Implementing SGMA

Results from a stakeholder survey

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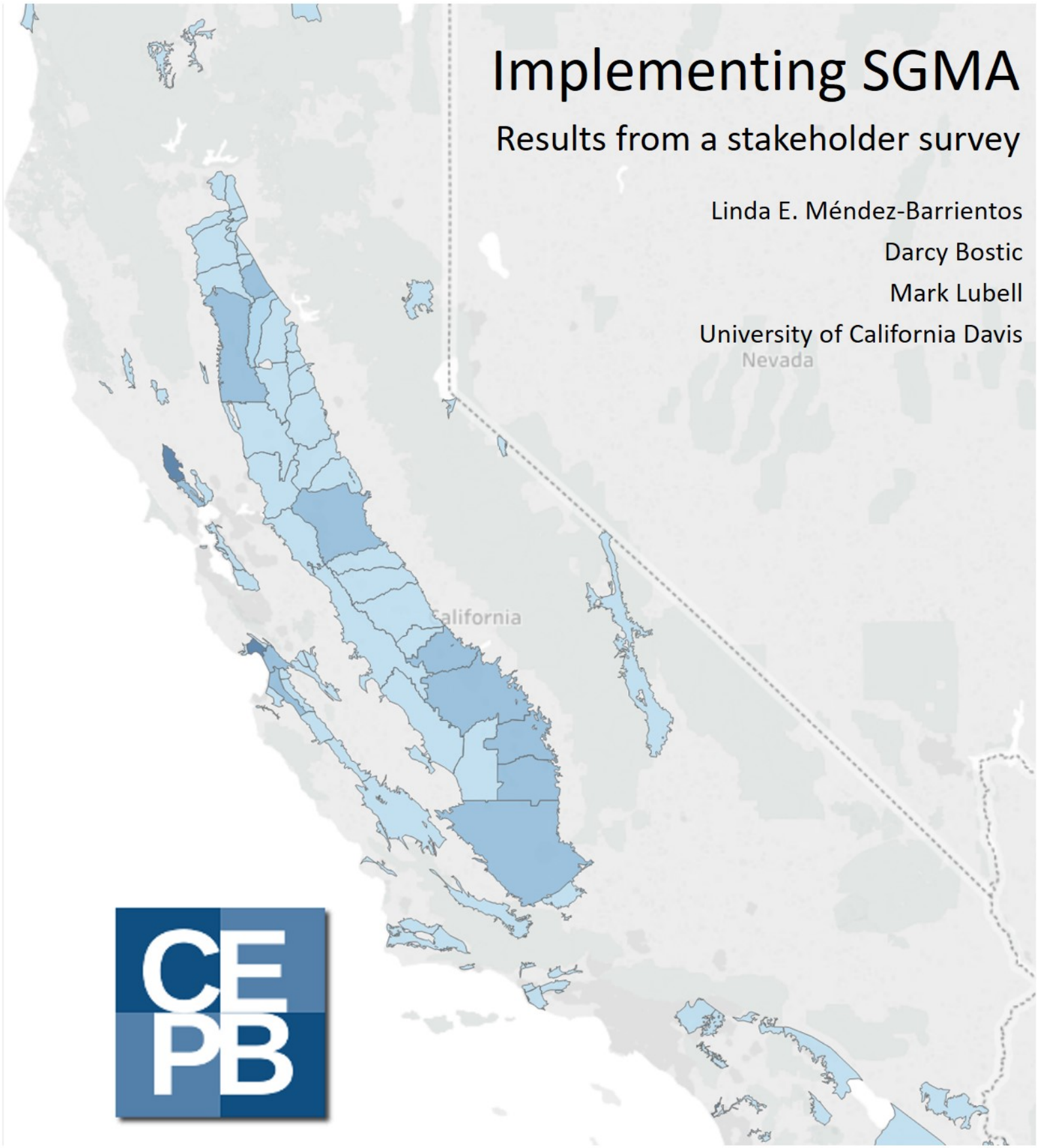

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The Sustainable Groundwater Management Act (SGMA) of 2014 represents a historic transition to collective groundwater resource management and has the potential to significantly reduce groundwater overdraft in California. A total of 260 groundwater sustainability agencies (GSAs) recently formed to collectively manage groundwater resources in the 127 high and medium priority groundwater basins of the state. The simultaneous formation of hundreds of new governing agencies is an unprecedented institutional effort with very few examples to learn from. As GSAs move towards the design and deliberation of their groundwater sustainability plans (GSPs), assessments on the process up until now can directly inform development processes that are still taking place.

This report summarizes the results from a state-wide survey that targeted SGMA participants. The survey sought information on perceptions regarding the SGMA process, access to participation and engagement, cross-sector and multi-actor collaboration, groundwater management strategies as well as stakeholder's groundwater dependence and vulnerability. The findings suggest that SGMA participants have little trust in SGMA's capacity to achieve environmental and social outcomes, which is key for its success. Nevertheless, while they are not confident on the policy reform, they support a portfolio of practical solutions for groundwater management. This means that in general, survey respondents show support for taking necessary measures to solve groundwater overdraft.

Climate change events such as drought and governance are perceived as the two most pressing challenges for groundwater management. While the experience of SGMA is unsurprisingly diverse across California, the statewide perspective presented here provides some insights on challenges and processes that are crucial to SGMA's success:

Science. The definition of clear geographic boundaries between groundwater basins and GSAs was generally characterized as effective. This is important because avoiding jurisdictional overlaps among GSAs managing groundwater basins is key to assign responsibility and accountability. Furthermore, inclusion of best available science and identification of hydrological dynamics influencing groundwater movement and quality were also perceived as effective in SGMA processes. All of these activities are key for the design and implementation of GSPs.

Cooperation. While 50% of respondents perceived that SGMA had effectively empowered local leadership, built social networks, encouraged collaboration and help stakeholders understand each other to agree on a common perspective, about 25% disagreed on SGMA's effectiveness in achieving these outcomes. This is not surprising as SGMA governance arrangements have also been diverse, with some GSAs

structured independently as single GSAs, and others as collective-action organizations or multi-agency GSAs.

