GSPs to be incomplete. In this paper we evaluate to what extent DWR's determinations provide oversight on the key issues of drinking water, disadvantaged communities, the environment, stakeholder involvement,

and climate change. We summarize the corrective actions that DWR is recommending or requiring, as well as compare DWR's determinations to the assessment of 31 GSPs that we conducted in 2020. We also reviewed the 11 comment letters submitted by the State Water Resources Control Board (SWRCB), 25 comment letters submitted by the California Department of Fish and Wildlife (CDFW), and seven comment letters submitted by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) to compare deficiencies identified in GSPs across agencies.



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# Disadvantaged Communities and Drinking Water

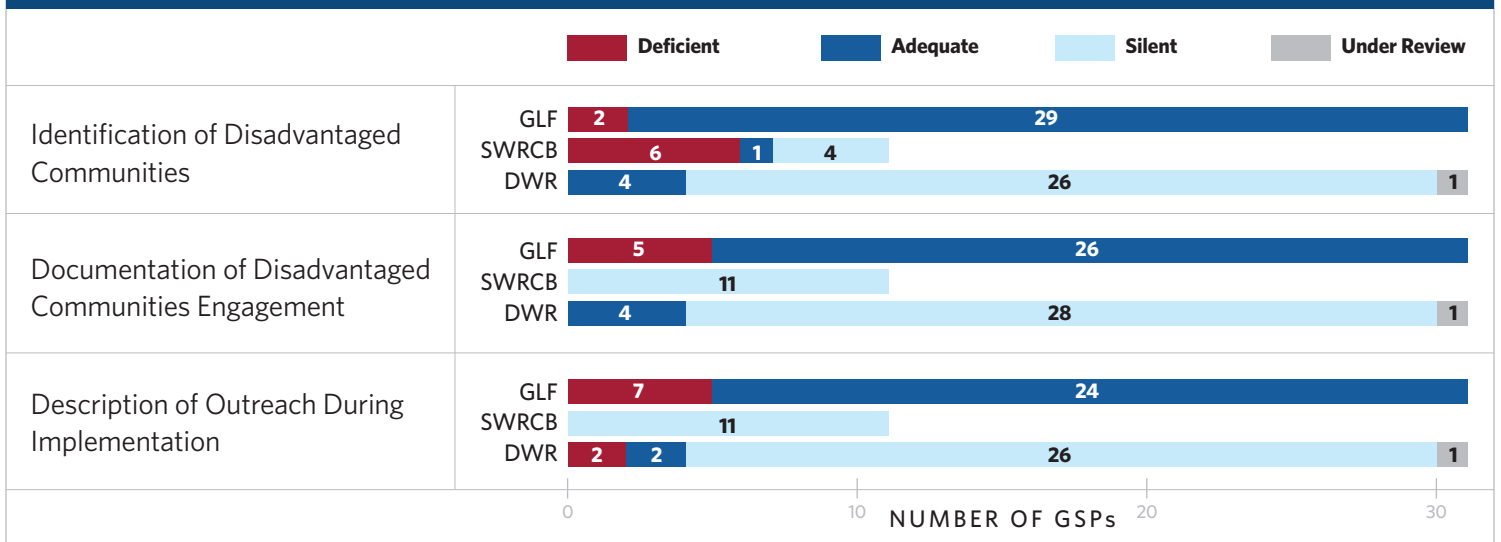
Disadvantaged communities throughout California’s groundwater basins rely on shallow drinking water wells or small water systems that are vulnerable to both water supply and quality issues. SGMA requires the consideration of these beneficial uses and users in GSP development, which is first contingent upon adequate identification of disadvantaged communities and domestic well users. Our organizations evaluated whether GSPs identified disadvantaged communities, domestic wells, and small community public water systems by including maps of their locations in the GSP. We referred to the disadvantaged community mapping tool that was provided by DWR for mapping disadvantaged communities census tracts, block groups, and places. Figure 1 provides the criteria we used to evaluate how these beneficial users were identified and how engagement of drinking water users and disadvantaged communities was documented in the GSP.

Our evaluation found that almost all GSPs reviewed included maps of disadvantaged communities within their basin. Our organizations found that most of the plans reviewed provided documentation of how they engaged disadvantaged communities in the GSP development process with the exception of five plans. Similarly, more than half of the GSPs reviewed included a description of outreach to disadvantaged communities during the GSP implementation phase with the exception of seven

plans. Our evaluation focused only on documentation of identification, outreach and engagement of drinking water users and disadvantaged communities as presented in the plans. Our organizations did not verify whether claimed identification, outreach and engagement occurred on the ground. Although our evaluation focused only on basic documentation of stakeholder engagement, inclusive and robust outreach and engagement to drinking water users and disadvantaged communities is critical for the Groundwater Sustainability Agencies (GSAs) to fully understand the specific interests and water demands of these beneficial users, and to support the identification and consideration of all beneficial uses and users in the development of sustainable management criteria and selection of projects and management actions.

The determination letters from DWR to GSAs were mostly silent on identification, outreach, and engagement of disadvantaged communities and drinking water users except for four GSPs deemed adequate. The SWRCB comment letters were significantly more detailed about identification, outreach, and engagement of disadvantaged communities and drinking water users and included higher review criteria for disadvantaged communities identification than the Groundwater Leadership Forum (GLF). The SWRCB found that six plans failed to adequately identify disadvantaged communities and 11 plans failed to document outreach and engagement to disadvantaged communities (Figure 1). Similar to DWR, the SWRCB was silent on outreach and engagement during the GSP implementation phase.

**FIGURE 1. IDENTIFICATION AND ENGAGEMENT OF DISADVANTAGED COMMUNITIES AND DRINKING WATER USERS**





# The Environment

Ecosystems throughout California are impacted by groundwater management where streams, seeps, springs, and terrestrial vegetation are connected to groundwater, even seasonally. Our organizations evaluated whether groundwater dependent ecosystems (GDEs) and interconnected surface waters (ISWs) were identified using best available science, as well as whether native vegetation was included in the GSP’s water budget (Figure 2). The accurate identification of GDEs and ISWs is critical for GSAs to fully understand the specific interests and water demands of these beneficial users, and to consider them in the development of sustainable management criteria and selection of projects and management actions.

We found that the 2020 GSPs largely did not identify GDEs or ISWs using best available science, frequently eliminating potential GDEs or ISWs where information was lacking, rather than developing a plan to fill existing data gaps. Also, less than half of GSPs transparently represented the water demands of native vegetation in their basin water budgets. Inclusive and robust engagement of environmental stakeholders is needed to improve the identification and consideration of environmental beneficial uses and users in future GSP updates.

In comment letters submitted to DWR in 2020, the SWRCB, CDFW, and NMFS all described a pattern of shortcomings in GSPs in the identification of ISWs and the consideration of ISWs in sustainable management criteria. CDFW and NMFS also identified deficiencies in the identification of GDEs and made recommendations to GSAs to use the best available science.

DWR did not emphasize stakeholder engagement or the identification of GDEs in their determinations on 2020 GSPs. In two instances where DWR did comment on shortcomings in GDE identification, they did so in recommendations for approved plans to make updates over the next five years. Consistent with DWR’s focus in their determinations on undesirable results and sustainable management criteria, they required corrective actions to improve the consideration of ISWs in the setting of sustainable management criteria in 11 GSPs they deemed incomplete. This sets an important threshold for compliance in selected basins, but significant uncertainty remains around whether and how DWR will phase in requirements for identification and consideration of both GDEs and ISWs where widespread deficiencies were present in 2020 GSPs.

**FIGURE 2. IDENTIFICATION AND ENGAGEMENT OF ENVIRONMENTAL STAKEHOLDERS**

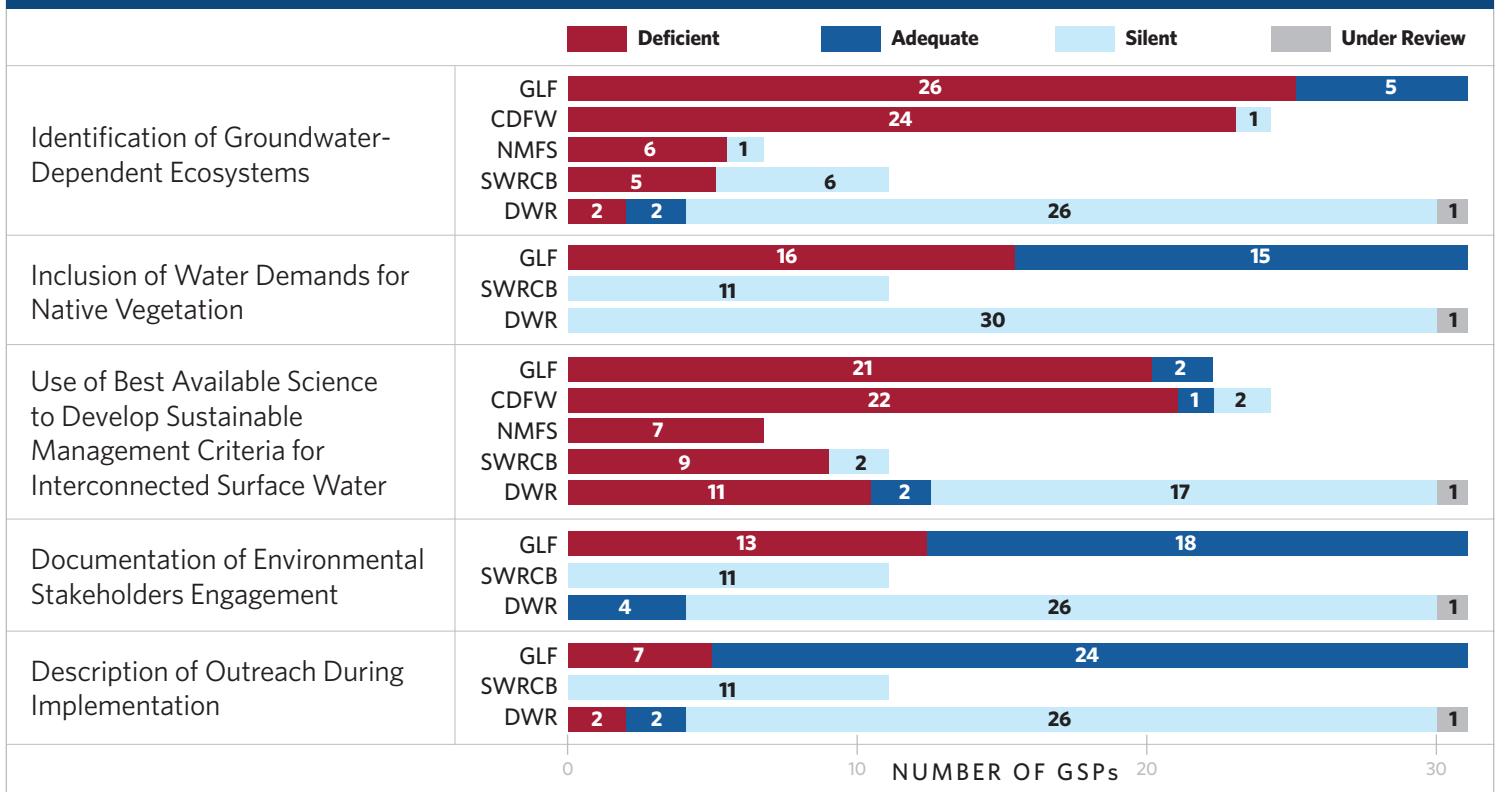
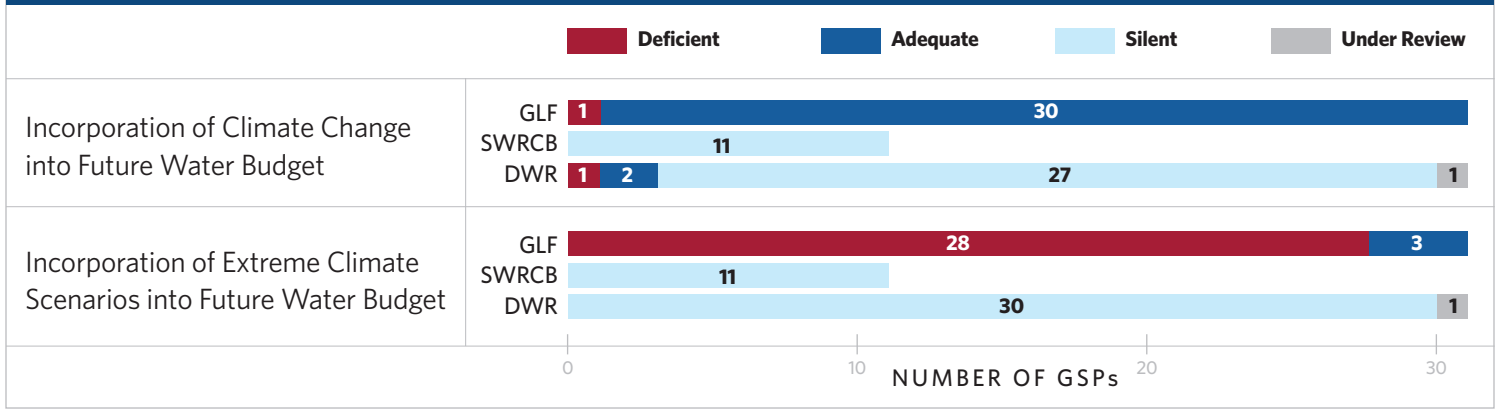




FIGURE 3: INCORPORATION OF CLIMATE CHANGE



## Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources that must be examined and incorporated in GSPs. The [GSP Regulations](#) require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures. DWR published a guidance document on the use of climate change data in the development of GSPs, but did not require that GSAs consider extreme



climate scenarios in their planning. The state of California is currently in its third year of severe drought, and experiencing its driest year on record. The current drought likely falls within such extreme scenarios that are not being considered in over half of the GSPs, but DWR failed to include extreme climate scenarios recommendations in their GSP determination letters (Figure 3).

In our review of the 2020 GSPs, we found that GSAs followed [DWR's guidance](#) to integrate climate change into the projected water budget, except one GSP (i.e., Indian Wells Valley Basin) that did not include climate change at all. The Indian Wells Valley Basin GSP was approved by DWR, and DWR recommended that the GSAs integrate climate change in their GSP update in five years. We consider the exclusion of potential future climate conditions to be a fatal flaw that should require immediate corrective action in the 180 days period applied to incomplete plans.

## GSP Implementation Actions

The consideration of potential impacts on all beneficial users of groundwater in the basin is required under SGMA when defining undesirable results and establishing minimum thresholds. Figure 4 provides a list of questions we used to evaluate the consideration of disadvantaged communities, drinking water users, and the environment in GSP implementation measures, including sustainable management criteria, monitoring networks, and projects and management actions. Adequate consideration of potential direct and indirect impacts on these beneficial users is contingent upon adequate identification and engagement of the appropriate stakeholders, and is essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.



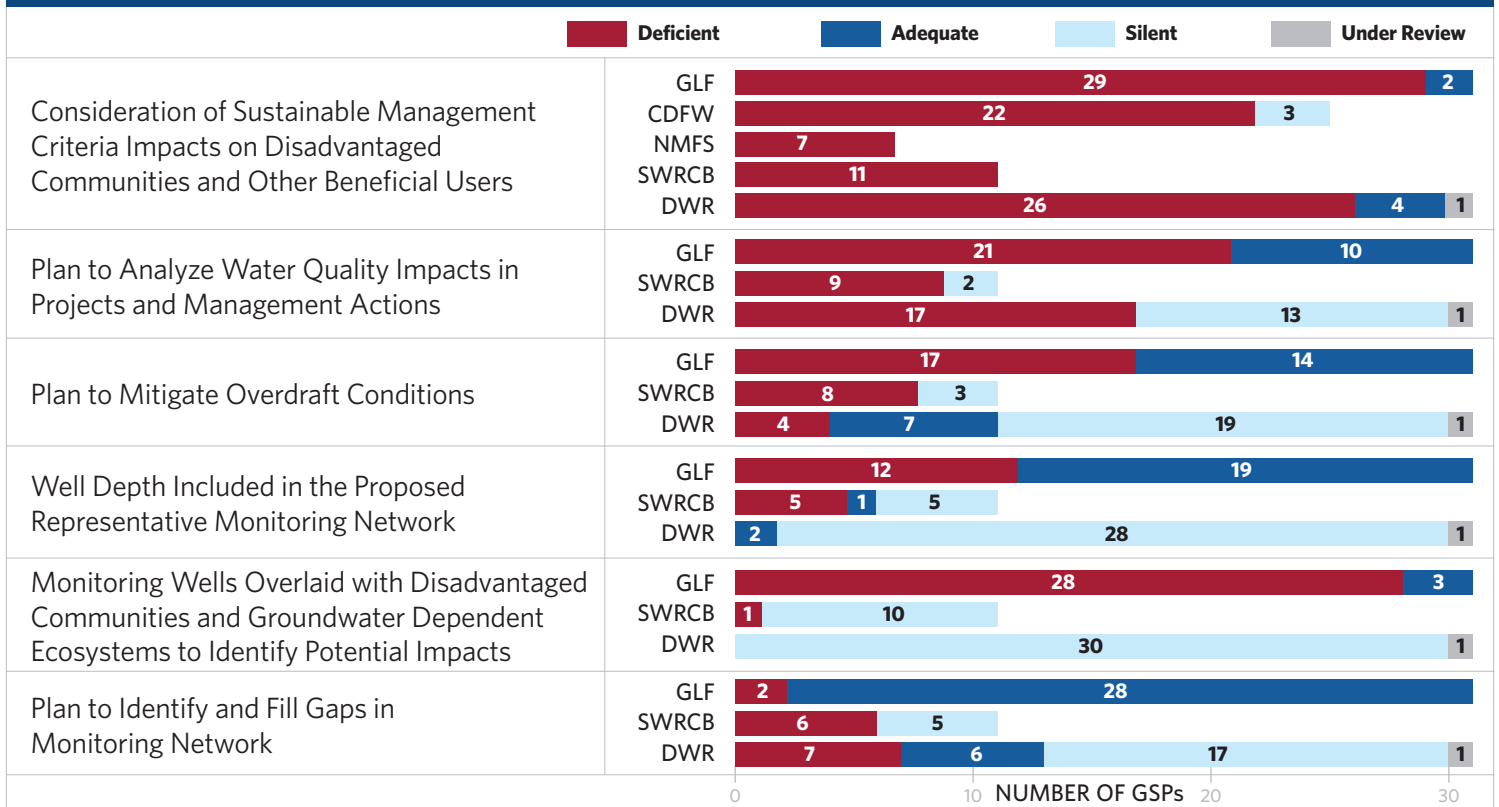
In general, there was agreement across agencies that the consideration of disadvantaged communities and environmental beneficial users were deficient in many plans. SGMA requires that the sustainable management criteria avoid significant and unreasonable impacts on drinking water users, consistent with the Human Right to Water policy. In addition, SGMA specifically requires that GSPs include “impacts on groundwater dependent ecosystems” and assess whether surface water depletions caused by groundwater use are having an adverse impact on beneficial users of surface water and groundwater.