Governance. There is a discrepancy between favorable perceptions of the opportunities given for public participation and perceptions of equity in decision-making. This paradox may be explained by differences in representation among groups and a reported hierarchy of participation access in SGMA processes; generally positive access to information about meetings and attendance contrasted with perceived less opportunities to comment on issues and express opinions, and even less opportunities to be adequately represented and influence decisions. This suggests that even among stakeholders who are involved in groundwater management and are knowledgeable about SGMA, there are important barriers to participation in SGMA processes.

Representation. Perceptions of adequate representation for agricultural interests, disadvantaged communities and tribal groups varied from 65%, less than 50% and about 30% respectively. Representation is key to ensure institutional legitimacy and equitable decision-making for all stakeholders. This finding suggests that SGMA participants perceive that new groundwater governance agencies have not done a sufficiently adequate job at integrating all interested groups. This is predictably supported by GSA data which shows that only 12% of all GSAs have included non-agency groups such as private pumpers, disadvantaged communities and tribal members in their decision-making boards.

Other governance questions such as adequate local and state funding, sufficient time to develop GSA governance structures and encouraging action on groundwater management received more mixed performance scores with about 50% of respondents considering they had been effective and around 25% of respondents giving neutral and negative answers to these categories.

INTRODUCTION

California is home to more than 39 million people, all of which depend on underground aquifers or groundwater to meet their water supply. Average annual data (2005-2010) indicates that groundwater dependence ranges from 9% to 86% in the Colorado and Central Coast hydrologic regions respectively (DWR, 2013). These numbers increase dramatically during drought years; conservative estimates suggest that groundwater supply provision meets up to 60% of total water supply during drought years compared to 40% on average water years state-wide (DWR, 2017a). Groundwater is thus a critical resource for Californians, especially in arid and semi-arid regions where surface water supply cannot meet demand.

In some groundwater basins, withdrawal has historically exceeded the amount that is replenished underground (Faunt *et al.* 2016). This is known as groundwater overdraft and produces various undesirable results such as reduction of groundwater levels and storage (which increase energy costs to pump water from deeper wells), sea-water intrusion to coastal wells (which diminishes water quality), subsidence or gradual collapse of land (which affects long-term aquifer capacity as well as existing infrastructure such as canals, highways and bridges), among others (DWR, 2016). In the Central Valley, groundwater overdraft averages approximately 2 million acre-feet annually (Hanak *et al.* 2017).

During the 2011-2016 drought, groundwater pumping accelerated as communities and farmers increased well drilling. This lowered water tables and dried nearly 4,000 domestic wells and affected 149 public water systems serving an estimated 480,000 people, prompting a state emergency (Pacific Institute, 2017). Groundwater overdraft questioned California's long-term groundwater resources sustainability (Faunt *et al.* 2009; Harter *et al.* 2012; DWR, 2016), which culminated with the passing of the Sustainable Groundwater Management Act (SGMA) at the height of California's 2011-2016 drought.

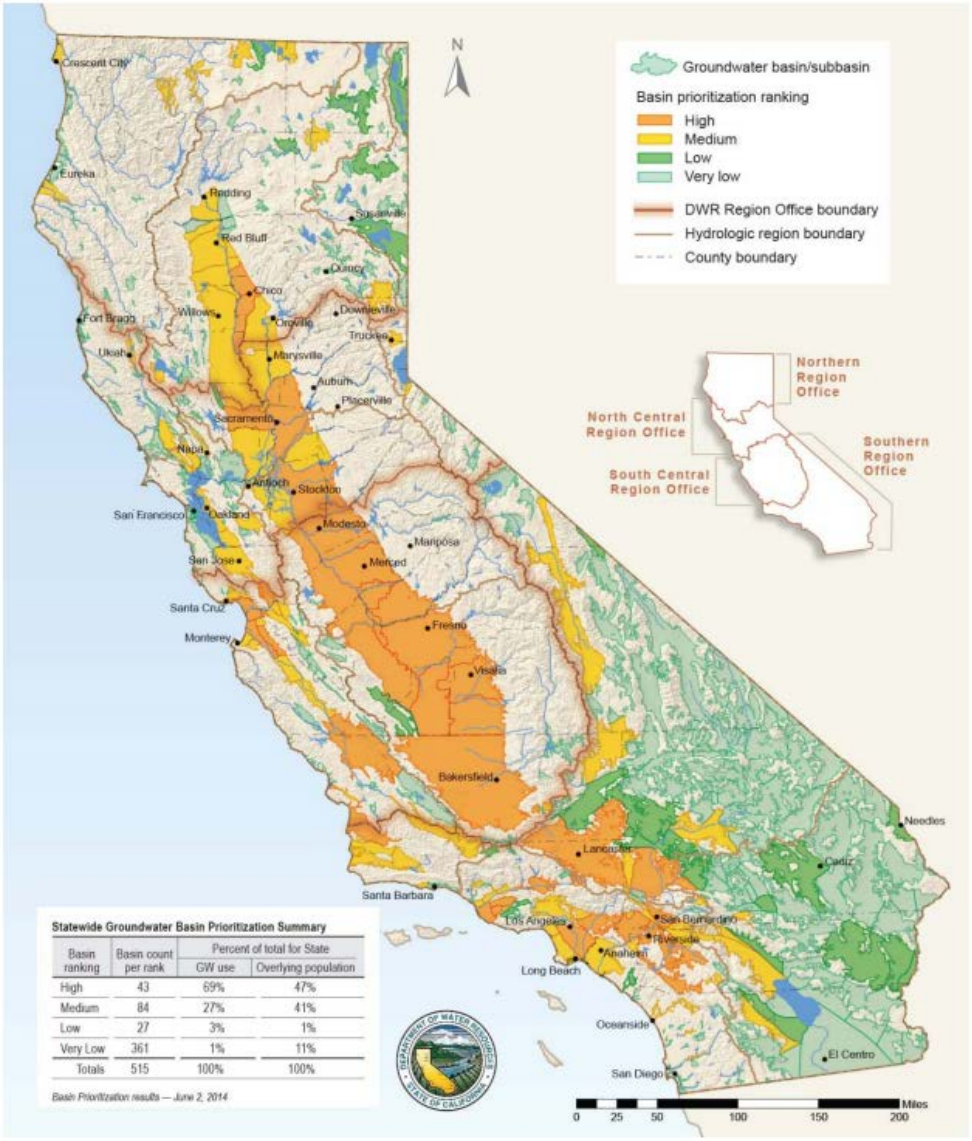
SGMA established a statewide framework and timeline to sustainably manage groundwater resources. Sustainability is defined as the management of groundwater in a manner that can be maintained without causing undesirable results; these include reduction of groundwater storage, lowering of groundwater levels, seawater intrusion, degraded water quality, land subsidence and depletion of interconnected surface water (DWR, 2016).

The goals of SGMA are to provide sustainable management of groundwater basins through local control, provide local public agencies with the authority and tools necessary to sustainably manage groundwater, establish minimum standards for sustainable groundwater management, and allow for state oversight and intervention if locals fail to act (Sustainable Groundwater Management Act, 2014). To achieve these goals, it proposes that local actors self-organize to develop new agencies for

groundwater management (known as groundwater sustainability agencies or GSAs) and groundwater management plans (known as groundwater sustainability plans or GSPs) for reducing groundwater overdraft.

Based on a state evaluation of California's groundwater basins (DWR, 2013; DWR, 2014), SGMA only applies to unadjudicated high and medium priority basins and sub-basins (see Figure 1 below). California has a total of 517 unique groundwater basins categorized by the California Department of Water Resources (DWR) in terms of management priority as 'very low', 'low', 'medium' and 'high' priority basins (DWR, 2014; DWR, 2016).This sums up to 127 of the state's 517 groundwater basins, which accounts for an estimated 96% of the state's groundwater use.

Figure 1. Groundwater Basins subject to SGMA compliance.



Source: DWR, 2014.

For most basins, SGMA represents a transition from open-access resource management to local common-pool resource management, and has the potential to significantly reduce groundwater overdraft. It is expected that SGMA will have a broad impact in coming years, spurring investments in water supply and water quality, while idling more than half a million acres of farmland (Hanak *et al.* 2019).

By June 30th 2017, all medium and high priority basins were required to have created a GSA or multiple GSAs, covering the entire extent of a basin (Wat. Code, § 10735.2, (a)(1)). A total of 260 groundwater sustainability agencies (GSAs) formed to collectively manage groundwater resources in the 127 high and medium priority groundwater basins state-wide[1]. The simultaneous formation of hundreds of new governing agencies is an unprecedented institutional effort with very few examples to learn from. As GSAs move towards the design and negotiation of their management plans (GSPs), assessments on the process up until now will directly inform development processes that are still taking place.

As part of an on-going research project on SGMA, the Center for Environmental Policy and Behavior surveyed SGMA participants from the fall of 2018 to spring 2019 about local SGMA processes taking place. The survey sought information on perceptions regarding the SGMA process, access to participation and engagement, cross-sector and multi-actor collaboration, groundwater management strategies as well as stakeholder's groundwater dependence and vulnerability.

This report draws on the local insights gathered from the survey, as well as, our own analysis on cooperation and social dynamics with SGMA. In the next section, we present the survey design methods. Next, we present findings, which include the socio-spatial distribution of survey response, followed by governance challenges and solutions, and stakeholders' evaluation of SGMA. Finally, we present conclusions.

SURVEY DESIGN AND DISTRIBUTION

The survey sought information on perceptions regarding the SGMA process, access to participation and engagement, cross-sector and multi-actor collaboration, groundwater management strategies as well as stakeholder's groundwater dependence and vulnerability. As such we divided the survey in three sections. The first section aimed at measuring local actor's perceptions on local groundwater issues and management strategies to reach sustainability in their basins. The second section asked survey participants about the SGMA process itself aimed at assessing the process up until now and the opportunities for participation at local levels. The final section focused on survey participant's perceptions on water security and vulnerability as well as an evaluation of their participation on other policy processes and cross-sector collaboration with various groups.

[1] According to cleaned database downloaded in April 2018 from the DWR SGMA portal website.

The survey design was first drafted internally by our team and subsequently revised by a group of reviewers which included SGMA facilitators, state officials and diverse local GSA actors in California. Upon integrating these reviews into the survey design, we launched the survey in November of 2018 and closed it in May 2019.

In the absence of a publically available comprehensive list of all SGMA participants in the state, our distribution strategy relied on GSP and GSA managers to voluntarily collaborate with us and distribute the survey invitation to their interested parties list of contacts for their participation. We disseminated the survey online using the survey platform Qualtrics and designated a unique code to each survey link for every survey receiver (i.e. GSP and GSA manager). First, from November-December 2018 we sent survey invitations for dissemination only to GSP managers, which are meant to coordinate efforts at the basin level. The intention behind this was to avoid spamming local actors in the same groundwater basin with multiple invitations to participate in the survey. Then, in winter and spring of 2019 we expanded survey invitations to include all GSA managers, whether they were GSP coordinators or not. In this second phase of survey participation outreach, phone calls to each GSP and GSA manager were done periodically and personalized follow-up emails were sent monthly to encourage participation in the survey.

A total of 209 survey invitations with unique codes embedded in survey links were distributed. Of these, 74 codes were used and 29 reported more than one response for that code. This indicates that only 29 GSP and GSA managers out the 209 distributed (14%) forwarded the survey invitation to other stakeholders, while 45 managers (22%) reported only one response. We obtained a total of 690 individual replies from 108 high and medium priority groundwater sub-basins. Of these, 472 respondents, or 68.5% completed the entire survey.