Our evaluation focused on whether GSPs provided a description of direct and indirect impacts on disadvantaged communities and drinking water users when defining undesirable results and minimum thresholds for chronic lowering of groundwater levels and degraded water quality and whether GSPs provided a description of direct and indirect impacts on GDEs and instream habitats within ISWs when defining undesirable results and minimum thresholds for chronic lowering of groundwater levels, degraded water quality, and depletion of ISWs. Our review found that almost all GSPs (except two) failed to consider impacts of their sustainable management criteria on disadvantaged communities and the environment (Figure 4). DWR evaluations and SWRCB comment letters

noted similar deficiencies in consideration of beneficial users. These deficiencies were identified as required corrective actions by DWR in determination letters for incomplete basins.

To ensure that sustainable management criteria adequately consider beneficial users and prevent adverse impacts, adaptive management is at the core of SGMA. SGMA requires that impacts to beneficial users or users of groundwater be monitored to enable adaptive management. In our review of monitoring deficiencies in GSPs (Figure 4), we found that there was general agreement across agencies that many GSPs had deficiencies in planning to identify and fill data gaps. However, GLF, NMFS, and CDFW specifically called out deficiencies in identifying monitoring data gaps around disadvantaged communities and the environment, whereas DWR remained silent on the issue. Without adequate monitoring, beneficial users remain unprotected by the GSP. When data gaps are not identified, particularly in shallow aquifers, impacts disproportionately threaten disadvantaged communities, GDEs, aquatic habitats, and shallow domestic well water users. In addition to monitoring wells, biological monitoring is an important component to ensure impacts to GDEs do not occur.

**FIGURE 4: DISADVANTAGED COMMUNITIES, DRINKING WATER USERS, AND THE ENVIRONMENT IN GSPs PROPOSED ACTIONS**





# DWR Requirements on Disadvantaged Communities, Drinking Water Users, the Environment, and Climate Change

The SGMA regulations outline three possible findings by DWR in their 2020 GSP determinations: **a) approval** with recommended corrective actions for GSP updates in 2025, **b) incomplete** with required corrective actions within 180 days, and **c) inadequate** with SWRCB intervention. DWR approved eight 2020 GSPs and deemed 34 incomplete. The deficiencies in Figures 1 - 4 reflect both recommended and required corrective actions identified by DWR. Figure 5 details whether DWR required fixes on our target criteria and whether those fixes were required to be

addressed within 180 days or in five years. DWR focused mostly on the development of sustainable management criteria, including undesirable results, measurable objectives, and minimum thresholds, in their incomplete GSP determinations. They emphasized that GSAs are required to consider all beneficial users of groundwater in their selection of sustainable management criteria. The determinations for approved plans generally lacked detailed requirements or corrective actions for addressing the consideration of disadvantaged communities, drinking water users, the environment or climate change. We identified numerous shortcomings on these topics in the approved GSPs, but DWR's approach pushes these issues out to the 2025 GSPs.

FIGURE 5: DWR REQUIREMENTS FOR CORRECTIVE ACTIONS IN 2020 GSPs

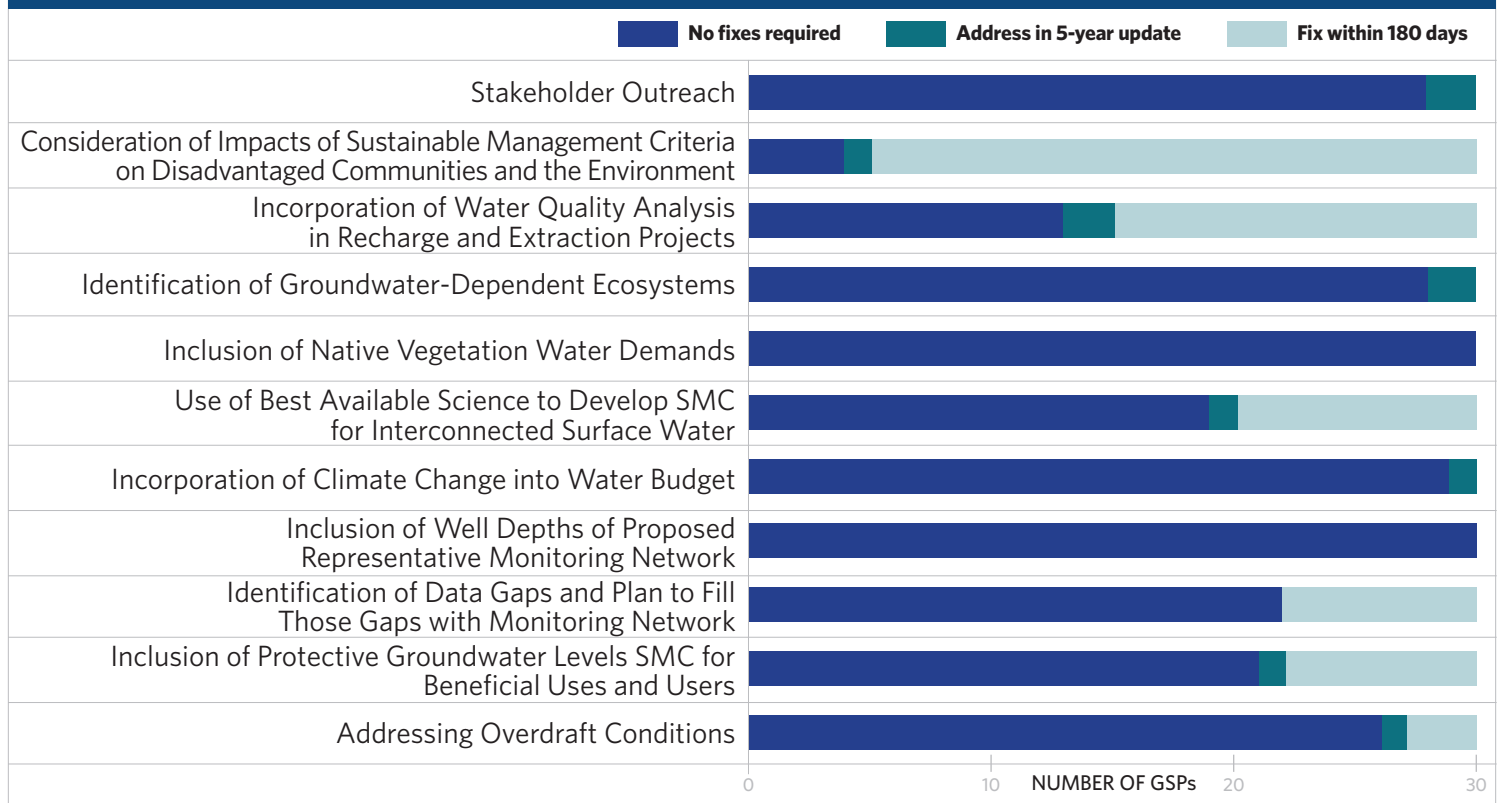
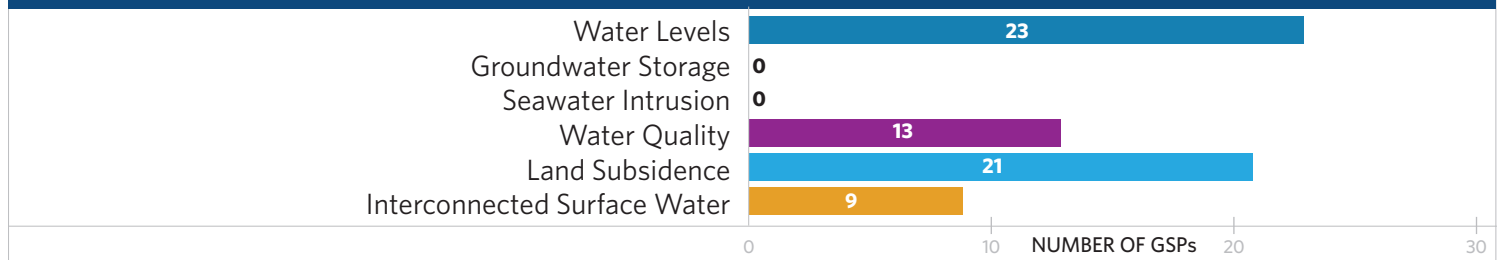


FIGURE 6: DWR REQUIREMENTS TO REVISE SUSTAINABLE MANAGEMENT CRITERIA FOR UNDESIRABLE RESULTS IN 2020 GSPs





# Recommendations to the Department of Water Resources

We found that DWR set an important baseline by requiring 12 basins to revise their GSPs to consider all beneficial uses and users, including interconnected surface waters, disadvantaged communities and drinking water users, when setting their sustainable management criteria. But DWR's determinations were broad and lacked details for issues relating to disadvantaged communities, drinking water users, climate change, and the environment.

Without specific guidance in SGMA regulations or DWR best management practices on how to adequately identify, engage and consider these users into plans, GSAs and their consultants are looking to DWR's determination letters to understand what is being required of them. DWR only provided vague recommendations on disadvantaged communities, drinking water, the environment, and climate change in recommended corrective actions on GSPs they approved. GSAs have less than three years remaining to address these issues in their 2025 GSPs, and it is unclear if DWR will ever require these improvements, instead of only recommending them.

## RECOMMENDATIONS



**Oversight of Plan Impacts:** Require all GSAs to analyze the impacts of sustainable management criteria on disadvantaged communities and the environment as beneficial users of groundwater. Move basins to probation with the SWRCB where vulnerable beneficial users are not adequately considered in updated GSPs resubmitted in July 2022.



**Well Impact Mitigation:** Ensure that GSAs include well impact mitigation programs if their minimum thresholds allow drinking water wells to go dry. Provide drinking water well impact mitigation guidance to all GSAs, with enforceable performance standards, that prevent or mitigate adverse impacts where projected groundwater levels will result in impacts to drinking water supply from declining groundwater levels. Ensure that all GSAs include updated plans documenting how significant and unreasonable impacts to drinking water users will be mitigated.



**Public Trust & Human Right to Water :** Review and evaluate projects and management actions identified by GSAs to ensure that public trust resources and the Human Right to Water are protected through the implementation phase.



**Financial Assistance:** Direct financial assistance to GSAs to address deficiencies in GSPs with respect to disadvantaged communities and drinking water, the environment, and climate change. Provide funding to existing technical assistance providers to facilitate participation of vulnerable stakeholders in SGMA implementation. Provide technical and financial assistance to GSAs to install monitoring wells that fill in monitoring gaps around GDEs, ISWs, drinking water wells, and disadvantaged communities.



**Accessibility & Transparency:** Publicly display spatial data for sustainable management criteria and representative monitoring networks as selected by GSAs on [California Groundwater Live](#). Provide real-time information on exceedances of measurable objectives and minimum thresholds in each basin.



**Annual Reporting:** Require GSAs to include information on ongoing stakeholder engagement, updated representative monitoring network data and updates on projects and management actions implementation in annual reports.

### Improve Guidance to GSAs:



- **Climate Change** | Update climate change guidance to require planning for extreme scenarios and inclusion of most recent drought data in GSP updates.
- **Environment** | Develop detailed guidance for GSAs to identify and consider groundwater impacts to GDEs and ISWs. Require refinements to GSPs that eliminate potential GDEs and ISWs without best available science.
- **Water Quality** | Develop water quality guidance and ensure that GSAs set sustainable management criteria for all water quality contaminants of concern within a basin impacted by groundwater use and/or management. Require water quality be addressed in five-year GSP updates.
- **Tribes** | Update guidance for tribal consultation and engagement, including a requirement to consider impacts on lands directly overlying the groundwater basin and lands impacted by groundwater use and/or management.
- **Stakeholder Engagement** | Update stakeholder engagement guidance. Augment DWR's existing translation services and provide detailed translation guidance to GSAs to ensure translation services during GSA meetings.

Several of the recommendations are in the process of being carried out by the Department of Water Resources, including review of updated and resubmitted GSPs that were deemed incomplete, development of a \$2 million technical assistance grant agreement, and development of well impact mitigation guidance.



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# Regulatory Requirements for Groundwater Sustainability Plan Evaluations



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Article 6 of 23 California Code of Regulations (CCR) specifies the requirements for DWR's evaluations of GSPs. Per 23 CCR § 355.2, "The Department shall evaluate a Plan within two years of its submittal date and issue a written assessment of the Plan, which shall be posted on the Department's website." Consequently, DWR was required to provide assessments for the majority of GSPs from critically overdrafted basins by January 2022. The regulations specify three designations that DWR can give a GSP: 1) approved, 2) incomplete, and 3) inadequate. The regulatory pathway for DWR's review of GSPs is shown in detail in Figure 7, and the timeline of DWR's review to date is shown in Figure 8 below. Notably, the GSP Emergency Regulations (23 CCR) outline the process to develop GSPs, and 23 CCR § 355.2, which provides the

requirements for DWR's review, provides direction on all items on a Plan-basis rather than on a basin-wide basis. However, for basins that have received determinations to date, DWR has only provided determinations on a basin-wide basis, and have only approved basins that have had a single basin wide GSP.

An approved GSP "satisfies the requirements of the Act and is in substantial compliance with this Subchapter, based on the criteria described in Section 355.4," which are discussed further below (23 CCR § 355.2(e)(1)). DWR is required to evaluate approved plans every five years, and a plan that was previously approved could receive an "incomplete" or "inadequate" designation during the implementation period from 2022 to 2040.



A GSP designated as incomplete “has one or more deficiencies that preclude approval, but which may be capable of being corrected by the Agency in a timely manner” (23 CCR § 355.2(e)(2)). DWR may recommend Corrective Actions, and the GSPs that DWR designated as incomplete can be revised within 180 days from the release of the basins’ Determination Letters. After this 180-day review period, DWR will reevaluate GSPs determined to be incomplete and designate them as either “approved” or “inadequate.”

A GSP can be designated as “inadequate” in three cases: 1) if the GSP does not satisfy the requirements of § 355.4(a), which states that the GSP must be submitted on time, include all necessary information, and cover the entire basin; 2) if the GSP contains “significant” deficiencies; or 3) if after the 180-day revision period, the GSAs did not take sufficient action to correct deficiencies identified when the GSP was determined to be incomplete (23 CCR § 355.2(e)(3)).

FIGURE 7. SGMA REGULATORY PATHWAYS

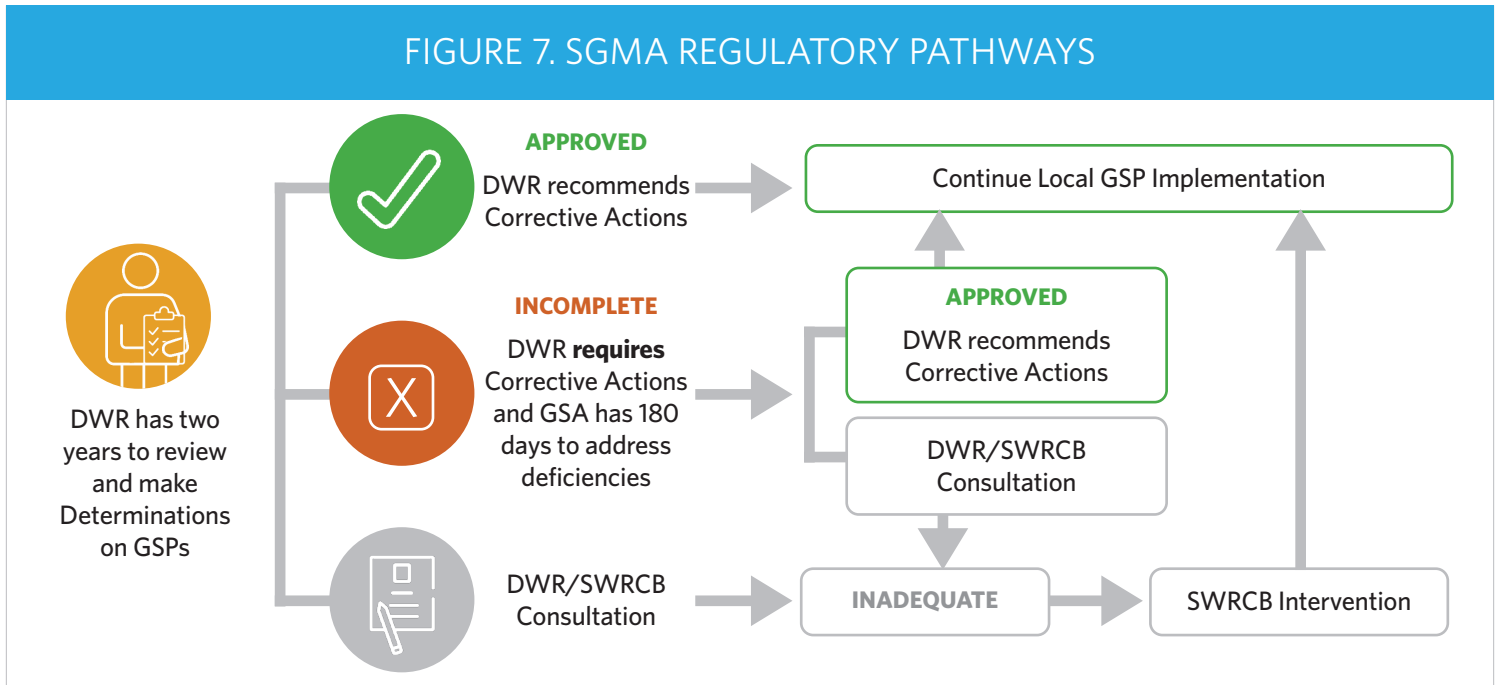
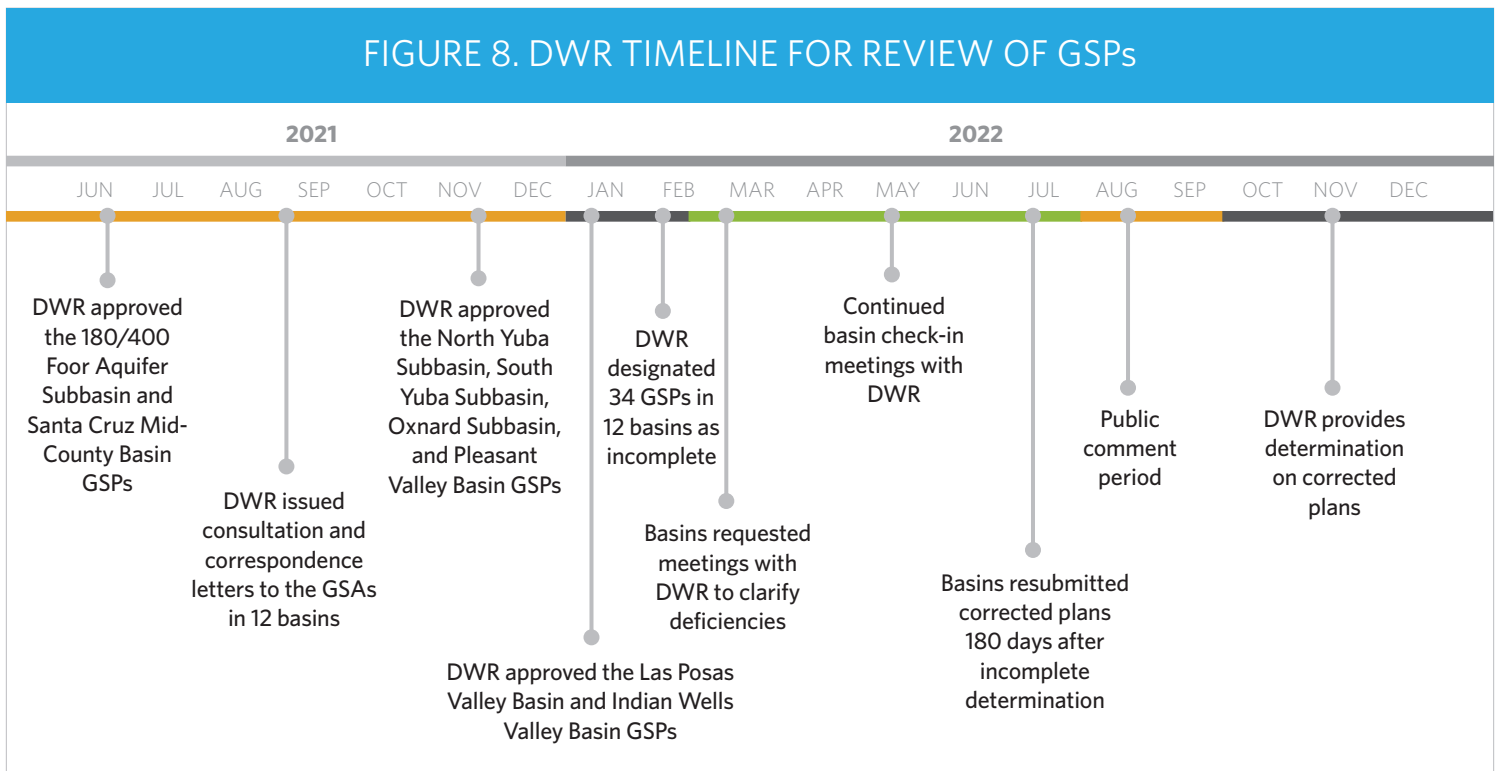