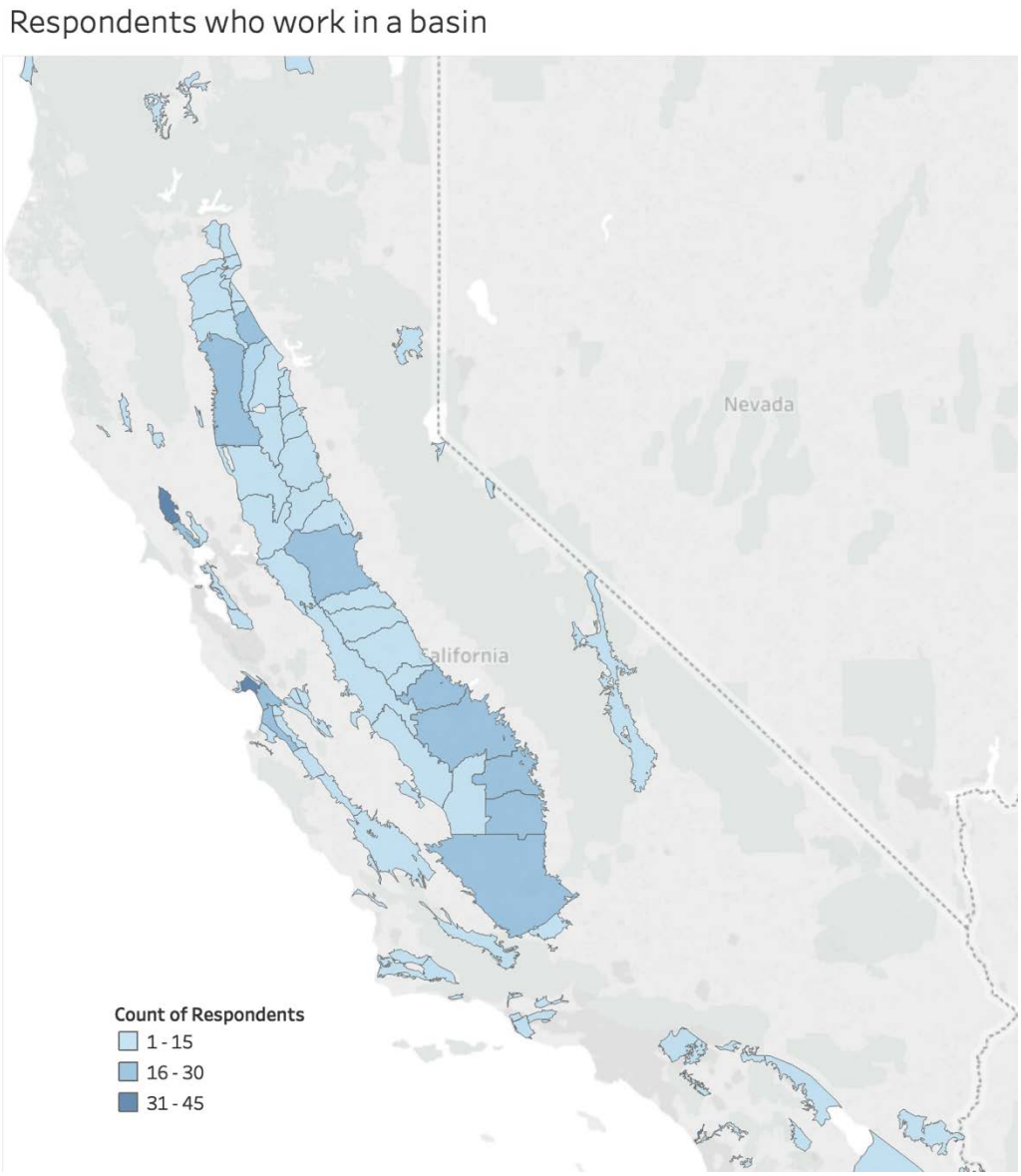
Most figures in this report provide descriptive statistics of the results such as averages or percentages, depending on the survey question. The maps were also produced in a similar way.

SOCIO-SPATIAL DISTRIBUTION OF SURVEY RESPONSE

As Figure 2 below shows, survey response is well distributed across California B118 groundwater basins. The survey gathered a total of 690 responses distributed across various high and medium priority basins subject to SGMA. Response rates are higher in the Central Coast (Salinas Valley, Santa Cruz and Santa Margarita groundwater basins), North Coast (Santa Rosa Valley groundwater basin) and in the Northern Central Valley (Colusa sub-basin in the Sacramento Valley groundwater basin). As explained in the previous section, the survey contained a unique code for each GSA and GSP manager in high and medium priority basins. The map in Figure 2 plots how frequently the code for each basin was used.

Table 1 summarizes top response rate by groundwater basin. We received more than one response from 83 groundwater sub-basins and overall responses from 108 groundwater sub-basins. The groundwater basins with multiple responses are the basins where we have the most confidence about the generalizability of the results. Basins with a smaller number of response, especially basins that have only one response most likely representing the GSA/GSP manager themselves, do not provide a broad view of stakeholder perspectives. As such, results presented are the aggregate experience state-wide, with heterogeneity among basins not yet analyzed in this current document.

Figure 2. Spatial Distribution of Survey Response



Source: the authors.

Table 1. Groundwater Basins with Highest Response Frequency

Basin Number	Basin Name	Frequency
5-022	SAN JOAQUIN VALLEY	223
5-021	SACRAMENTO VALLEY	191
3-004	SALINAS VALLEY	77
9-004	SANTA MARGARITA VALLEY	44
3-001	SANTA CRUZ MID-COUNTY	41
1-055	SANTA ROSA VALLEY	33
3-002	CORRALITOS	29
2-001	PETALUMA VALLEY	17
2-002	NAPA-SONOMA VALLEY	15
1-004	SHASTA VALLEY	14
1-005	SCOTT RIVER VALLEY	13
3-003	GILROY-HOLLISTER VALLEY	11
5-014	SCOTTS VALLEY	11
5-006	REDDING AREA	10
1-052	UKIAH VALLEY	9

Source: the authors.