FIGURE 8. DWR TIMELINE FOR REVIEW OF GSPs



**DWR IS REQUIRED TO CONSIDER THE FOLLOWING CRITERIA IN ITS EVALUATION OF THE GSPs, PER 23 CCR §355.4(B):**

- ✓ Whether the assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are reasonable and supported by the best available information and best available science.
- ✓ Whether the Plan identifies reasonable measures and schedules to eliminate data gaps.
- ✓ Whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the Plan.
- ✓ Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered.
- ✓ Whether the projects and management actions are feasible and likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield.
- ✓ Whether the Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present.
- ✓ Whether the Plan will adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of its sustainability goal.
- ✓ Whether coordination agreements, if required, have been adopted by all relevant parties, and satisfy the requirements of the Act and this Subchapter.
- ✓ Whether the Agency has the legal authority and financial resources necessary to implement the Plan.
- ✓ Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan.



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SGMA requires GSAs in high- and medium-priority groundwater basins to develop and implement GSPs that provide detailed road maps for how groundwater basins will reach long-term sustainability. The 46 GSPs for the 21 high-priority groundwater basins that have been designated as being in “critical overdraft” conditions were due in January 2020, and the GSPs for the remaining high- and medium-priority groundwater basins were due in January 2022. Our organizations collectively submitted formal comment letters to GSAs during the public review periods for 31 draft GSPs in 16 of the critically overdrafted basins in 2019, and formal comment letters to DWR on the final adopted plans during the 2020 DWR public comment period. Our comments focused on the assessment and consideration of drinking water users, disadvantaged communities, environmental users and climate change. Table 1 lists the 31 GSPs that were reviewed by our organizations.

Upon GSP submittal, DWR is given two years to review and make determinations on the adequacy of the plans. As part of the review process, DWR issued consultation letters to some GSAs, prior to the release of final determinations for critically overdrafted basins. SWRCB submitted comment letters to DWR for 11 of the 46 critically overdrafted plans, providing their assessment of selected issues, but not formally participating in their role defined by SGMA statute, which only arises if DWR deems a basin inadequate and sends it to probation under the SWRCB. CDFW and NMFS sent 25 and seven comment letters, respectively, to DWR regarding GSPs for critically overdrafted basins. The timeline and scope of these reviews and the final determination are described below.



TABLE 1. GSPs REVIEWED BY GLF AND DWR DETERMINATION STATUS

BASIN	GSP
<b>Approved by DWR</b>	
<b>Indian Wells Valley Groundwater Basin (DWR 6-54)</b>	Indian Wells Valley Basin Groundwater Sustainability Plan
<b>Pleasant Valley Basin (DWR 4-06)</b>	Pleasant Valley Basin – 2020 Groundwater Sustainability Plan
<b>Salinas Valley – 180/400-Foot Aquifer Subbasin (DWR 3-04.01)</b>	180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan
<b>Santa Cruz Mid-County Groundwater Basin (DWR 5-22.12)</b>	Santa Cruz Mid-County Basin Groundwater Sustainability Plan
<b>Determined Incomplete by DWR</b>	
<b>Chowchilla Subbasin (DWR 5-22.05)</b>	Chowchilla Subbasin Groundwater Sustainability Plan*
<b>Delta-Mendota Subbasin (DWR 5-22.07)</b>	Groundwater Sustainability Plan for County of Fresno GSA Management Area A & Management Area B - Delta-Mendota Subbasin
	Grassland Groundwater Sustainability Agency Groundwater Sustainability Plan
	Groundwater Sustainability Plan for the Northern and Central Delta-Mendota Regions
<b>Eastern San Joaquin Groundwater Subbasin (DWR 5-22.01)</b>	Eastern San Joaquin Subbasin Groundwater Sustainability Plan*
<b>Kaweah Subbasin (DWR 5-22.11)</b>	East Kaweah GSA Groundwater Sustainability Plan*
	Greater Kaweah Groundwater Sustainability Agency Groundwater Sustainability Plan*
	Mid-Kaweah GSA Groundwater Sustainability Plan*
<b>Kern County Subbasin (DWR 5-22.14)</b>	Kern Groundwater Authority Groundwater Sustainability Plan
	Kern River Groundwater Sustainability Plan
(continues...)	Semitropic Water Storage District GSA Management Area Plan

\* SWRCB issued a review letter to DWR for this GSP.



**TABLE 1. GSPs REVIEWED BY GLF AND DWR DETERMINATION STATUS (CONTINUED)**

BASIN	GSP
<b>Determined Incomplete by DWR</b>	
<b>Kings Subbasin (DWR 5-22.08)</b>	Central Kings Groundwater Sustainability Agency Groundwater Sustainability Plan*
	Kings River East Groundwater Sustainability Agency Groundwater Sustainability Plan*
	North Fork Kings Groundwater Sustainability Agency Groundwater Sustainability Plan
	North Kings Groundwater Sustainability Agency Groundwater Sustainability Plan*
	South Kings Groundwater Sustainability Agency Groundwater Sustainability Plan*
<b>Merced Subbasin (DWR 5-22.04)</b>	Merced Subbasin Groundwater Sustainability Plan*
<b>Paso Robles Subbasin (DWR 3-04.06)</b>	Paso Robles Area Subbasin Groundwater Sustainability Plan
<b>Tulare Lake Subbasin (DWR 5-22.12)</b>	Tulare Lake Subbasin Groundwater Sustainability Plan*
<b>Tule Subbasin (DWR 5-22.13)</b>	Groundwater Sustainability Plan, Alpaugh Groundwater Sustainability Agency
	Delano-Earlimart Irrigation District Groundwater Sustainability Agency Groundwater Sustainability Plan
	Eastern Tule Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan
	Lower Tule River Irrigation District Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan
	Pixley Irrigation District Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan
	Tri-County Water Authority, Groundwater Sustainability Plan
<b>Westside Subbasin (DWR 5-22.09)</b>	Westside Subbasin Groundwater Sustainability Plan
<b>DWR Review Not Yet Complete</b>	
<b>Madera Subbasin (DWR 5-22.06)</b>	Madera Subbasin Joint Groundwater Sustainability Plan

\* SWRCB issued a review letter to DWR for this GSP.



## DWR CONSULTATION AND CORRESPONDENCE LETTERS

DWR issued consultation letters to the GSAs of six out of 21 critically overdrafted basins (DWR Consultation Letters) and correspondence letters to the GSAs of an additional six out of 21 critically overdrafted basins (DWR Correspondence Letters). DWR described the intent of these letters to initiate consultation between the Department and the GSAs in advance of issuance of a final determination. The Consultation Letters were issued from June through November 2021 and identified potential deficiencies in the basins' GSPs that would be addressed in DWR's final determinations. The DWR Consultation Letters included detailed and specific potential Corrective Actions, while the DWR Correspondence Letters issued in December 2021 only identified that basins would be receiving a determination of "incomplete" and referred the GSAs to DWR Consultation Letters previously issued to other basins.

## STATE WATER RESOURCES CONTROL BOARD COMMENT LETTERS

During DWR's review period, the SWRCB issued seven comment letters to DWR (five in August 2021 and two in November 2021) commenting on the deficiencies of the GSPs in eight critically overdrafted basins that had not yet received a determination at that time (SWRCB Comment

Letters). Two of these letters covered basins with multiple GSPs (the Kings and Kaweah Subbasins), thus SWRCB provided Comment Letters for a total of 11 of the GSPs in six basins that our organizations also reviewed. The intent of these letters was for the SWRCB to communicate the key issues and areas of improvement needed from the SWRCB's perspective, to inform DWR's review and determinations.

## CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE COMMENT LETTERS

During the public comment period, CDFW submitted 25 comment letters to DWR commenting on deficiencies in GSPs with respect to environmental beneficial uses and users, ISWs, GDEs, and sustainable management criteria. Although the SGMA statute does not articulate a role for CDFW, the agency is responsible for the oversight of public trust resources in California and owns properties throughout many critically overdrafted basins.

## NATIONAL MARINE FISHERIES SERVICE COMMENT LETTERS

During the public comment period, NMFS submitted seven comment letters to DWR commenting on deficiencies in GSPs with respect to environmental beneficial uses and users and ISWs. NMFS is the federal agency responsible for oversight and recovery of federally listed freshwater species.





## DWR DETERMINATIONS







Pursuant to 23 California Code of Regulations § 355.2(e), DWR issued determinations for all GSPs submitted by the January 2020 deadline, within two years of submittal to DWR<sup>2</sup>. One determination was issued per basin, regardless of how many GSPs were prepared for the basin. In June 2021, DWR issued the first Determination Letters approving the GSPs in two basins (Santa Cruz Mid-County Basin and the 180/400-Foot Aquifer Subbasin). In November 2021, DWR approved GSPs for four more basins (the North and South Yuba Subbasins, the Oxnard Subbasin, and the Pleasant Valley Basin). In January 2022, approaching the two-year deadline to review the GSPs for critically overdrafted basins, DWR approved two other basins' GSPs (the Indian Wells Valley Basin and Las Posas Valley Basin) and determined that the remaining 34 GSPs in 12 groundwater basins were incomplete. The Madera Subbasin has not yet received a determination by DWR. As shown in Table 1, of the basins reviewed by our organizations, four basins (four GSPs) were approved by DWR, 11 basins (26 GSPs) were determined to be incomplete, and one basin and GSP are still pending a determination.<sup>2</sup>

Per 23 CCR § 355.2(e)(2), the GSAs in basins that DWR designated as "incomplete" have been given 180 days from the release of the basins' Determination Letters to revise the GSPs according to DWR's "Corrective Actions." After the 180 days, DWR will reevaluate the GSPs and determine whether they are approved or inadequate (see Section 2 for further description of the regulatory timeline). If a GSP is found to be inadequate, the SWRCB may designate the basin as probationary and establish an interim plan for the basin.



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The analysis presented herein compares the deficiencies identified in the DWR determinations and SWRCB, CDFW, and NMFS Comment Letters (when available), to the findings of the Spring 2020 comment letters submitted by our organizations. This review categorizes potential deficiencies into six categories:

-  stakeholder engagement
-  identification of vulnerable beneficial users
-  incorporation of climate change, mainly in the water budget
-  consideration of impacts to disadvantaged communities<sup>3</sup>, drinking water users, and environmental users in the sustainable management criteria
-  identification and reconciliation of data gaps
-  identification of potential impacts to beneficial users in the projects and management actions.

The goal of this analysis is to assess whether DWR's determinations of the 2020 GSPs are adequately protective of drinking water and environmental beneficial users, and to identify opportunities for DWR and GSAs to improve consideration of the needs of these key beneficial users through ongoing GSP revisions, SGMA implementation, and five-year GSP updates.

DWR issued Consultation Letters for 12 basins between June and December 2021, prior to releasing the Final Determinations (see Figure 8 for a timeline of DWR's review of GSPs to date). DWR was not required by SGMA regulations to issue these Consultation Letters, which identified potential deficiencies that would preclude approval of the GSPs and potential Corrective Actions. In each of these 12 letters, DWR noted that "potential deficiencies do not necessarily represent all deficiencies or discrepancies that the Department may identify in the GSP but focus on those deficiencies that staff believe, if not addressed, could lead to a determination that the GSP is incomplete or inadequate." Consequently, all 12 basins that received Consultation Letters were later designated as incomplete. Table 2 below summarizes the quantity of deficiencies DWR found in both their initial Consultation Letters and Determination Letters.

2 The Madera Subbasin GSPs were not accepted as complete by DWR until Fall 2020. Therefore, it is anticipated that DWR will provide its determination for this basin by Fall 2022.

3 DWR defines a Disadvantaged Community as a community with an annual median household income that is less than 80% of the Statewide annual median household income.



**TABLE 2. ISSUES IDENTIFIED IN DWR CONSULTATION AND DWR DETERMINATION LETTERS**

BASIN	Date of DWR Consultation Letter	GSP	# of Potential Deficiencies Identified in Consultation Letter <sup>5</sup>	# of Corrective Actions identified in DWR Determination Letter <sup>6</sup>
<b>Approved by DWR</b>				
<b>Indian Wells Valley Groundwater Basin (DWR 6-54)</b>	N/A	Indian Wells Valley Basin Groundwater Sustainability Plan	N/A	7
<b>Pleasant Valley Basin (DWR 4-06)</b>	N/A	Pleasant Valley Basin - 2020 Groundwater Sustainability Plan	N/A	5
<b>Salinas Valley - 180/400-Foot Aquifer Subbasin (DWR 3-04.01)</b>	N/A	180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan	N/A	5
<b>Santa Cruz Mid-County Groundwater Basin (DWR 5-22.12)</b>	N/A	Santa Cruz Mid-County Basin Groundwater Sustainability Plan	N/A	1
<b>Determined Incomplete by DWR</b>				
<b>Chowchilla Subbasin (DWR 5-22.05)</b>	11/18/2021	Chowchilla Subbasin Groundwater Sustainability Plan	6	6
<b>Delta-Mendota Subbasin (DWR 5-22.07)</b>	12/9/2021	Groundwater Sustainability Plan for County of Fresno GSA Management Area A & Management Area B - Delta-Mendota Subbasin	0	4
<b>Delta-Mendota Subbasin (DWR 5-22.07)</b>	12/9/2021	Grassland Groundwater Sustainability Agency Groundwater Sustainability Plan	0	4
(continues...)		Groundwater Sustainability Plan for the Northern and Central Delta-Mendota Regions	0	4

<sup>5</sup> DWR identified “Potential Deficiencies” in the Consultation Letters issued to GSAs ahead of the final determinations. Basins that did not receive a Consultation Letter are indicated with “N/A” in this column. Several basins received a Correspondence Letter in December 2021 with no Potential Deficiencies identified. These basins are indicated with a value of 0 in this column.

<sup>6</sup> DWR identified deficiencies for both approved and incomplete GSPs. DWR provided approved GSPs with “Recommended Corrective Actions” to be addressed in the Five-Year GSP update. GSPs designated as incomplete were given “Corrective Actions” that are to be addressed in the 180-day review period. Several of the “Corrective Actions” were further subdivided into more specific improvements that the GSAs could make to remedy the identified deficiencies. The quantity shown in the table reflects the number of specific improvements suggested by DWR.

**TABLE 2. ISSUES IDENTIFIED IN DWR CONSULTATION AND DWR DETERMINATION LETTERS**

BASIN	Date of DWR Consultation Letter	GSP	# of Potential Deficiencies Identified in Consultation Letter <sup>5</sup>	# of Corrective Actions identified in DWR Determination Letter <sup>6</sup>
<b>Determined Incomplete by DWR</b>				
<b>Eastern San Joaquin Groundwater Subbasin (DWR 5-22.01)</b>	11/18/2021	Eastern San Joaquin Subbasin Groundwater Sustainability Plan	9	9
<b>Kaweah Subbasin (DWR 5-22.11)</b>	12/9/2021	East Kaweah GSA Groundwater Sustainability Plan	0	5
		Greater Kaweah Groundwater Sustainability Agency Groundwater Sustainability Plan	0	5
		Mid-Kaweah GSA Groundwater Sustainability Plan	0	5
<b>Kern County Subbasin (DWR 5-22.14)</b>	12/9/2021	Kern Groundwater Authority Groundwater Sustainability Plan	0	4 <sup>7</sup>
		Kern River Groundwater Sustainability Plan	0	4 <sup>8</sup>
		Semitropic Water Storage District GSA Management Area Plan	0	7 <sup>9</sup>
<b>Kings Subbasin (DWR 5-22.08)</b>	12/9/2021	Central Kings Groundwater Sustainability Agency Groundwater Sustainability Plan	0	10
<b>Merced Subbasin (DWR 5-22.04)</b>	11/18/2021	Merced Subbasin Groundwater Sustainability Plan	9	9
<b>Paso Robles Subbasin (DWR 3-04.06)</b>	6/3/2021	Paso Robles Area Subbasin Groundwater Sustainability Plan	4	4
<b>Tulare Lake Subbasin (DWR 5-22.12)</b>	12/9/2021	Tulare Lake Subbasin Groundwater Sustainability Plan	0	7

<sup>7</sup> The Kern Groundwater Authority GSP received four Corrective Actions: three were for all GSPs in the Kern County Subbasin, and one was GSP-specific.