Figure 3 below shows that most survey participants reported to be involved in groundwater management (98%) while 86% had knowledge of SGMA (i.e. reported knowing what SGMA was). Since only 39% of GSP and GSA managers who used the code reported more than one response this is not a surprising result. The majority of GSA and GSP managers reported just one answer, suggesting that they may not have shared the survey with their interested parties list and therefore, the single answer we have from their codes is likely coming from themselves or GSA staff, all of which are more likely to be highly involved in SGMA. Thus, while the survey was intended to reach SGMA participants regardless of their knowledge and level of participation in SGMA, it overwhelmingly reached individuals who are highly involved in SGMA. Furthermore, for basins where we have multiple responses, this suggests that the interested parties lists that were utilized contain a high number of people who are knowledgeable of SGMA.

Figure 3. Knowledge and Involvement in SGMA from Survey Participants.

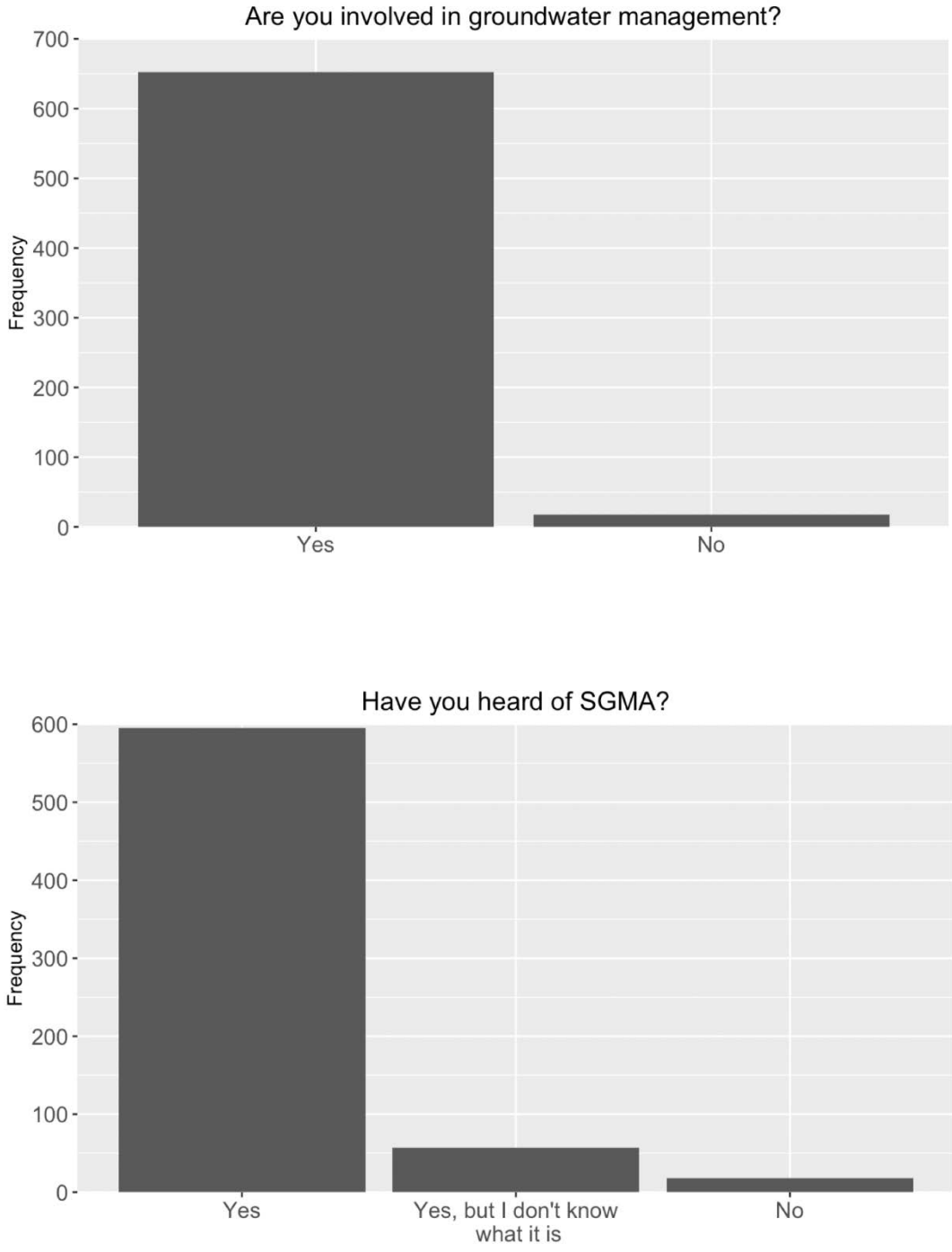


Figure 4. Interested group representation among survey respondents

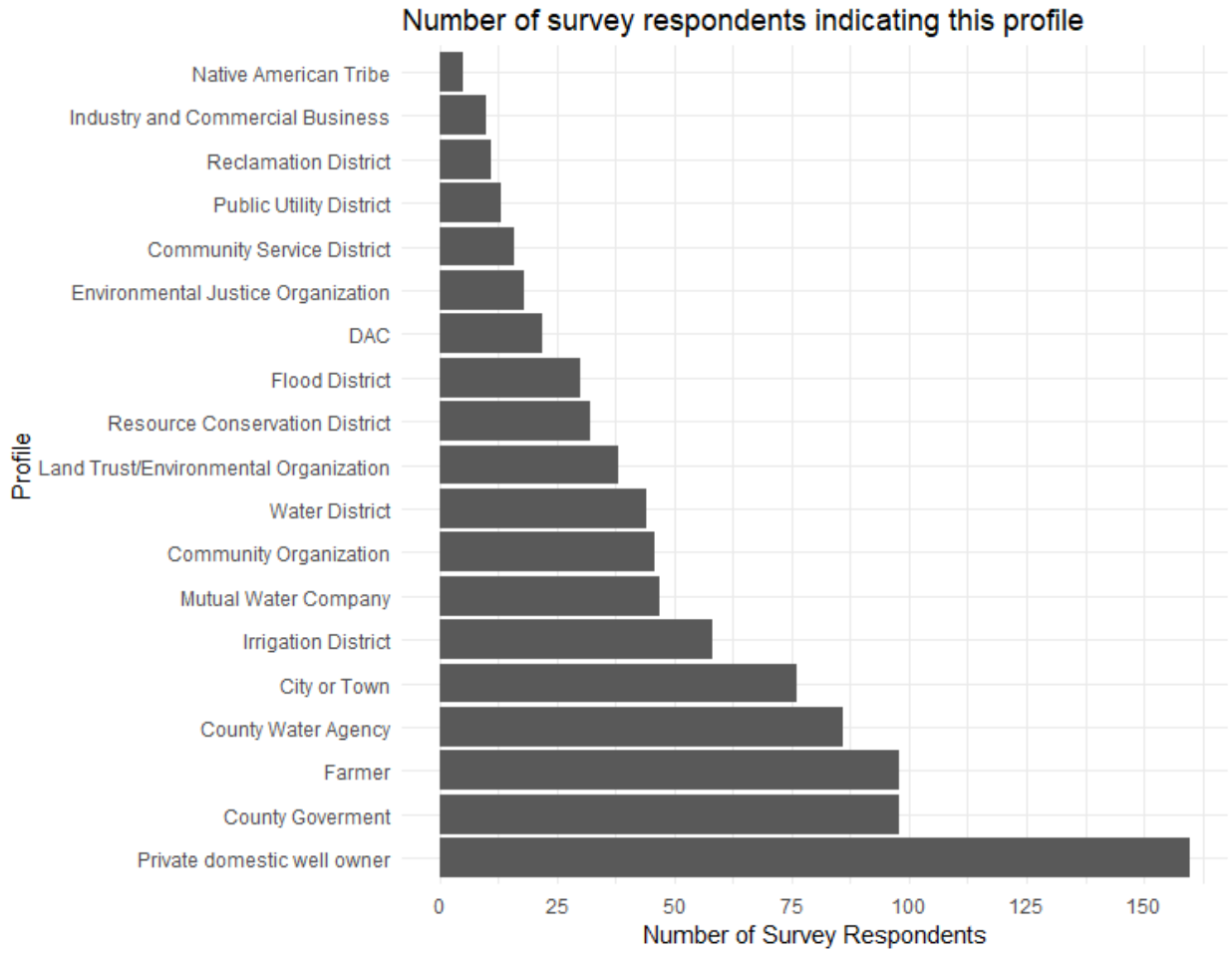


Figure 4 shows the approximate profile of survey respondents. We asked survey respondents to choose among various categories that represented them. As Figure 4 shows, this included categories such as 'native American tribe', 'farmer', 'private domestic well owner', disadvantaged community member or 'DAC', among many other. The graph shows that survey responses overwhelming came from private domestic well owners; in other words, groundwater dependent users. Moreover, local governance officials in county government or county water agency and cities and towns, as well as, agricultural related categories such as 'farmer', members from 'irrigation districts', 'water districts' and even privately owned companies such as 'mutual water companies' constituted the bulk of the survey responses. Other categories representing the environment, disadvantaged communities and Native American tribes were significantly less represented among survey responses. This suggests that interested parties lists, used for survey distribution, contain higher numbers of local government and agricultural related representatives and lower numbers of environmental, disadvantaged communities and tribe members. Furthermore, the response rate may have been lower among some of the less-represented stakeholder types, but in our experience, such

large difference in frequencies are more likely attributable to the types of people included in the baseline lists.