<sup>8</sup> The Kern River GSP received four Corrective Actions: three were for all GSPs in the Kern County Subbasin, and one was GSP-specific.

<sup>9</sup> The Semitropic Water Storage District GSA Management Area Plan is a part of the Kern Groundwater Authority Umbrella GSP and received seven Corrective Actions: three for all GSPs in the Kern County Subbasin, one for the Kern Groundwater Authority Umbrella GSP, and three that were specific to the Management Area Plan.



**TABLE 2. ISSUES IDENTIFIED IN DWR CONSULTATION AND  
DWR DETERMINATION LETTERS (CONTINUED)**

BASIN	Date of DWR Consultation Letter	GSP	# of Potential Deficiencies Identified in Consultation Letter <sup>5</sup>	# of Corrective Actions identified in DWR Determination Letter <sup>6</sup>
<b>Determined Incomplete by DWR</b>				
<b>Tule Subbasin (DWR 5-22.13)</b>	12/9/2021	Groundwater Sustainability Plan, Alpaugh Groundwater Sustainability Agency	0	9
		Delano-Earlimart Irrigation District Groundwater Sustainability Agency Groundwater Sustainability Plan	0	9
		Eastern Tule Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan	0	9
		Lower Tule River Irrigation District Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan	0	9
		Pixley Irrigation District Groundwater Sustainability Agency, Tule Subbasin Groundwater Sustainability Plan	0	9
		Tri-County Water Authority, Groundwater Sustainability Plan	0	9
<b>Westside Subbasin (DWR 5-22.09)</b>	11/18/2021	Westside Subbasin Groundwater Sustainability Plan	13	13
<b>DWR Review Not Yet Complete</b>				
<b>Madera Subbasin (DWR 5-22.06)</b>	N/A	Madera Subbasin Joint Groundwater Sustainability Plan	N/A	N/A

# Methods Comparing DWR Determinations to NGO Review of 2020 Groundwater Sustainability Plans



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In order to evaluate whether DWR’s determinations of the 2020 GSPs are adequately protective of drinking water and environmental beneficial users, our organizations asked specific questions organized by overarching topics, consistent with the titles of Sections 4 through 9 of this report. The majority of these questions are concerns that were identified in our organizations’ comment letters and topics in our analysis of the [2020 GSPs](#) (GLF, 2021). Our organizations evaluated whether DWR, SWRCB, CDFW, and NMFS (the “reviewing agencies”)<sup>10</sup> addressed these questions, and as shown in Figures 9 through 34, compared the findings of our organizations with those of the reviewing agencies. The results of our analysis are discussed further in Sections 4 through 9 of this report. These questions are not intended to capture all of the shortcomings of the GSPs from the regulatory requirements; rather, these questions are aimed to evaluate whether issues of interest to our organizations that we previously commented on were considered in DWR’s review and determination of the 2020 GSPs. The following discussion includes the methods for reviewing and interpreting DWR’s Determination Letters and SWRCB’s, CDFW’s, and NMFS’s Comment Letters, including the assumptions made when an item was not directly addressed by the reviewing agency.

The majority of the questions listed in Figures 9 through 34 below were developed during our organizations’ previous analysis of the 2020 GSPs. One exception is the question asked in Figure 22: Does the GSP use the best available science to develop sustainable management criteria for Interconnected Surface Water? DWR, SWRCB, CDFW, and NMFS each identified deficiencies in identifying and establishing sustainable management criteria for ISWs, and our organizations believe this to be a key issue for the protection of environmental beneficial users. Therefore, we have included discussion of this issue in our report, even though it was not a question asked in our previous analysis of the 2020 GSPs. However, The Nature Conservancy (TNC; a signatory of this report) reviewed the identification of ISWs in their report titled [SGMA Signals: Managing Groundwater for Nature](#) (TNC, 2021). Our organizations have adopted TNC’s comments for ISWs as the GLF data for this question.

<sup>10</sup> As discussed above, only DWR determination letters obligate GSAs to make changes to the GSPs. Comment letters provided by the other agencies are considered recommendations.



For questions that were asked in our previous analysis, we have summarized our organizations' findings as either "Deficient" or "Adequate" in the "GLF" column of the Figures 9 through 34. If our organizations did not ask the question in our previous analysis or the question is "not applicable" to a certain GSP, results exclude these GSPs.

As mentioned in Section 2 above, our organization reviewed 31 of the "critically overdrafted" basin GSPs. Out of these 31 GSPs, DWR provided determinations for 30 GSPs, SWRCB provided comments for 11 GSPs, CDFW provided comments for 25 GSPs, and NMFS provided comments for 7 GSPs. Results in Figures 9 through 34 are displayed out of these totals, or the total number of GSPs reviewed by both our organizations and the reviewing agency. Further, CDFW's and NMFS's reviews primarily focused on the protection of environmental beneficial users, and



only three questions asked in our previous analysis were considered applicable to their review (see Figures 13, 21, and 22). Therefore, we only compared the findings of our organizations, DWR, and SWRCB for the majority of questions asked, as DWR and SWRCB provided a review of GSP elements beyond the interests of environmental beneficial users.

The questions that our organizations asked may not have been directly addressed in DWR's Determination Letters and SWRCB's, NMFS', and CDFW's Comment letters, and our assessment of whether the reviewing agencies addressed our specific questions required professional judgment. If the reviewing agencies did not have a clear comment on the issue, the charts included in the following sections indicate that the reviewing agency was "silent" on the issue.

Our review of the DWR Determination Letters also includes a summary of the time DWR gave GSAs to address the identified issues. If a DWR Determination Letter included "Corrective Actions," the basin was designated as incomplete and DWR required the GSP be revised per the Corrective Actions within 180 days. If a DWR Determination Letter included "Recommended Corrective Actions," the basin was approved, and the Recommended Corrective Actions are required to be included in the five-year GSP update.<sup>11</sup> If an item was not listed as a Corrective Action or Recommended Corrective Action, then our review concludes that DWR is not requiring that the item be addressed.

As previously mentioned, the results of our analysis are summarized in charts throughout Sections 4 through 9, below and include: 1) charts that compare the findings of our organizations, DWR, SWRCB, CDFW, and NMFS (as applicable); and 2) Figures that show the time given by DWR to address a deficiency. These figures show results out of the 30 GSPs reviewed by both DWR and our organizations.

Notably, DWR issued one Determination Letter per basin, even when multiple GSPs were submitted within a given basin. Many of these Determination Letters for multiple-GSP basins did not provide GSP-specific comments within a letter. For the purpose of our assessment of the Determination Letters, we assumed that basin-wide applied to each GSP in the basin, unless the Determination Letter explicitly stated that a GSP was sufficient for a topic.

<sup>11</sup> DWR uses the terms "recommended" to describe revisions for approved GSPs. DWR stated that these Recommended Corrective Actions are "areas of improvement" and "should be considered by the authority for the first five-year assessment of the GSP."



# Stakeholder Engagement Evaluation



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In accordance with 23 CCR § 354.10 (d)(2), each GSP is required to include a communication section that includes “identification of opportunities for public engagement and a discussion of how public input and response will be used.” Further, the DWR Guidance Document for GSP Stakeholder Communication and Engagement (DWR, 2018a) specifies that encouraging active stakeholder involvement is required during the implementation and reporting phase under California Water Code (CWC) § 10727.8 and that public notices and meetings are required before amending a GSP and prior to imposing or increasing a fee. Our organizations reviewed the 2020 GSPs for documentation of both stakeholder engagement and outreach during implementation. The results of our previous assessment and both DWR’s and SWRCB’s findings are discussed in detail in the following sections.

## KEY FINDINGS



DWR generally did not identify deficiencies in stakeholder engagement, and the deficiencies that were identified were in basins that received approval.



SWRCB found that, going forward, the GSAs should engage with public water systems and that GSPs should elaborate on tribal engagement efforts.



DWR did not consider ongoing stakeholder engagement as a key issue in their reviews of GSPs.



## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, AND SWRCB

DWR provided a Stakeholder Communication and Engagement guidance document in 2018 to support GSAs in carrying out effective stakeholder engagement through GSP development and implementation (DWR, 2018a). Our organizations evaluated the documentation of stakeholder engagement within the GSP. It should be noted that other resources that may document additional engagement efforts, such as GSA websites or public meeting minutes, were not considered in our review.

As shown in Figures 9 and 10, our analysis found that 13 out of 31 GSPs and five out of 31 GSPs did not adequately document how environmental beneficial users and disadvantaged communities, respectively, were given opportunities to engage in GSP development. However, DWR did not identify any deficiencies with the way that GSAs documented stakeholder engagement with respect to disadvantaged communities and environmental beneficial users, despite a detailed guidance document being available. DWR explicitly provided comments on stakeholder engagement during GSP development only in

the four approved GSPs, stating that the documentation of stakeholder engagement was sufficient (see Figures 9 and 10). In the 26 other GSPs that were determined to be incomplete, DWR did not provide guidance on deficiencies with the way the GSPs documented stakeholder engagement.

SWRCB comments suggested that, going forward, the GSAs should engage with public water systems and that GSPs should elaborate on tribal engagement efforts.



FIGURE 9. DOES THE GSP IDENTIFY HOW ENVIRONMENTAL BENEFICIAL USERS AND ENVIRONMENTAL STAKEHOLDERS WERE ENGAGED THROUGHOUT THE DEVELOPMENT OF THE GSP?

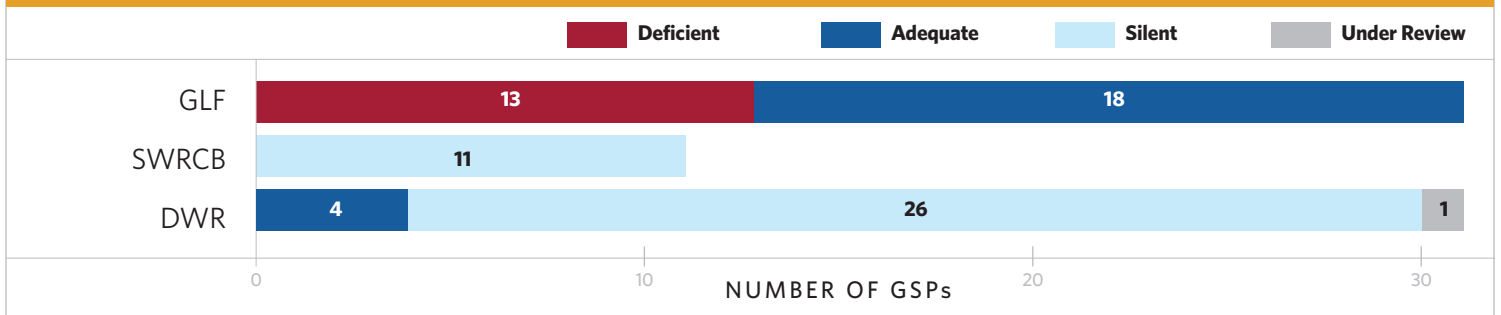
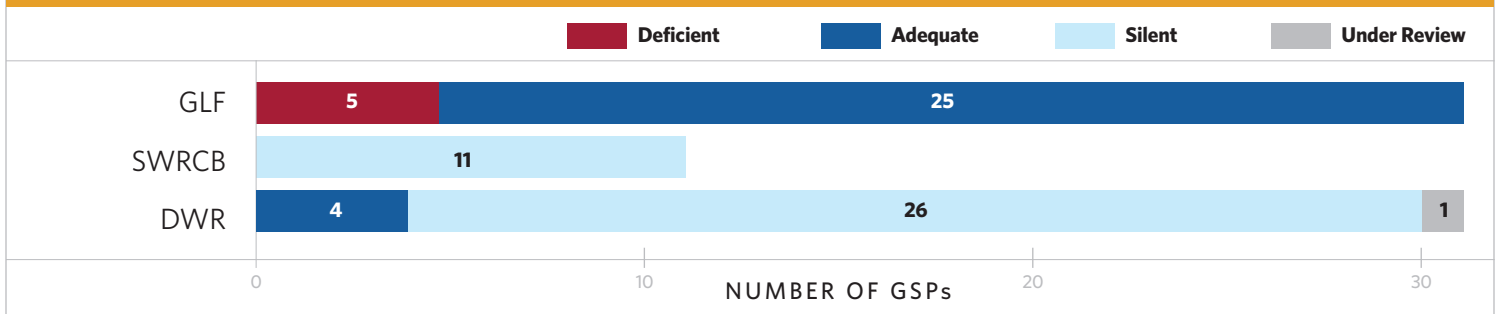


FIGURE 10. DOES THE STAKEHOLDER COMMUNICATION & ENGAGEMENT PLAN OR GSP SPECIFICALLY IDENTIFY HOW DISADVANTAGED COMMUNITIES WERE ENGAGED IN THE PLANNING PROCESS?



As shown on Figure 11, our organizations' previous analysis identified that seven out of 31 GSPs (23%) did not describe the process with which GSAs will conduct ongoing stakeholder outreach during the GSP implementation period. DWR found outreach during implementation to be deficient in only two out of 30 GSPs; notably, these two GSPs were approved. SWRCB did not provide any comments related to outreach during implementation. These results suggest that DWR did not consider ongoing stakeholder engagement as a key issue in their reviews of GSPs.

### DWR REQUIRED FIXES

DWR did not identify deficiencies related to documentation of stakeholder engagement, and consequently, did not require any Corrective Actions. However, DWR identified that two of the approved GSPs did not adequately describe their process for outreach during implementation. Since these two GSPs were approved, DWR gave these GSAs five years to improve their descriptions of how outreach has or will occur during the implementation timeframe (see Figure 12). No revisions on this topic were required on the other 28 GSPs reviewed by both DWR and our organizations.



FIGURE 11. DOES THE STAKEHOLDER COMMUNICATION & ENGAGEMENT PLAN DESCRIBE HOW OUTREACH WILL OCCUR DURING IMPLEMENTATION?

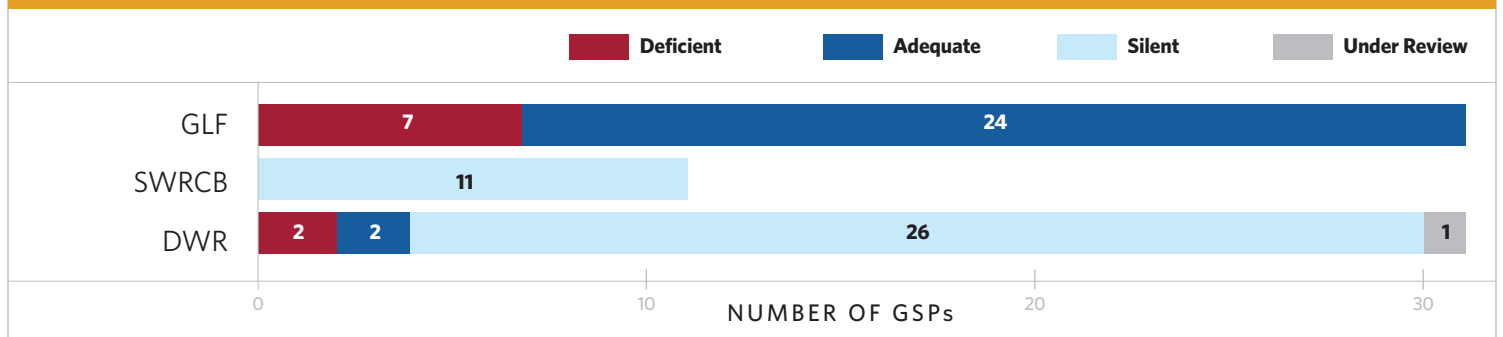
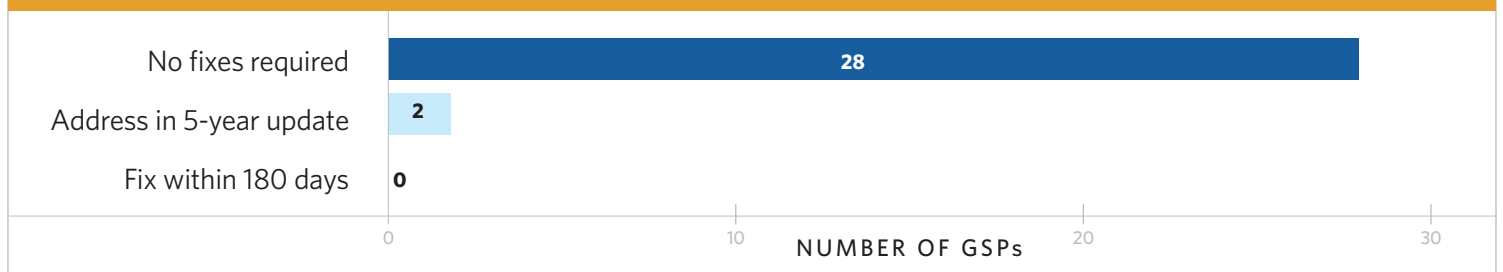


FIGURE 12. DWR REQUIREMENTS TO CONDUCT OUTREACH WITH KEY STAKEHOLDERS DURING IMPLEMENTATION





# Identification of Vulnerable Beneficial Users Evaluation







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In accordance with CWC § 10723.2, the GSAs “shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans.” The interests named in CWC § 10723.2 include, among others: 1) domestic well owners, 2) municipal well operators, 3) public water systems, 4) environmental users of groundwater, 5) “surface water users, if there is a hydraulic connection between surface and groundwater bodies,” 6) California Native American tribes, and 7) “disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems.” Each GSP is required to provide a description of current and historical groundwater conditions, including “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 (23 CCR § 354.16 (g)).”

Further, GSP water budgets are required to quantify outflows from the groundwater system by “water use sector” (23 CCR § 354.18 (b)(3)). Based on 23 CCR § 351 (a), “Water use sector” refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation. Our organizations specifically reviewed whether disadvantaged communities, GDEs, managed

wetlands (where applicable), and native vegetation were incorporated into the GSPs and/or water budgets. Our findings and those from DWR, SWRCB, CDFW, and NMFS are summarized below.

## KEY FINDINGS

-  DWR provided few comments on the identification of GDEs, despite our organizations’ findings that GSPs often failed to identify GDEs consistent with best available science.
-  Given that DWR only provided comments on incomplete identification of GDEs in GSPs that received approval, DWR did not consider failure to fully identify these beneficial users as reason to determine a GSP incomplete or inadequate.
-  DWR did not provide comments in their Determination Letters for any basin on the failure to fully identify DACs, or include native vegetation and wetlands in water budgets, despite these being key issues called out to the GSAs and DWR in our comment letters.
-  Three of the four GSPs approved by DWR failed to identify at least one of the beneficial users or water sectors identified under CWC § 10723.2 and 23 CCR § 351 (a).

## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, SWRCB, CDFW, AND NMFS

### DISADVANTAGED COMMUNITIES

DWR developed a disadvantaged community mapping tool, which provided the locations of disadvantaged communities based on census data (DWR, 2018c). Our analysis evaluated whether the GSAs, at a minimum, used this resource to map disadvantaged communities. For this analysis, we did not consider the quality of the description of disadvantaged communities or how disadvantaged communities were incorporated into GSP development. Consequently, we found that most GSPs (27 out of the 29 GSPs that have disadvantaged communities located within the GSP area; see Figure 13) adequately identified the presence of disadvantaged communities using the DWR mapping tool. However, two GSPs did not identify the locations of disadvantaged communities in the Plan Area, and therefore did not incorporate disadvantaged communities into the GSPs.

DWR did not provide comments on the identification of disadvantaged communities, except in the four GSPs that were approved. It should be noted that based on our review, one GSP approved by DWR (the Indian Wells Valley Basin GSP) did not identify disadvantaged communities in the plan area. GSPs that neglect to identify disadvantaged communities are not complete and in compliance with SGMA regulations and leave room for adverse impacts to sensitive communities in the final plan. Therefore, we recommended to DWR that both GSPs be designated as inadequate.

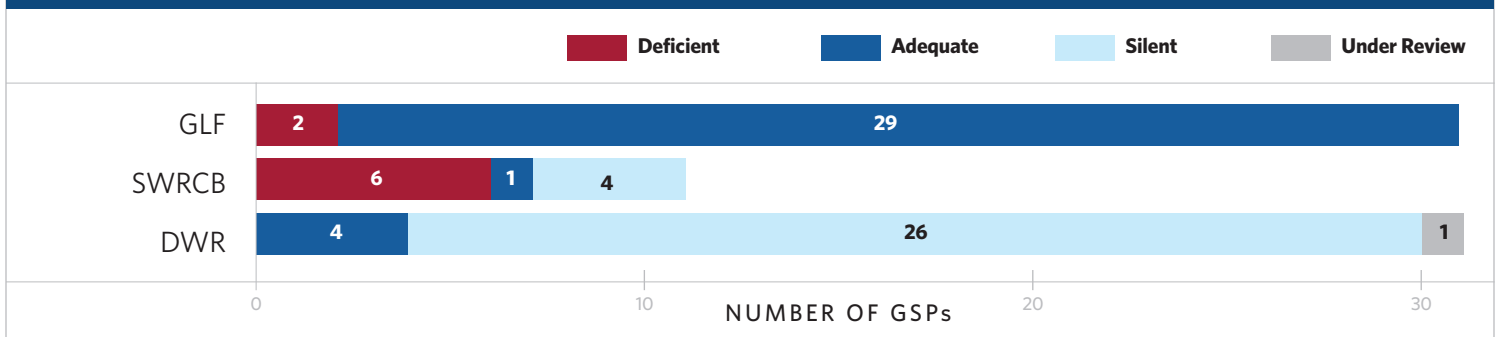
SWRCB provided more detailed comments on disadvantaged communities than DWR, suggesting that “GSAs should include further description of the disadvantaged communities and Severely Disadvantaged

Communities” (Kings Subbasin Comment Letter, page 18). Similarly, during our review, we found that although most GSPs identified the presence of disadvantaged communities, the GSAs needed to provide a greater amount of detail regarding the characteristics of the disadvantaged community population and use of groundwater to fully consider these beneficial uses. Our organizations provided this comment to several GSAs in comment letters submitted on the 2020 GSPs.



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FIGURE 13. DOES THE GSP IDENTIFY DISADVANTAGED COMMUNITIES?



Note that SWRCB deficiencies are due to an incomplete or insufficient description of disadvantaged communities, whereas GLF deficiencies are due to missing identification of disadvantaged communities in the GSP, as described above.



## ENVIRONMENT

Our organizations considered two key, publicly available tools for identifying GDEs: 1) DWR’s Natural Communities Commonly Associated with Groundwater dataset (NCCAG; DWR, 2018b), and 2) The Nature Conservancy’s detailed guidance document, Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act (TNC, 2018). Using these tools as guidance, we reviewed whether GDE identification was complete, and found that 26 out of 31 GSPs did not fully identify GDEs in accordance with these guidance documents.

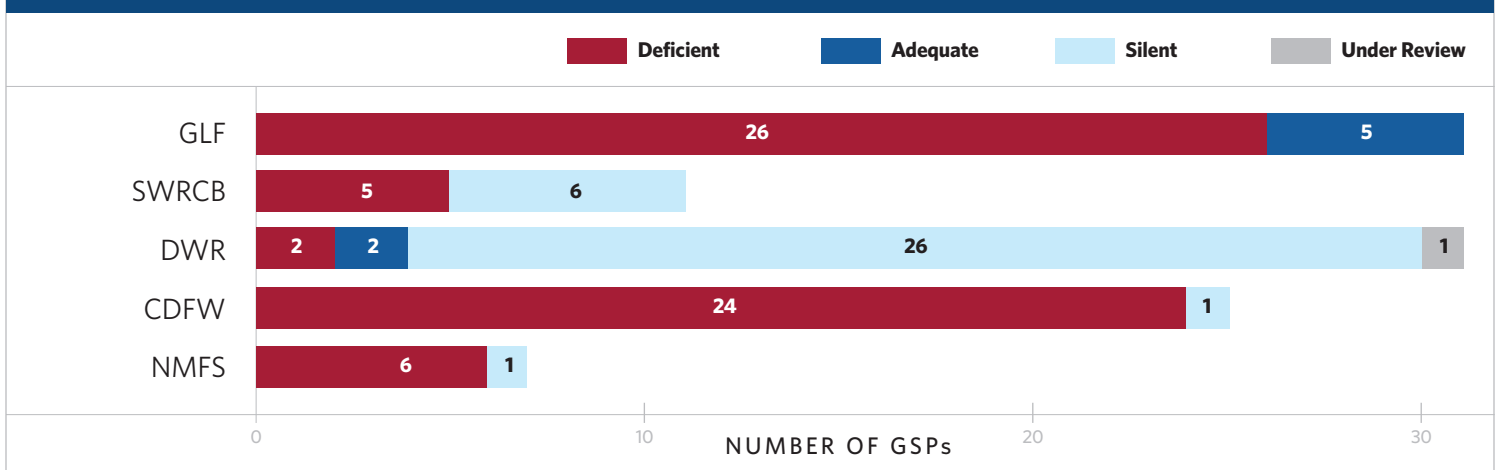
Additionally, CDFW found that 24 out of the 25 GSPs it reviewed had an incomplete or insufficient analysis for identifying GDEs within the GSP area. CDFW generally recommended that GSAs establish a plan to conduct a more robust analysis of the presence of GDEs by using multiple data sources, establishing a baseline depth to water based on multiple seasons and water year types, and conducting field reconnaissance. NMFS similarly found six out of the seven GSPs that it reviewed to insufficiently identify GDEs. NMFS comments primarily concerned the incorrect identification of aquatic GDEs.

However, DWR and SWRCB provided few comments on the identification of GDEs, conflicting with our organizations’ findings and in addition to CDFW and NMFS (see Figure 14). It is worth noting that DWR only provided comments regarding GDEs to the GSAs of the four approved GSPs, acknowledging in one that “the GSP neither confirms the identification of GDEs in the Basin nor confirms the connection between GDEs and shallow alluvial aquifer” (Pleasant Valley Basin Determination Letter, page 36).

This acknowledgment, as well as the lack of comments on GDEs in the incomplete GSPs, suggests that incomplete identification of GDEs was not considered a “fatal flaw” by DWR. We recommended to DWR that GSPs that did not adequately identify GDEs be deemed incomplete and given 180 days to make corrections, which would have ensured these sensitive ecosystems were integrated into monitoring networks and considered in sustainable management criteria prior to 2025. Because DWR was largely silent on GDEs in their determinations, significant uncertainty exists about whether and how these GDE requirements in SGMA will be met over time.

Based on our review, many GSPs did not identify native vegetation clearly in the description of the water budget component calculations in SGMA regulations, and it was therefore unclear how or if water use by native vegetation was accounted for. Similarly, our organizations found that only 5 out of 10 GSPs that contain managed wetlands in the Plan Area clearly accounted for managed wetlands in the water budget. Rather, many GSPs included broad, un- or poorly defined water budget sectors (e.g., “plant evapotranspiration”). As shown in Figure 15, we found that 16 of the 31 GSPs did not clearly include water demands for native vegetation (i.e., it was not included, or its conclusion could not be readily determined from the GSP). Despite native vegetation being explicitly identified as a “water use sector” under 23 CCR § 351 (a), DWR and SWRCB did not comment on the inclusion of water demands for native vegetation or managed wetlands in any of their Determination or Comment Letters.

FIGURE 14. IS THE IDENTIFICATION OF GDEs COMPLETE AND CONSISTENT WITH GUIDANCE?



## DWR REQUIRED FIXES

As mentioned above, DWR only provided Corrective Actions on the identification of GDEs on the two GSPs that were approved. These GSAs were given five years to refine the locations of GDEs within their plan areas. DWR recommended further investigations (i.e., field reconnaissance) be conducted to better characterize GDEs and their connection to shallow aquifers. DWR did not identify any Corrective Actions regarding GDEs for any of the GSPs it determined to be incomplete (see Figure 16).

FIGURE 15. DOES THE GSP INCLUDE WATER DEMANDS FOR NATIVE VEGETATION?

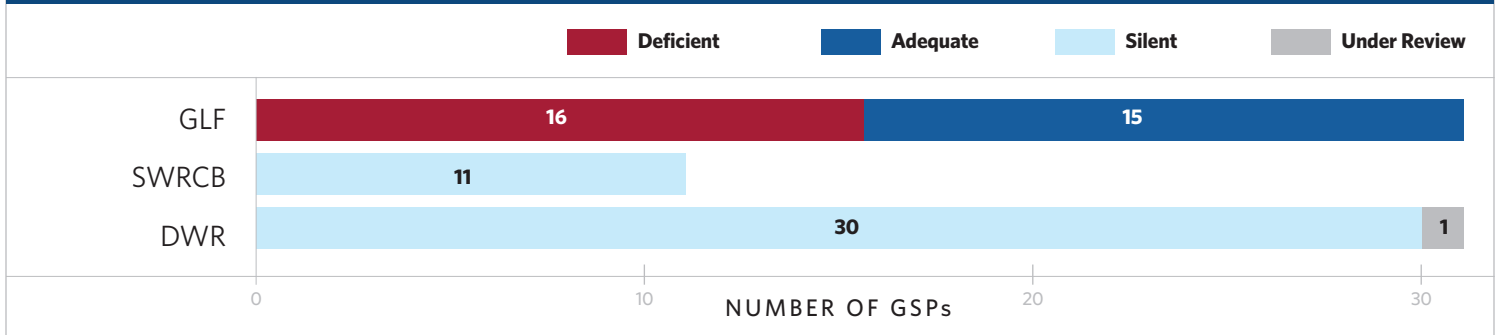
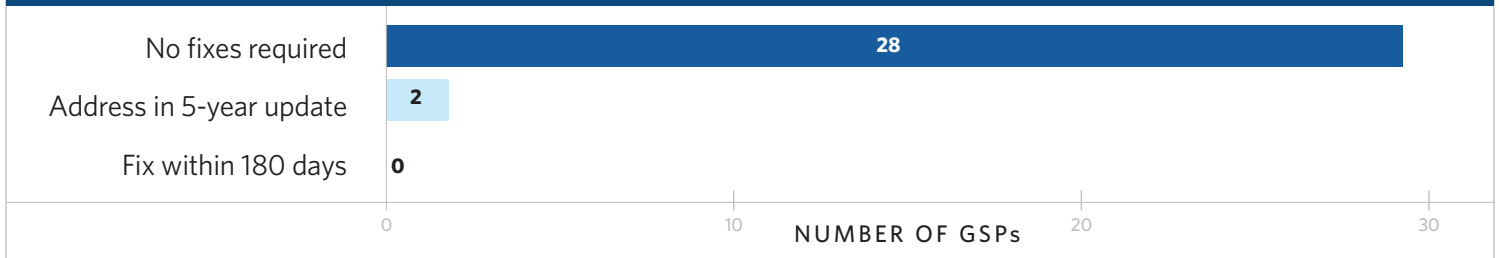


FIGURE 16. DWR REQUIREMENTS TO REEVALUATE THE IDENTIFICATION OF GDEs



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# Incorporation of Climate Change in the Water Budget Evaluation



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SGMA regulations require GSAs to “utilize the following information provided, as available, by DWR pursuant to Section 353.2, or other data of comparable quality, to develop the water budget: ... (3) Projected water budget information for population, population growth, climate change, and sea level rise” (23 CCR § 354.18 (d)(3)). DWR provided detailed guidance on how to incorporate climate change into the water budget, including precipitation and evapotranspiration factors to represent climate change under two future climate periods, 2030 and 2070 (DWR, 2018d). The climate projects provided included a 2030 central tendency, a 2070 central tendency, and what DWR considers as two 2070 extreme scenarios (i.e., one drier with extreme warming [referred to as “extremely dry”] and one wetter with moderate warming [referred to as “extremely wet”]). Our organizations previously reviewed whether climate change was incorporated into the water budgets, including both the 2030 and 2070 scenarios.

Another element included in this analysis is whether the water budgets are clear and transparent. While this topic was not quantified in our previous analysis (i.e., our organizations did not explicitly tally the number of GSAs that were considered to be transparent), transparency of water budgets was frequently identified as a deficiency in our comment letters on the 2020 GSAs. For the purposes of this analysis, we determined that a water budget was clear and transparent if it incorporated climate change and clearly identified and listed inflows and outflows for

all water use sectors, including managed wetlands (when applicable) and native vegetation. These findings, as well as comments by SWRCB and DWR, are summarized in the following section.

## KEY FINDINGS



Although our organizations found that 12 out of 31 GSAs did not clearly identify how climate change was incorporated into the Water Budget, DWR found that three of 31 GSAs did not transparently show water budget components, and DWR deemed these plans incomplete.



Only three of 31 GSAs incorporated the 2030 and 2070 extremely wet and dry climate change scenarios into their future water budget projections. However, DWR did not identify this as an issue and is not requiring GSAs to include multiple climate scenarios in their analyses as part of their Corrective Actions.



DWR approved a GSA despite the fact that it “did not incorporate climate change into models used to develop its Plan” (Indian Wells Valley Basin Determination Letter, page 30), in direct conflict with SGMA regulations (23 CCR §354.18(d)(3)), and the detailed climate change guidance published by DWR (DWR, 2018d).

## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, AND SWRCB

In our previous analysis, we found that most GSPs incorporated climate change to some extent (see Figure 17). Both SWRCB and DWR generally did not provide comments regarding climate change in their Comment and Determination Letters. However, both our organizations and DWR found that one GSP, Indian Wells Valley Basin, “did not incorporate climate change into models used to develop its Plan” (Indian Wells Valley Basin Determination Letter, page 30). Notably, this GSP was approved by DWR, suggesting that exclusion of climate change from the water budget is not a reason to designate a Basin as incomplete. Our organizations find this to be a noteworthy omission that directly conflicts with both SGMA regulations (23 CCR §354.18(d)(3)), and the detailed climate change guidance published by DWR (DWR, 2018d).

As mentioned above, DWR provided both central tendency and extreme future climate scenarios. While SGMA regulations did not explicitly require GSPs to include extreme scenarios, incorporating these DWR-provided scenarios into the water budget allows the GSA to better account for the range of uncertainty associated

with climate change. As shown in Figure 18, only 3 of 31 GSPs included the 2030 and 2070 extremely wet and dry climate change scenarios. It is important for GSPs to integrate multiple scenarios of climate change into all elements of the water budget and convey this information clearly, as this forms the basis for developing sustainable management criteria and determining sustainability over the SGMA implementation period.



FIGURE 17. DOES THE GSP INCORPORATE CLIMATE CHANGE INTO THE FUTURE WATER BUDGET?

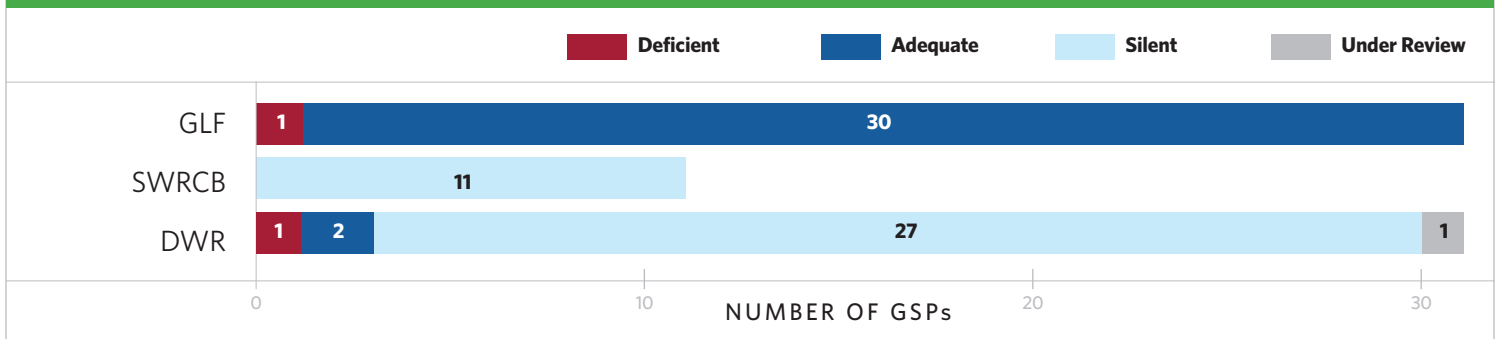
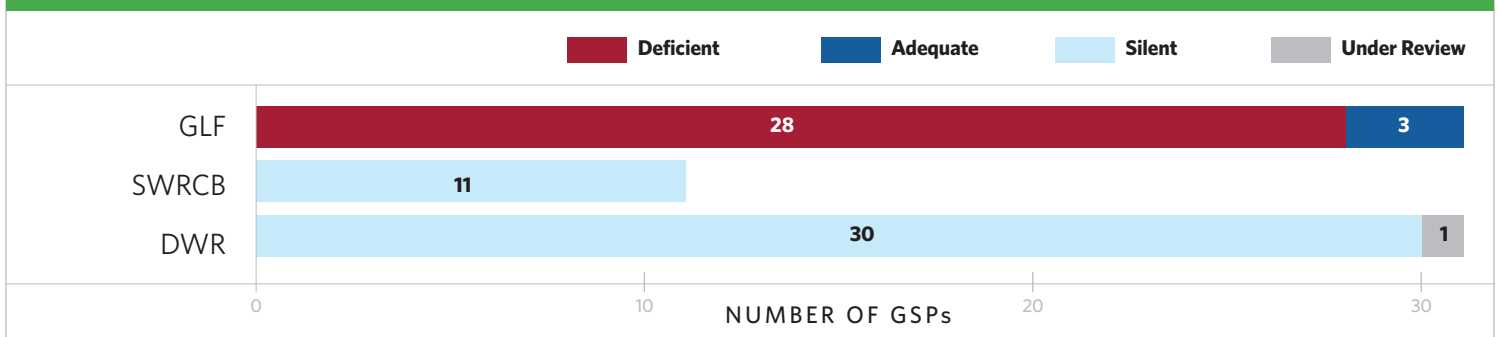


FIGURE 18. DOES THE GSP INCORPORATE EXTREME CLIMATE CHANGE SCENARIOS (EXTREMELY WET AND DRY 2070 SCENARIOS)?