Figure 5. Level of involvement in GSA and GSP processes

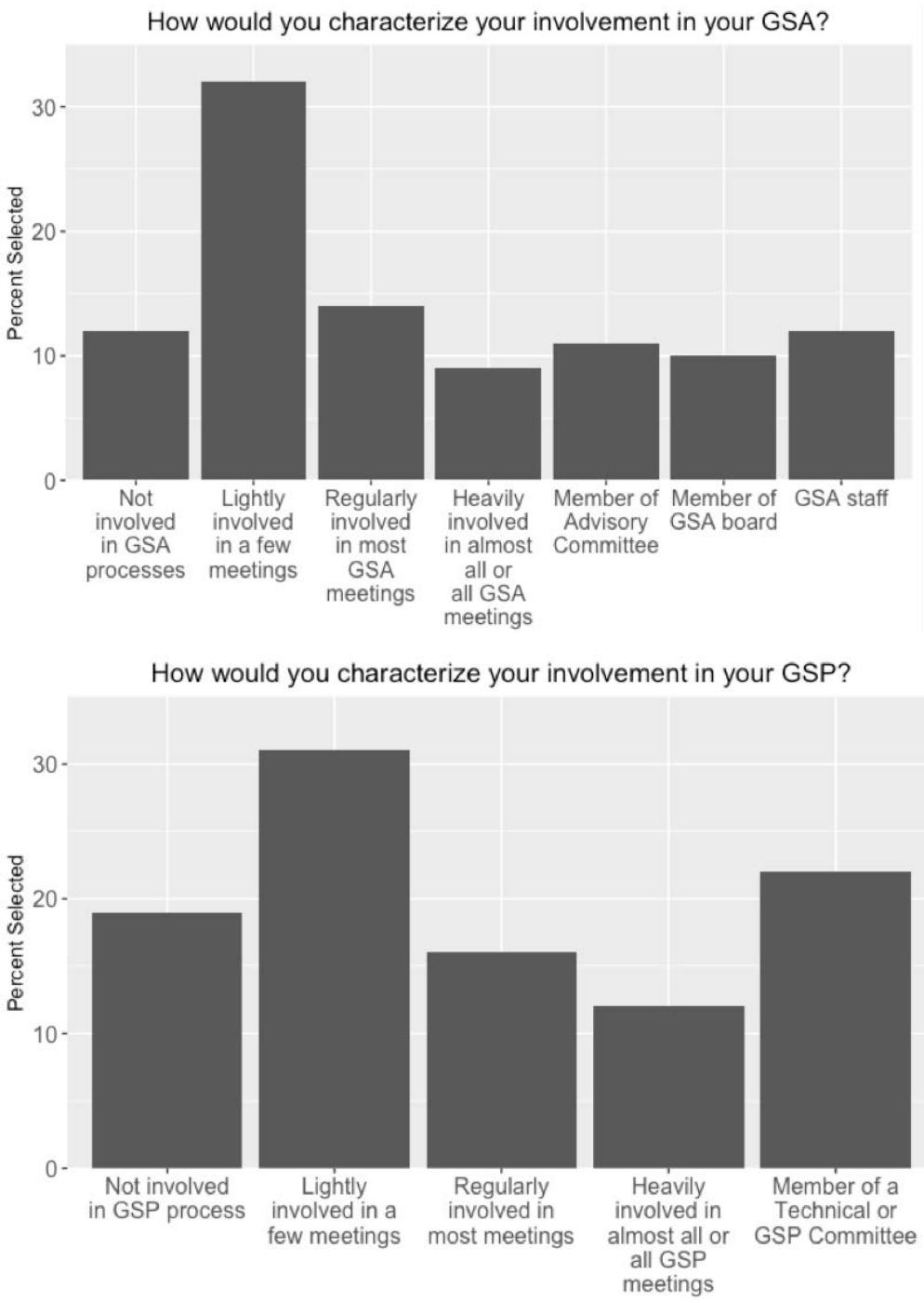


Figure 5 shows that involvement in GSA and GSP development was high among survey participants. Only 12% of survey respondents reported not being involved in GSA processes, while 19% reported not being involved in GSP processes. This difference is understandable since GSP processes are just starting to take place in some groundwater basins. Moreover, 32% and 31% of respondents reported being lightly involved in GSA processes and GSP processes respectively. In contrast, 56% of respondents reported being regularly or highly involved in GSA (including being part of a committee and staff). 50% of respondents reported high or regular involvement in GSP (including being part of a GSP committee). High engagement in SGMA processes represented 50-56% compared to 44-50% of light or no engagement in GSA and GSP processes among survey respondents.

These results need to be understood within the various survey distribution limitations and also SGMA's own institutional design. By *de jure* local public agencies [with water supply, water management or land use responsibilities within the boundaries of a groundwater basin] are specifically called in SGMA and subsequently, in the California Water Code (Wat. Code, § 10721 – 23) as the local actors that could become a governing agency. SGMA also encourages the inclusion and participation of interested actors on groundwater management. This include but are not limited to disadvantaged communities (DACs), private (domestic) well owners and other groundwater users.

There are many incentives that SGMA provides for complying with the reform and for choosing more collaborative and inclusive forms of management. Once a GSA is formed, it is empowered by law to implement reporting, monitoring, and even establishing pumping-limits on groundwater users. For example, by attaining GSA status, local governing entities may also acquire additional authority that they did not possess before, such as levying new fees on users and requiring the metering of water usage (Water Code §10725 – 32). Moreover, the state has provided two rounds of grants programs ("Sustainable Groundwater Management Grant Program") to facilitate GSA formation and the development of GSPs, defining clear guidelines that emphasize a preference for collective management and the inclusion of disadvantaged communities (DWR, 2017b).

However, when the deadline for GSA formation was closed on June 30th 2017, a total of 529 local public agencies participated in forming 260 GSAs for groundwater management throughout the state. This meant that 45.6% of local public agencies that could have participated in SGMA decided to participate. As table 2 summarizes, diversity in types of governance arrangements is high. Only 12% of all GSAs included tribes, private groundwater users and disadvantaged communities representatives in their management boards (n=31), while the majority (n=229) included *only* public agencies in their management boards. This meant that the majority of SGMA participants are by *de facto* public agency representatives and staff that are already highly involved in groundwater management and SGMA implementation, with little participation from non-agency groups.

Local public agencies that are participating have either formed their own single GSAs (n=175) or become members of a multi-agency GSA shared with other local agencies and actors (n=85). Some have merely repackaged their existing structures to become independent single GSAs (n=166), and others have developed various institutional structures to formally become GSAs; these include: Special Act Districts (n=12), Joint Power Authorities (n=44), Memorandum of Agreements (MOAs) or Memorandum of Understanding (MOUs) (n=38). Only 45 GSAs will exclusively manage an entire groundwater basin, whether that is as a single GSA (n=18) or a multi-agency (n=27); of these, only five agencies will exclusively manage more than one groundwater basin. The majority of GSAs (n=215) will coordinate "fragmented" management of groundwater basins (c.f. Conrad *et al.* 2018).

Table 2. Diversity of Governance Arrangements with SGMA

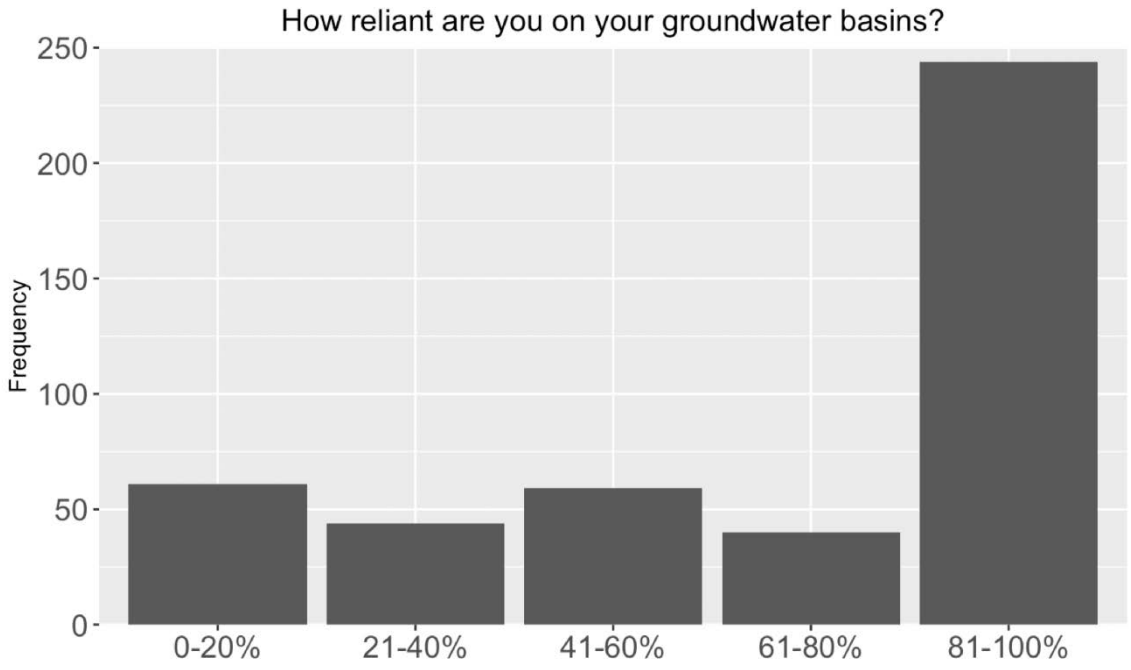
Design characteristics	Single agency GSA (n=175)	Multi-agency GSA (n=85)	All GSAs (n=260)
Groundwater basin structure			
One GSA for multiple basins	2	3	5
One GSA per groundwater basin	18	27	45
Multiple GSAs per groundwater basin	157	58	215
GSA institutional structure			
Special Act District	9	3	12
Joint Power Authority	-	44	44
MOA/MOU	-	38	38
Single public agency	166	-	166
GSA governance structure			
Inclusion of DACs, tribes and private groundwater users in management boards	2	29	31
Inclusion of only public agencies in management boards	173	56	229