Even though most GSPs included, at minimum, a general statement that climate change was considered, our organizations found that only 19 of 31 GSPs clearly and transparently identified the effects of climate change in the water budget (i.e., identified how climate change was applied to each water budget component). Our organizations primarily focused on the incorporation of climate change, native vegetation, and managed wetlands and whether these components were clearly and transparently included in the water budget. While DWR and the SWRCB did not appear to review the transparency of water budgets with the same lens, both provided a few comments on the overall transparency of water budget components. For example, in the Delta-Mendota Subbasin (a subbasin with multiple GSPs), the inflows and outflows in the water budget do not “roll-up” to the basin-wide cumulative change in storage, and “the overdraft information does not line up throughout the GSPs.” (Delta-Mendota Subbasin Determination Letter, page 22). DWR and SWRCB commented on the clarity of water budget components in four out of 30 GSPs and three out of 11 GSPs, respectively.

### DWR REQUIRED FIXES

DWR only provided comments related to climate change for three approved GSPs, identifying only one deficiency (i.e., Recommended Corrective Action). As such, the GSA

was given until the five-year update to address this issue (see Figure 19). DWR also provided limited comments on the transparency of water budgets, requiring three of the incomplete GSPs from the Delta-Mendota Subbasin to provide more clarity on their water budget components (see Figure 20).



FIGURE 19. DWR REQUIREMENTS TO INCORPORATE CLIMATE CHANGE INTO THE FUTURE WATER BUDGET

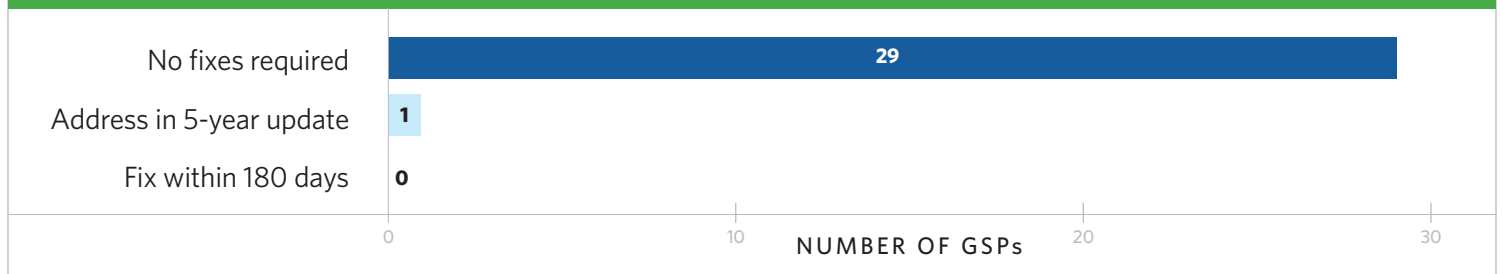
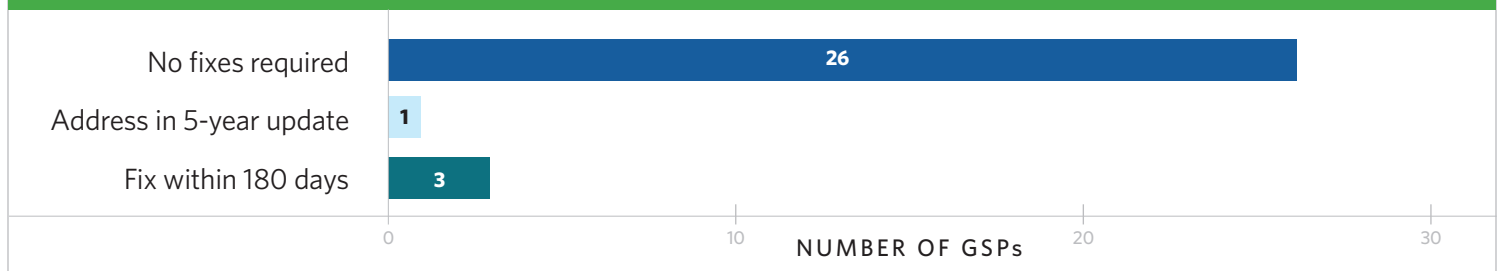


FIGURE 20. DWR REQUIREMENTS FOR FURTHER TRANSPARENCY OR CLARITY OF THE WATER BUDGET



# Consideration of Impacts to Disadvantaged Communities, Drinking Water Users, and Environmental Users in the Sustainable Management Criteria Evaluation



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Per SGMA regulations, the description of both Undesirable Results and minimum thresholds must include the effects on beneficial uses and users of groundwater or other land use and property interests (23 CCR § 354.26(b)(3) and 354.28(b)(4)). As described in Section 2 above, DWR is required by 23 CCR § 355.4(b)(4) to evaluate GSPs on “whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered.” Our organizations previously reviewed whether GSPs evaluated the impacts that sustainable management criteria had on disadvantaged communities, drinking water users and environmental users and outlined steps for conducting this analysis, including:

- Provide a map that overlays groundwater level contours at minimum threshold groundwater levels and the locations of disadvantaged communities, domestic wells and small community water systems;
- Estimate the number and location of domestic wells and public supply systems impacted at the minimum thresholds; and
- Describe and quantify the anticipated impacts to beneficial users if the number of minimum threshold exceedances reaches the threshold to constitute an Undesirable Result (i.e., the Undesirable Results criteria).

Further, 23 CCR § 354.16(f) requires that the GSAs identify ISW systems within the basin “utilizing data available from the Department, as specified in Section 535.2, or the best available science.” Our organizations did not previously highlight whether the 2020 GSPs utilized the best available science to develop ISW sustainable management criteria (GLF, 2021). However, we recognize that insufficient identification of ISW bodies may lead to unintended impacts on environmental beneficial users, particularly GDEs. Thus, our findings, as well as DWR’s, SWRCB’s, CDFW, and NFMS findings on this topic have been incorporated into this analysis.

## KEY FINDINGS



The primary focus of DWR’s review was sustainable management criteria, including the impacts of Undesirable Results, minimum thresholds, and measurable objectives on beneficial users.



DWR found that many GSAs did not adequately characterize interconnected surface water within the GSP area, potentially leading to impacts on environmental users such as GDEs.



DWR provided the greatest number of Corrective Actions on the Chronic Lowering of Groundwater Levels and Land Subsidence sustainable management criteria.



## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, SWRCB, CDFW, AND NMFS

Per 23 CCR § 354.22, sustainable management criteria define conditions that “constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.” Further, undesirable results are defined as the occurrence of “significant and unreasonable effects [...] are caused by groundwater conditions occurring throughout the basin” (23 CCR § 354.26). Therefore, in order to characterize undesirable results and determine that the minimum thresholds and measurable objectives are protective, the effects that these criteria have on beneficial users must be understood.

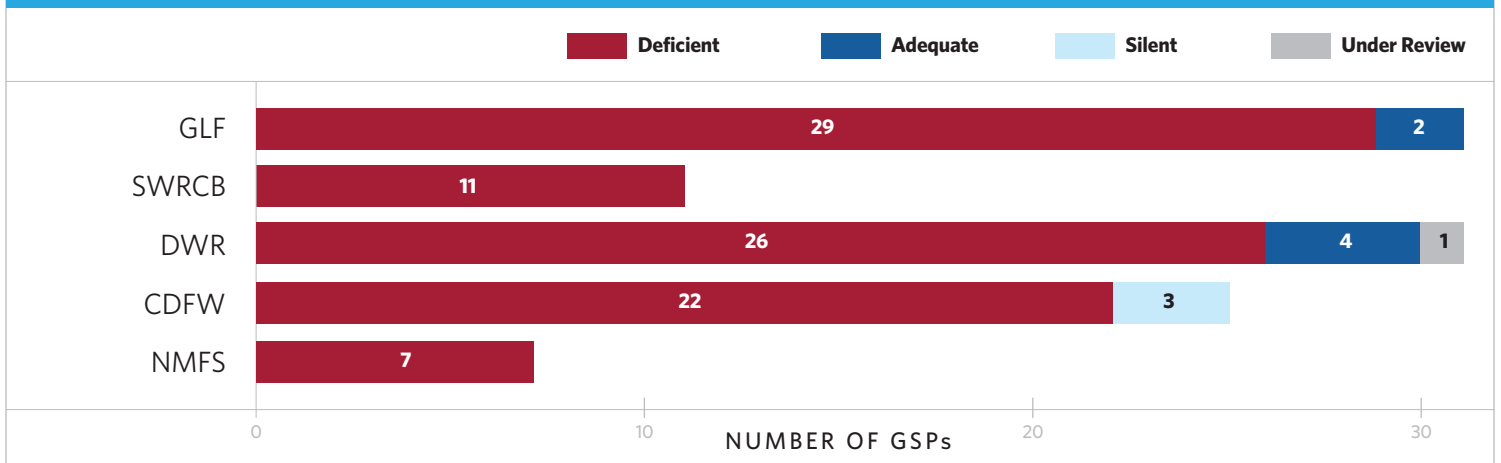
Our organizations’ analysis evaluated whether the GSPs documented how sustainable management criteria impacted disadvantaged communities, drinking water users, and environmental users using clear and quantifiable methods. A complete assessment of impacts should include an evaluation of both direct and indirect impacts. For example, a direct impact of declining water levels would be the dewatering of wells. The number of wells dewatered at minimum threshold levels could be determined using available well construction information to compare the depth of the well screen to the minimum threshold groundwater level. Indirect impacts of minimum thresholds are notably more difficult to quantify than the direct impacts for each sustainability indicator. An important example of indirect effects of minimum thresholds are water quality impacts that can result from

declining water levels. For example, in some areas of the Central Valley, it has been documented that declining water levels that result in the dewatering of Corcoran Clay can result in increased concentrations of arsenic in groundwater (Smith et al. 2018). GSAs could evaluate the relationship between water levels and water quality constituents by collecting this data at representative monitoring sites and conducting a statistical analysis (e.g., Mann-Kendall trend analysis), or by utilizing publicly available datasets such as the concentration trends of inorganic water quality constituents in public water supply wells by the United States Geological Survey (USGS, 2019).

To adequately evaluate the impacts of sustainable management criteria for our analysis, a GSP had to include a complete assessment (i.e., an evaluation of both direct and indirect impacts) of the effects of sustainable management criteria on beneficial users. Our organizations found that 29 out of 31 GSPs did not include a complete assessment of sustainable management criteria (see Figure 21).

Similarly, both DWR and SWRCB found that most GSPs (26 out of 30 GSPs and 11 out of 11 GSPs, respectively) required further explanation or analysis to determine whether sustainable management criteria are protective of beneficial uses and users (see Figure 21). Sustainable management criteria were the focus of DWR’s review, as DWR provided comments on this topic in every Determination Letter, and provided the greatest number of Corrective Actions pertaining to this section of the GSP. The deficiencies identified by DWR pertaining to the impacts of sustainable management criteria on beneficial users align with our organizations’ review. However, DWR did not appear to distinguish between direct and indirect impacts.

FIGURE 21. DOES THE GSP CONSIDER THE IMPACTS OF UNDESIRABLE RESULTS, MEASURABLE OBJECTIVES, AND MINIMUM THRESHOLDS ON DISADVANTAGED COMMUNITIES AND OTHER BENEFICIAL USERS?



Similarly, CDFW found that 22 out of 25 GSPs it reviewed did not evaluate the impacts that sustainable management criteria had on environmental beneficial users, such as GDEs. CDFW found that when GSPs did evaluate impacts to beneficial users, the analysis focused on drinking water users, such as domestic wells, but did not include environmental uses of groundwater. Additionally, NMFS found that all seven GSPs that it reviewed did not analyze the impacts that sustainable management criteria had on streamflow depletions and surface water environmental users.

ISW is the term that describes the connectivity between surface water and groundwater systems. In the context of SGMA, pumping by GSAs can cause depressions in the water table that lead to surface water flowing towards groundwater, therefore inducing stream depletions that adversely affect riparian habitat and environmental users, particularly GDEs. ISW is arguably one of the least understood and most complex aspects of SGMA, and consequently, many GSPs failed to follow SGMA regulations that require the GSAs to estimate “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” (23 CCR §354.16).

Our organizations found that 21 out of 23 GSPs<sup>12</sup> did not adequately characterize ISWs, while DWR found that 11 of 30 GSPs deficient, specifically taking issue with GSAs that claimed ISWs were not present in the GSP area without supporting this claim with the best available science (see Figure 22). Similarly, SWRCB found that 9 out of the 11 GSPs it reviewed did not accurately identify or develop sustainable management criteria for ISWs.

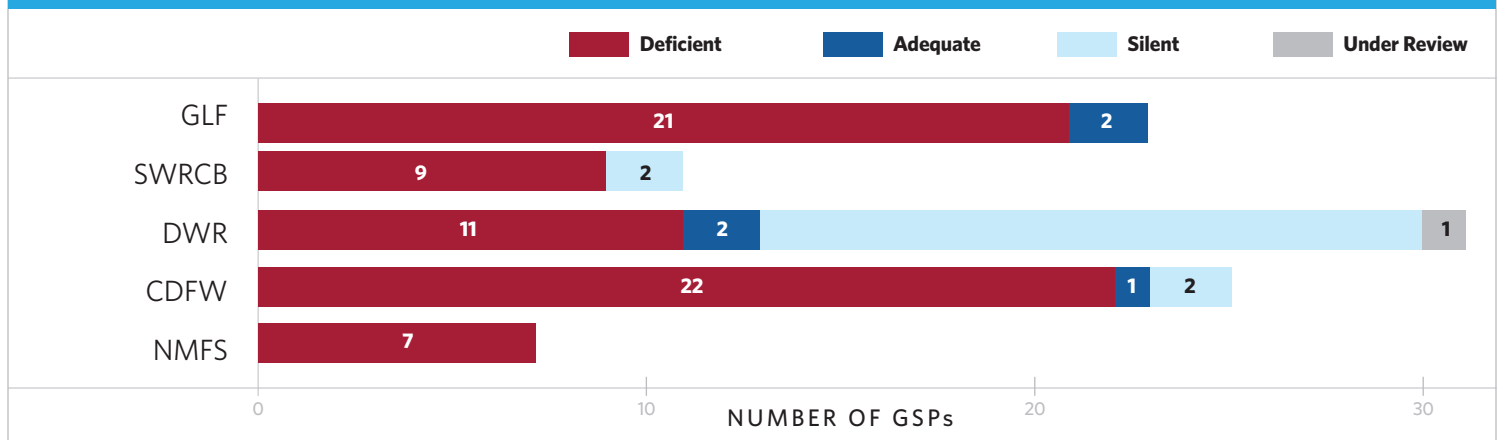
In addition to finding that some GSPs inappropriately claimed a lack of ISWs in the GSP area, SWRCB also cited the requirement to identify the “quantity and timing of depletions” when ISWs were found. SWRCB identified this deficiency in two GSPs that DWR was silent on (i.e., the Eastern San Joaquin Subbasin GSP and Merced Subbasin GSPs). However, in a February 2022 SGMA Implementation Update, DWR stated that “By 2025, [GSAs should] provide the specific methodology to quantify stream depletion, including the location, quantity, and timing of depletion of interconnected surface waters” (DWR, 2022), showing that DWR is providing time (until the five-year update) for GSAs to collect this data.

Additionally, CDFW found that 22 out of 25 GSPs did not adequately characterize the locations, timing, and quantity of streamflow depletions, or did not describe a plan and schedule to fill these data gaps, if necessary. Similarly, NMFS found that all seven of the GSPs it reviewed insufficiently identified and developed ISWs sustainable management criteria.

### DWR REQUIRED FIXES

Generally, GSAs that did not evaluate the potential impacts of sustainable management criteria on beneficial users were designed as incomplete by DWR and given 180 days to revise the GSP (see Figure 23). The one exception is for the approved Pleasant Valley Basin GSP, where DWR commented, “[T]he GSP does not clearly discuss how the established minimum thresholds for groundwater levels may impact the beneficial users and uses of groundwater in the Basin” (Pleasant Valley Basin GSP, page 33). This

**FIGURE 22. DOES THE GSP USE THE BEST AVAILABLE SCIENCE TO IDENTIFY INTERCONNECTED SURFACE WATER?**



<sup>12</sup> Identification of interconnected surface water in GSPs was evaluated by The Nature Conservancy’s (TNC) SGMA Signals report, but not explicitly included in our 2020 comment letters. TNC reviewed 23 of the 31 GSPs that our organizations provided comment letters on in 2020, and the results for those 23 GSPs are summarized here. TNC SGMA Signals: [https://groundwaterresourcehub.org/public/uploads/pdfs/110421\\_SGMA\\_Report\\_K.pdf](https://groundwaterresourcehub.org/public/uploads/pdfs/110421_SGMA_Report_K.pdf)

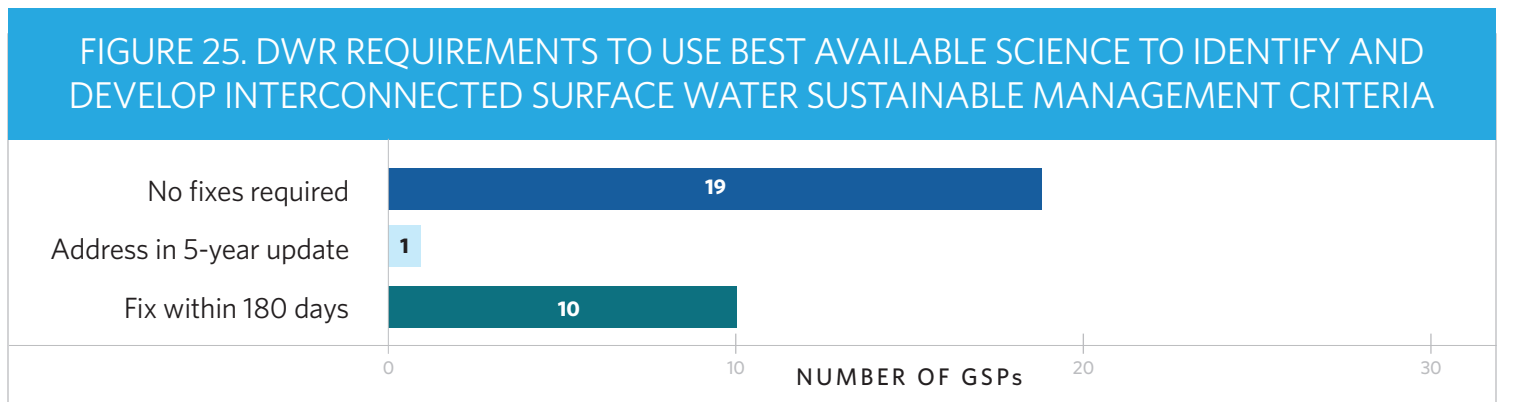
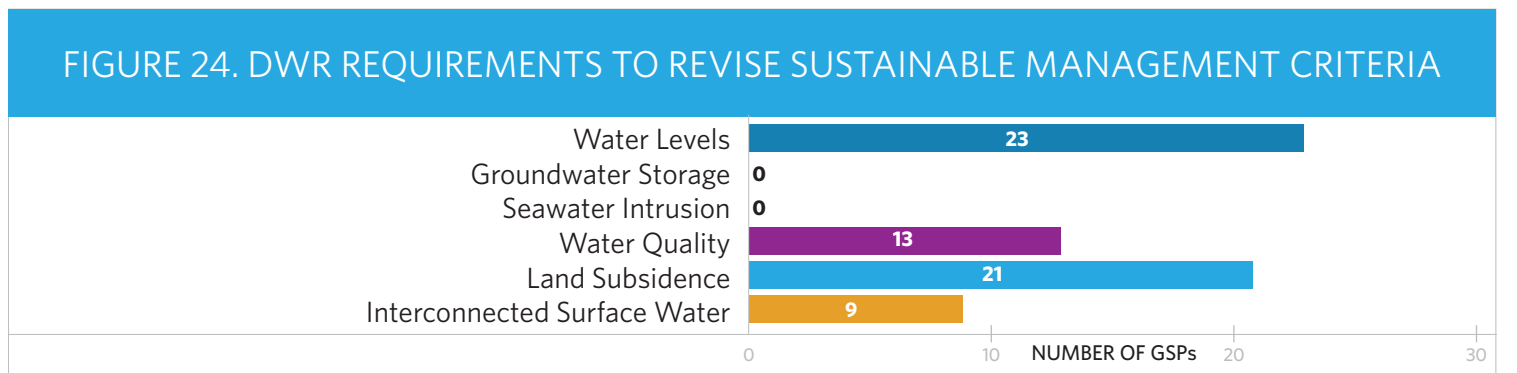
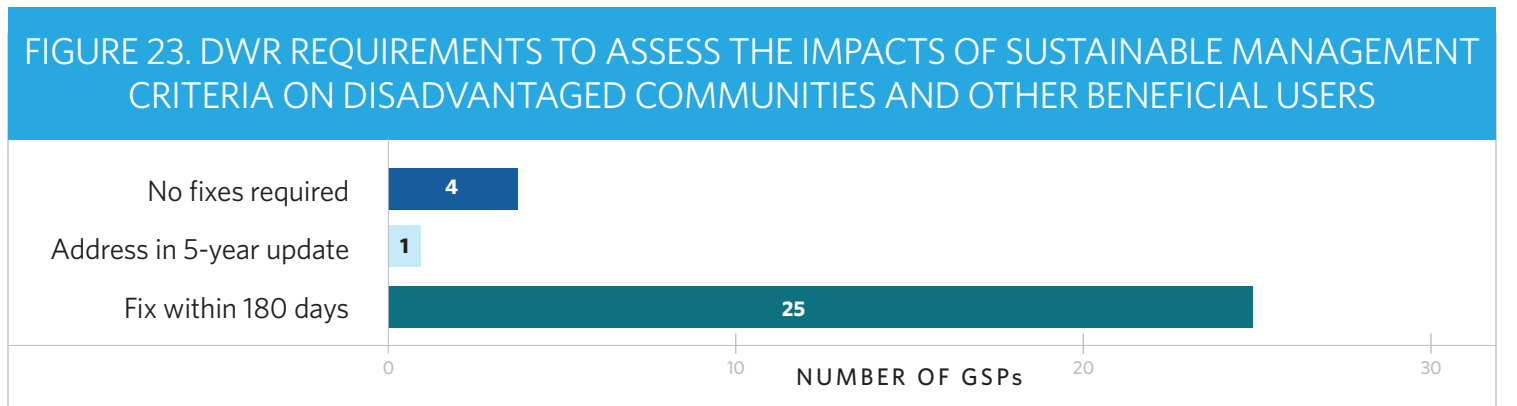


finding is similar to the Corrective Actions provided for GSPs designated as incomplete, and therefore was inconsistently applied in giving the Pleasant Valley Basin GSA five years to address this concern.

Notably, DWR provided the greatest number of Corrective Actions for the Chronic Lowering of Groundwater Levels sustainability indicator (see Figure 24). The emphasis on water levels is not surprising, as declining water levels have numerous impacts on a wide range of beneficial users and are directly linked to the causes of Undesirable Results for other sustainability indicators (e.g., declining water levels lead to the depressurization of aquifers, causing land subsidence). DWR found the Chronic Lowering of Groundwater Levels sustainable management criteria deficient in 23 out of 30 GSPs. Land subsidence was also a primary concern, with DWR finding deficiencies in 21 out of 30 GSPs. Comments on

land subsidence included the requirement to: 1) provide additional analysis on the impacts of subsidence minimum thresholds and measurable objectives to beneficial users (i.e., critical surface water infrastructure), 2) provide justification for using groundwater levels as a proxy, and 3) justify measurable objectives that allow for additional subsidence throughout the SGMA implementation period or minimum thresholds that allow subsidence to continue beyond 2040.

DWR generally required GSAs to provide evidence that ISWs did not exist within the 180-day review period (see Figure 25). The one exception was in the 180/400-foot Aquifer Subbasin GSP, which was approved. It should be noted that this GSA cited several studies that indicated surface water-groundwater connectivity was unlikely in the principal aquifer but acknowledged that additional data was needed to be able to conclude this information themselves.



# Identification and Reconciliation of Data Gaps Evaluation



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SGMA regulations state that the monitoring network objectives shall be implemented to “[m]onitor impacts to beneficial uses or users of groundwater” (23 CCR § 354.34(b)(2)). Therefore, GSAs should demonstrate that the monitoring network is in close proximity to beneficial users. One way of doing this would be to map the locations of beneficial users, particularly sensitive users such as disadvantaged communities and GDEs with respect to the proposed monitoring networks. We believe this assessment is essential to evaluate if the network can adequately monitor the potential impacts to beneficial users.

Additionally, 23 CCR §354.4(c)(1)(D) requires that GSAs provide well construction information, including total well depth, casing perforations, and borehole depth, for wells used to monitor groundwater conditions. If this information is not available, the GSA should describe a schedule for acquiring wells with this information available, or demonstrate that this information is not necessary to understand and manage groundwater. GSAs must “identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor

sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency” (23 CCR § 354.38(b)).

## KEY FINDINGS



DWR did not comment on whether GSAs mapped the location of sensitive users, such as disadvantaged communities and GDEs, with the locations of the representative monitoring sites. Our organizations found that only three out of 31 GSPs provided a map that overlays disadvantaged communities and GDEs with the monitoring network.



DWR did not comment on whether any GSPs failed to include well depths of the proposed monitoring network, per 23 CCR §354.4(c)(1)(D). Our organizations found that 12 out of 31 GSPs did not include monitoring network well depths.



## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, AND SWRCB

Our organizations reviewed whether GSPs provided a map that overlays the location of the monitoring network with disadvantaged communities or GDEs. Our organizations found that only 10 out of 31 GSPs provided a map overlaying the SGMA monitoring network with disadvantaged communities, and only four out of 31 GSPs provided a map overlaying the SGMA monitoring network with GDEs (see Figures 26 and 27). Without explicit indication that these sensitive users are considered in the development of the monitoring network, the GSAs have left potential for the impacts to these users to be unreported or underreported.

Despite the requirement to demonstrate that the monitoring networks can monitor beneficial users, DWR did not provide any comments on this issue. SWRCB cited one deficiency in the Kings River East GSP, stating, “Based on the monitoring network description and map, RMSs may not reflect impacts to beneficial uses and users in [disadvantaged communities (DACs)]. Most DACs don’t have a monitoring site located within the DAC boundary” (page 21). While this comment reflects the concerns of

our organization, neither DWR nor SWRCB consistently or thoroughly identified whether monitoring networks were chosen with consideration of these beneficial users.

Our organizations found that 12 out of 31 GSPs did not include the well depth of the proposed representative monitoring sites (see Figure 28). However, DWR did not provide any comments or Corrective Actions to include total well depth information. Without knowledge of well depth, it is unclear whether a representative monitoring site is collecting data from the principal aquifer and accurately representing impacts to drinking water users. SWRCB provided a comment to this extent on the Kings Subbasin GSPs, saying, “It is not clear if the proposed [representative monitoring site] wells for groundwater levels will provide the GSAs adequate spatial or depth coverage for monitoring impacts to groundwater users, because it is not clear that the GSAs have determined (1) which RMS wells are screened in each aquifer or (2) which aquifers each class of beneficial users extract from” (page 6).

SGMA regulations recognize that historically, agencies may not have monitored for the sustainability indicators defined by SGMA. Therefore, GSAs are required to identify and

FIGURE 26. DOES THE GSP OVERLAY THE SGMA MONITORING WELL NETWORK WITH DISADVANTAGED COMMUNITIES?

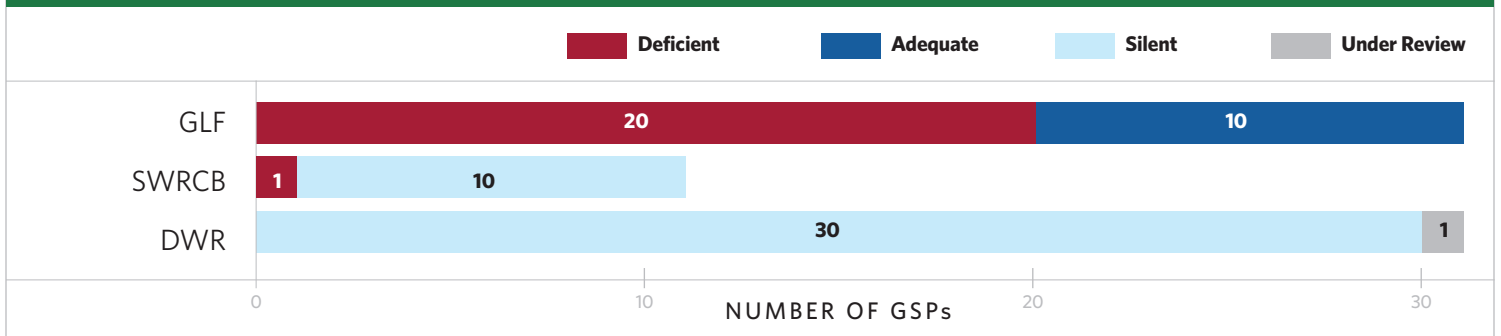
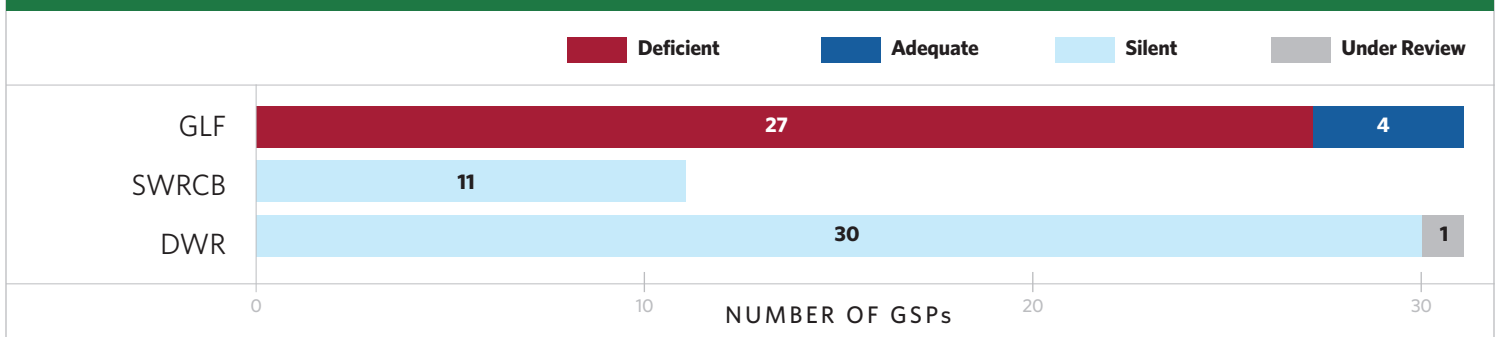


FIGURE 27. DOES THE GSP OVERLAY THE SGMA MONITORING WELL NETWORK WITH GDEs?



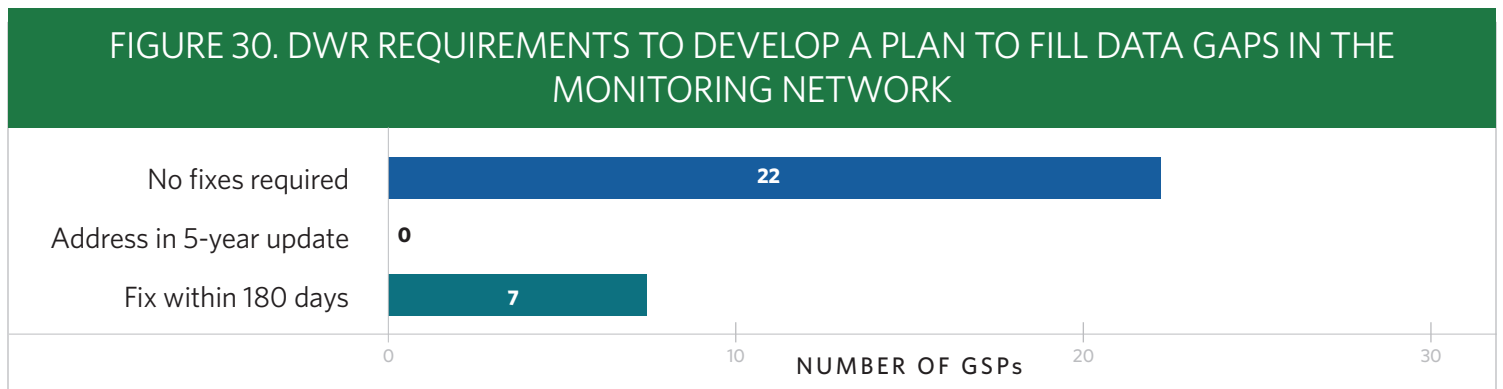
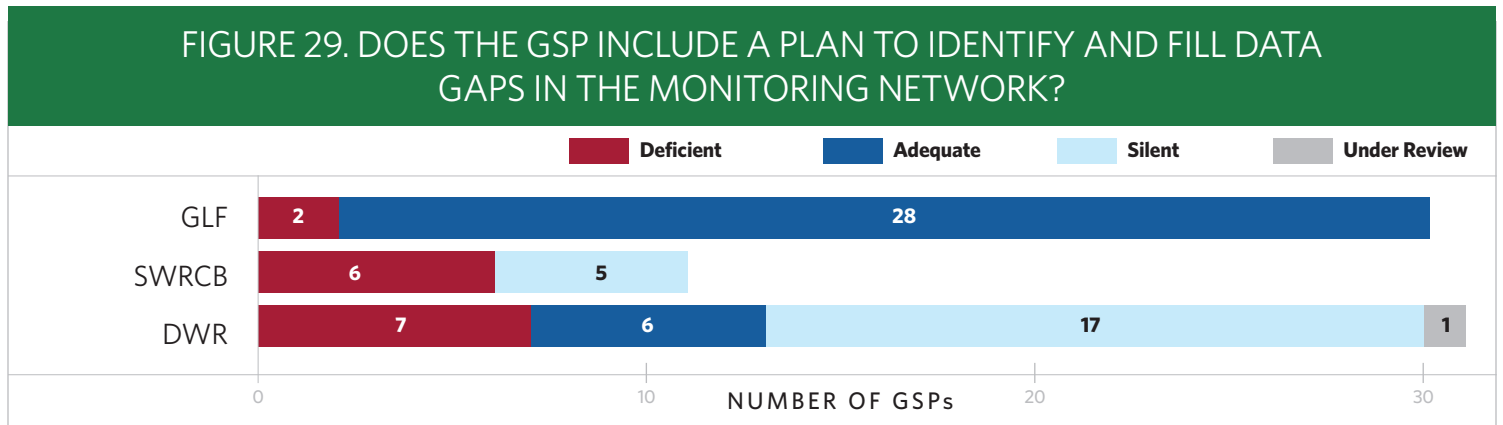
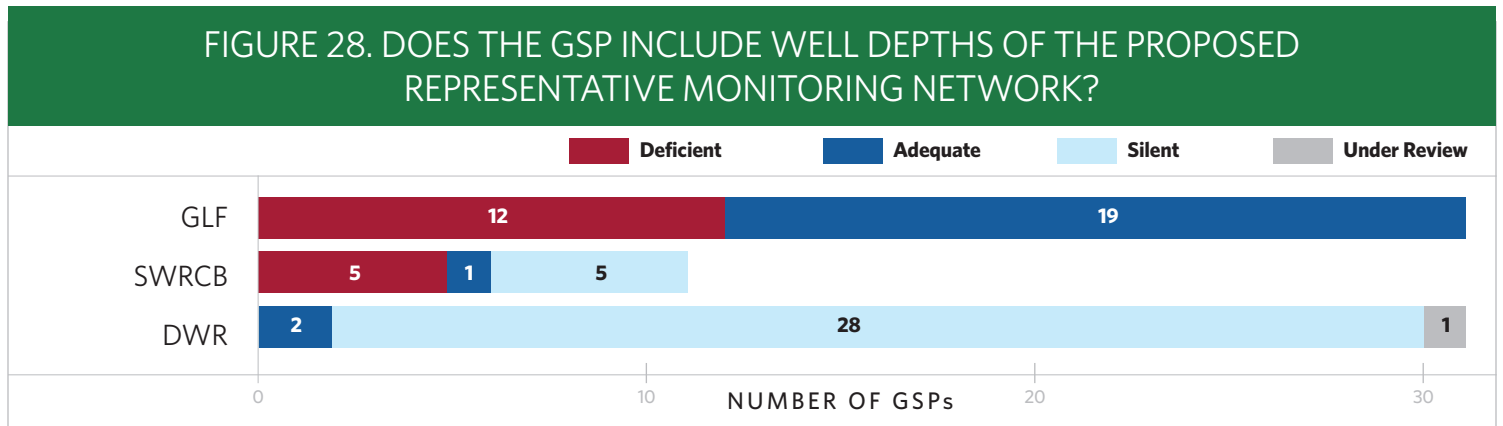
include a plan to fill data gaps in the monitoring network during GSP development. Filling data gaps in a timely fashion is necessary to monitor the progress of sustainability. Our organizations' analysis looked at whether GSPs included any kind of intention to address and fill data gaps, but did not consider the quality of the plan in our final tally. We observed that while most (28 out of 31) GSPs included a plan to identify and fill data gaps in the monitoring network (see Figure 29), the proposed plans were often: 1) not very specific as to the locations of proposed new monitoring wells or points, and 2) often did not specifically address data gaps affecting the ability to monitor conditions for disadvantaged communities and GDEs.

DWR found that seven out of 30 GSPs did not include a plan to identify and fill data gaps. As discussed in

Section 7, DWR determined that many GSAs concluded that ISWs did not exist in the plan area without pointing towards specific data or evidence. Consequently, DWR's comments focused primarily on filling data gaps for the ISW monitoring network to better characterize surface water-groundwater systems. SWRCB comments more closely aligned with our organizations' analysis, and stated that greater detail on the plans to fill data gaps in the monitoring network should be provided.

### DWR REQUIRED FIXES

Since DWR comments on filling data gaps in the monitoring network were related to characterizing ISWs, all GSPs with this deficiency were designated incomplete and given 180 days to address the issue (see Figure 30).





# Identification of Potential Impacts to Beneficial Users in the Projects and Management Actions Evaluation



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Projects and management actions are the GSAs path to sustainability and achieving the goals set out in the rest of the GSP. 23 CCR § 354.44 (b)(2) requires that “[i]f overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.” Further, the GSP must provide a description of the estimated cost, status and/or schedule for implementation, expected benefits, permitting and regulatory process, and water source and reliability for each project (23 CCR § 354.44(b)). The above-listed details are necessary to determine the likelihood of a project achieving expected benefits, and in turn, whether a GSA will reach its goals for sustainability.

Some projects, specifically groundwater recharge projects, have the potential to mobilize shallow soil contaminants and spread existing plumes and degrade existing water quality. GSAs are not responsible for improving water quality conditions that occurred before, and have not been corrected by, January 1, 2015 (CWC § 10727.2(b) (4)). However, GSAs are responsible for addressing water quality conditions that occur after January 1, 2015, particularly degraded conditions that are caused or exacerbated by GSA-driven groundwater management actions such as groundwater recharge or banking projects.

The SWRCB stated that a GSA’s responsibility with regard to water quality is “to ensure that its management of groundwater conditions in the basin and any other action taken by the GSA will not significantly and unreasonably degrade water quality” and “projects or management actions adopted by a GSA within their GSPs should not cause degradation of water quality that could lead to an undesirable result” (SWRCB, 2019). Therefore, it is necessary for GSAs to consider how the proposed projects and management actions may impact water quality during the planning stages.

## KEY FINDINGS



DWR found that four GSPs did not address overdraft conditions by 2040. However, DWR approved one of these GSPs (the Indian Wells Valley Basin GSP), even though it allows for overdraft to continue beyond the SGMA implementation period. Therefore, DWR was inconsistent in its determination on whether allowing for continued overdraft is considered a “fatal flaw” in the Plans.



DWR found that 17 out of 30 GSPs did not investigate potential impacts that the projects and management actions could have on water quality.

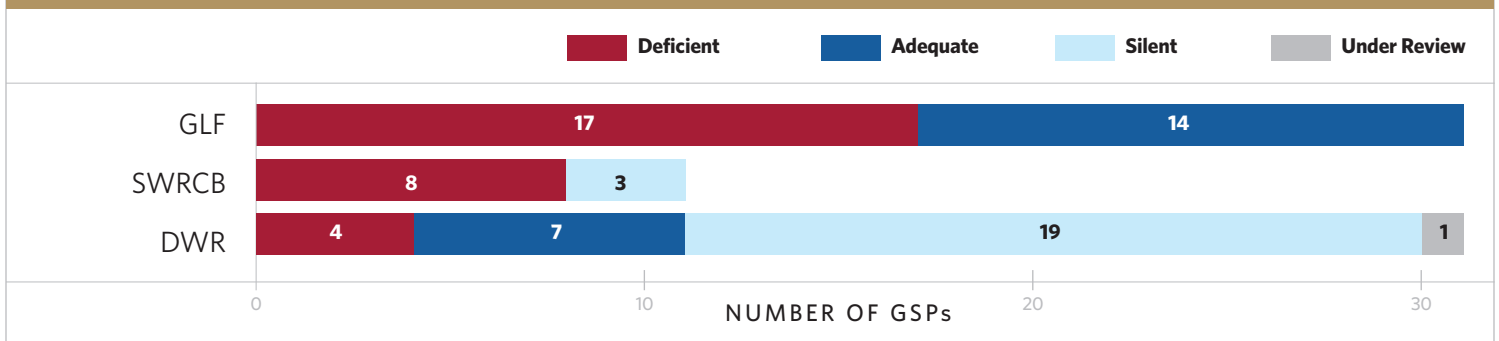


## SUMMARY AND COMPARISON OF FINDINGS BY GLF, DWR, AND SWRCB

In order to prevent irreversible damage to environmental users and disadvantaged communities (e.g., permanent loss of habitat), it is necessary for overdraft conditions to be addressed immediately (i.e., in the first five years of SGMA implementation) through projects and management actions. For our analysis, we reviewed the projects identified in the GSP, including the estimated yield and funding source for each project, and determined that if the quantified benefits of projects would address at least 25%

of the identified overdraft in the basin within the first five years, then the GSP was considered to adequately address overdraft in the first five years of implementation. Notably, we did not review the feasibility of the projects, question the yield assumptions, or investigate water rights. Additionally, if funding sources were not yet identified, we assumed that the project was unlikely to occur in the first five years of plan implementation; if funding was secured or a funding source identified, we assumed that the project would be implemented by 2025. Our analysis found that 17 out of 31 GSPs did not appear to be able to address overdraft conditions within the first five years (see Figure 31).

FIGURE 31. DO THE PROJECTS AND MANAGEMENT ACTIONS IDENTIFIED IN THE GSP REPRESENT A PLAN TO MITIGATE OVERDRAFT CONDITIONS?



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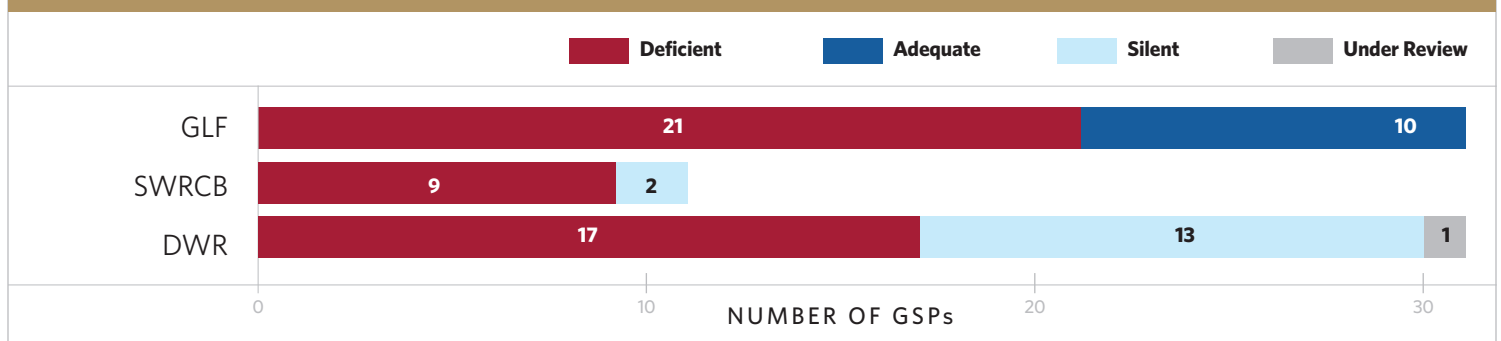
In the Determination Letters, neither DWR nor SWRCB reviewed whether projects and management actions addressed overdraft conditions specifically within the first five years, or if the projects had a feasible plan for implementation. Rather, both DWR's and SWRCB's review appeared to focus on whether the quantifiable benefits of projects and management actions would mitigate the volume of identified overdraft by 2040. Therefore, for DWR and SWRCB, Figure 32 shows the count of GSPs that did or did not mitigate the volume of overdraft by 2040, whereas GLF's value represents the count of GSPs that did or did not contain a plan to mitigate overdraft in the first five years, as described above.

DWR found that four out of 30 GSPs allowed for overdraft conditions beyond the 20-year implementation period. DWR has indicated that continued overdraft is not consistent with the intent of SGMA, but has been inconsistent in whether this is a "fatal flaw" (i.e., will lead to an "Incomplete" or "Inadequate" determination), as the Indian Wells Valley Basin GSP allows for overdraft beyond 2040, but was ultimately approved by DWR.

Our review identified that the most common type of supply augmentation project is groundwater recharge. As discussed above, recharge projects have the potential to mobilize contaminants and cause further degradation of water quality. GSAs are responsible for degradation of water quality due to groundwater management actions, including extraction and recharge. However, our analysis shows that 21 out of 31 GSPs did not include a commitment to monitor for and analyze the potential impacts that projects and management actions may have on water quality through their implementation (see Figure 32).

DWR took similar concern, citing that GSAs "should describe and disclose how the GSAs will assess whether any future degradation in groundwater quality is due to groundwater pumping and recharge projects occurring during GSP implementation" (Determination Letter for the Tule Subbasin, page 26). DWR found that 17 out of 30 GSPs did not consider the impacts that projects and management actions may have on water quality. SWRCB similarly found that nine out of 11 of the GSPs that it reviewed needed additional analysis on water quality impacts.

FIGURE 32. DOES THE GSP INCLUDE A COMMITMENT TO INCORPORATE WATER QUALITY ANALYSIS AS PART OF PROJECT IMPLEMENTATION?

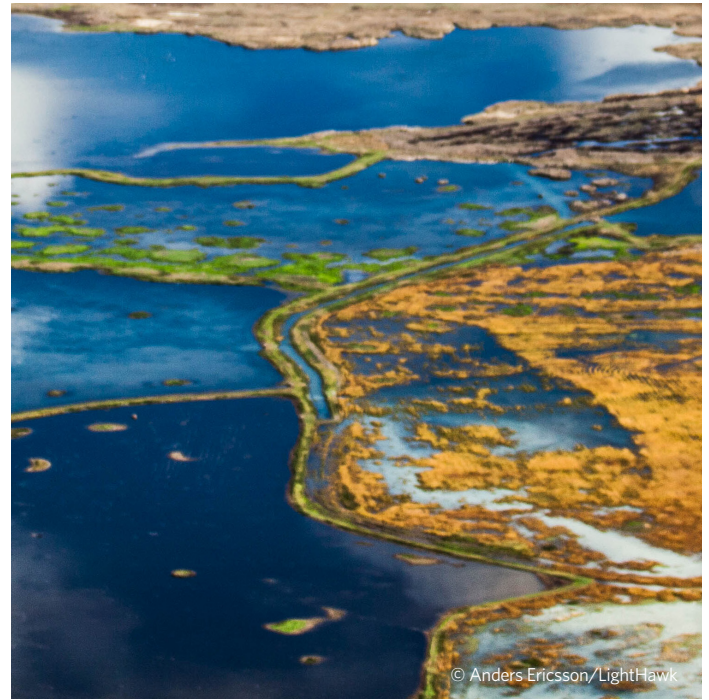


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## DWR REQUIRED FIXES

As discussed above, DWR has been inconsistent in its determination for GSPs that allow for overdraft to continue past 2040. While DWR has indicated that continued overdraft conflicts with the intent of SGMA and needs to be addressed, it approved the Indian Wells Valley Basin GSP while it designated three other GSPs as incomplete for the same issue (see Figure 33).

DWR found that approximately 55% of GSPs designated as incomplete and 50% of approved GSPs did not incorporate water quality analysis as part of the planned projects and management actions (see Figure 34). It does not appear that DWR considered lack of water quality analysis in projects and management actions alone a sufficient reason to designate a GSP as incomplete. However, DWR provided several comments on this issue, and has indicated that water quality analysis will be an important consideration in project implementation.



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FIGURE 33. DWR REQUIREMENTS TO ADDRESS OVERDRAFT CONDITIONS BY 2040

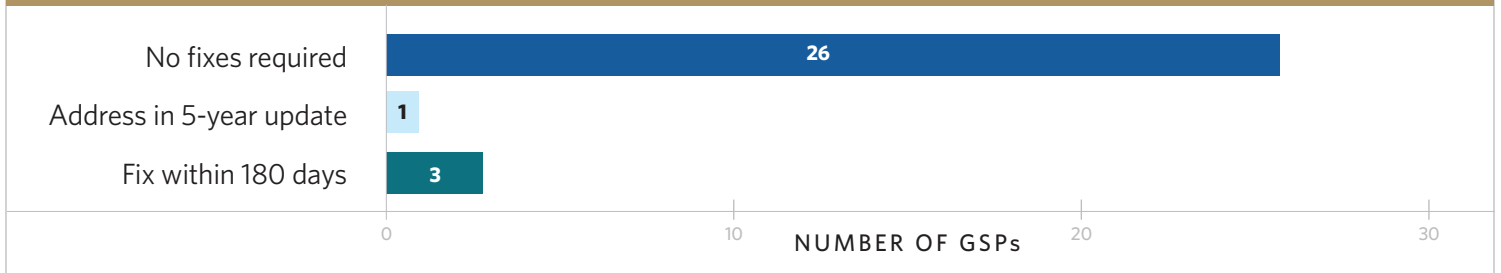
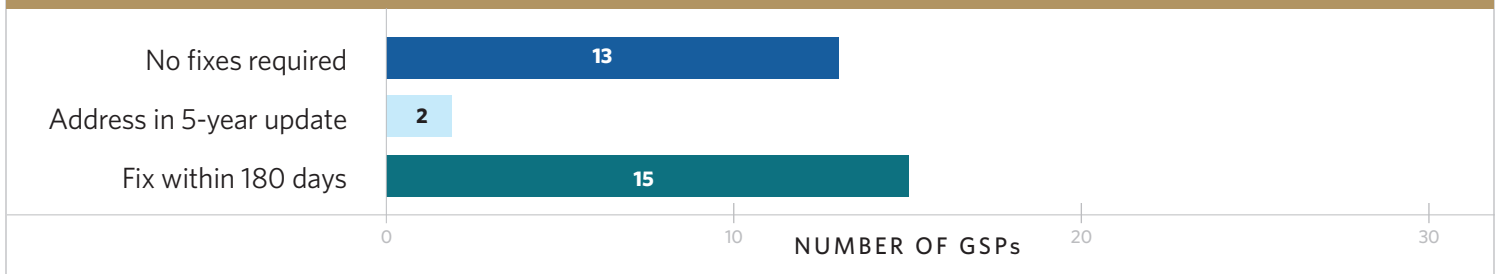


FIGURE 34. DWR REQUIREMENTS TO INCORPORATE WATER QUALITY ANALYSIS IN GROUNDWATER RECHARGE AND EXTRACTION PROJECTS





DWR, 2022. Sustainable Groundwater Management Update. California Department of Water Resources, February 2022. [https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2022/02\\_February/February2022\\_Item\\_11\\_Attach\\_1\\_PowerPoint\\_Final.pdf](https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2022/02_February/February2022_Item_11_Attach_1_PowerPoint_Final.pdf)

DWR, 2018a. Guidance Document for Groundwater Sustainability Plan, Stakeholder Communication and Engagement. California Department of Water Resources, Sustainable Groundwater Management Program, January 2018. <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Assistance-and-Engagement/Files/Guidance-Doc-for-GSP---Stakeholder-Communication-and-Engagement.pdf?msclkid=e56ed999b69111ec846f6fa535eeadf3>

DWR, 2018b. "Natural Communities Commonly Associated with Groundwater" Dataset. California Department of Water Resources, Sustainable Groundwater Management Program, April 2018. <https://data.cnra.ca.gov/dataset/natural-communities-commonly-associated-with-groundwater?msclkid=d4bdf6c0b69111ecac57484805754b7f>

DWR, 2018c. DAC Mapping Tool. California Department of Water Resources, Sustainable Groundwater Management Program, 2018. <https://gis.water.ca.gov/app/dacs/>

DWR, 2018d. Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development. California Department of Water Resources, Sustainable Groundwater Management Program, July 2018. [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\\_ay\\_19.pdf?msclkid=f1ff92d2b69311eca1d37cf8e496eb37](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_ay_19.pdf?msclkid=f1ff92d2b69311eca1d37cf8e496eb37)

GLF, 2021. Summary Analysis of 31 Groundwater Sustainability Plans in Critically Overdrafted Basins, Groundwater Leadership Forum (GLF), 19 February 2021. <https://groundwaterexchange.org/wp-content/uploads/2021/03/NGO-Analysis-of-2020-GSPs-for-Key-Beneficial-Users.pdf>

Smith, Ryan et al., 2018. Overpumping Leads to California Groundwater Arsenic Threat. *Nature Communications* vol. 9,1 2089, 5 June 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5988660/>

SWRCB, 2019. Sustainable Groundwater Management Act, Water Quality Frequently Asked Questions, California State Water Resources Control Board, 10 October 2019. [https://www.waterboards.ca.gov/water\\_issues/programs/gmp/docs/sgma/sgma\\_wtr\\_qual.pdf](https://www.waterboards.ca.gov/water_issues/programs/gmp/docs/sgma/sgma_wtr_qual.pdf)

TNC, 2021. SGMA Signals: Managing Groundwater for Nature. The Nature Conservancy, December 2021. [https://www.groundwaterresourcehub.org/public/uploads/pdfs/110421\\_SGMA\\_Report\\_K.pdf](https://www.groundwaterresourcehub.org/public/uploads/pdfs/110421_SGMA_Report_K.pdf)

TNC, 2018. Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act. The Nature Conservancy, January 2018. <https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf?msclkid=fb3fff64b69111ec9210d9e60e2892d1>

USGS, 2019. California GAMA Priority Basin Project: Trends in water-quality for inorganic constituents in California public-supply wells (1st ed.), Dupuy, D.I., Nguyen, D.H., and Jurgens, B.C, 2019. <https://ca.water.usgs.gov/projects/gama/public-well-water-quality-trends/>, <https://doi.org/10.5066/P9AD3Q76>