Source: the authors.

Types of Water Users

Survey respondents who were involved or interested in groundwater management and who were knowledgeable of SGMA, were asked about their reliance on groundwater resources. Four hundred and fifty-six participants answered this question (n=456) and more than half of respondents (55%) stated that their reliance on groundwater was as high as 81-100%. Moreover, around 10% reported having a dependence of 61-80% also considered extremely high if we consider that state-wide reported groundwater supply of total water supply is estimated to be around 40% in average water years and up to 60% during drought years. Together, around 2/3 of our survey respondents reported being above the average California groundwater dependency.

Figure 6. Groundwater Dependence of Survey Participants



Additionally, we asked all survey respondents (whether knowledgeable in SGMA or involved/interested in groundwater management or not), their drinking water sources. Four hundred and eighty eight answered this question (n=488). As it is shown in Figure 7a, survey respondents reported getting their drinking water from three main sources: through public water systems (n=207), private wells (n=192) and through private systems (n=50). If survey respondents used water for agricultural purposes, then they were asked about their agricultural water sources as well. Only one hundred and ninety-eight survey respondents answered this question (n=198). As it is shown in Figure 7b, water for agricultural purposes was overwhelmingly met by private wells (n=87) among survey respondents, followed by a combination of private wells and water from an irrigation or water district (n=19), surface water from a water or irrigation district (n=17)

and groundwater from a water or irrigation district (n=14); the rest of survey respondents that answered this question (n=61) get their water for agricultural purposes through various combinations of water sources that include these options plus water from a private or shared reservoir and riparian water rights.

Figure 7a. Water Supply Sources for Drinking Purposes

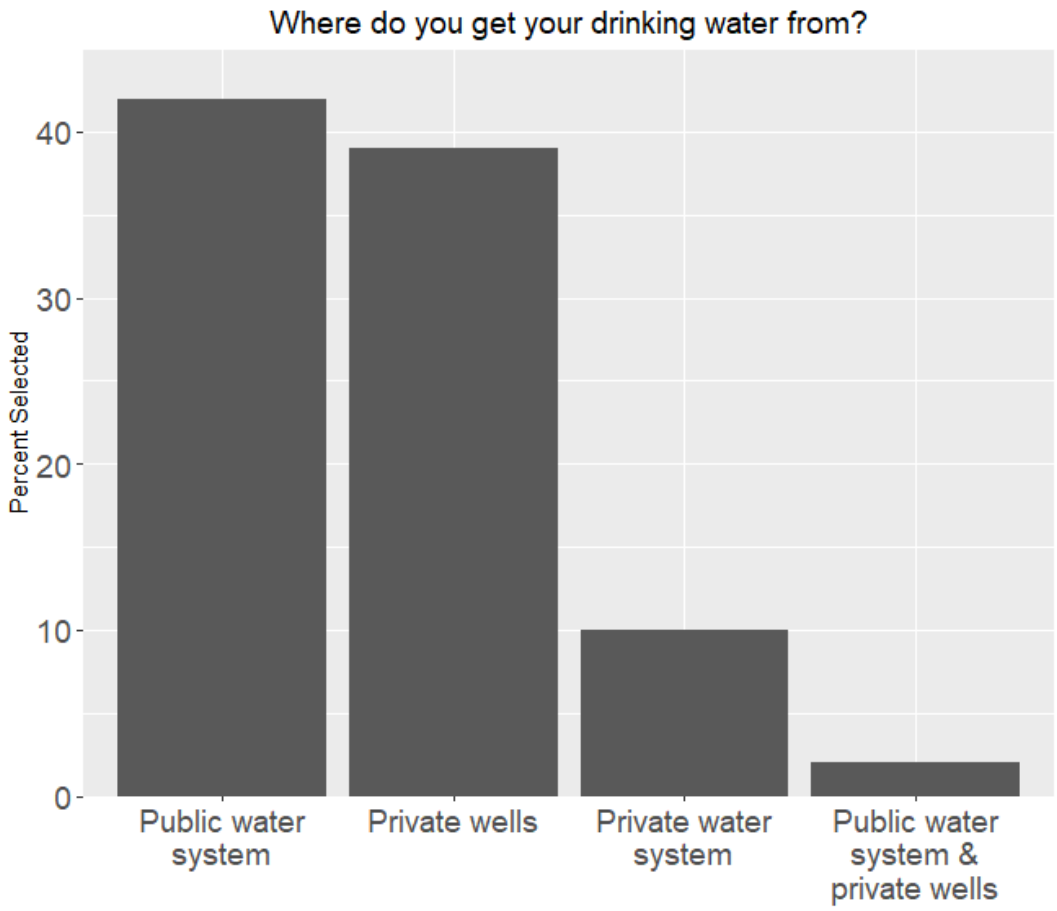
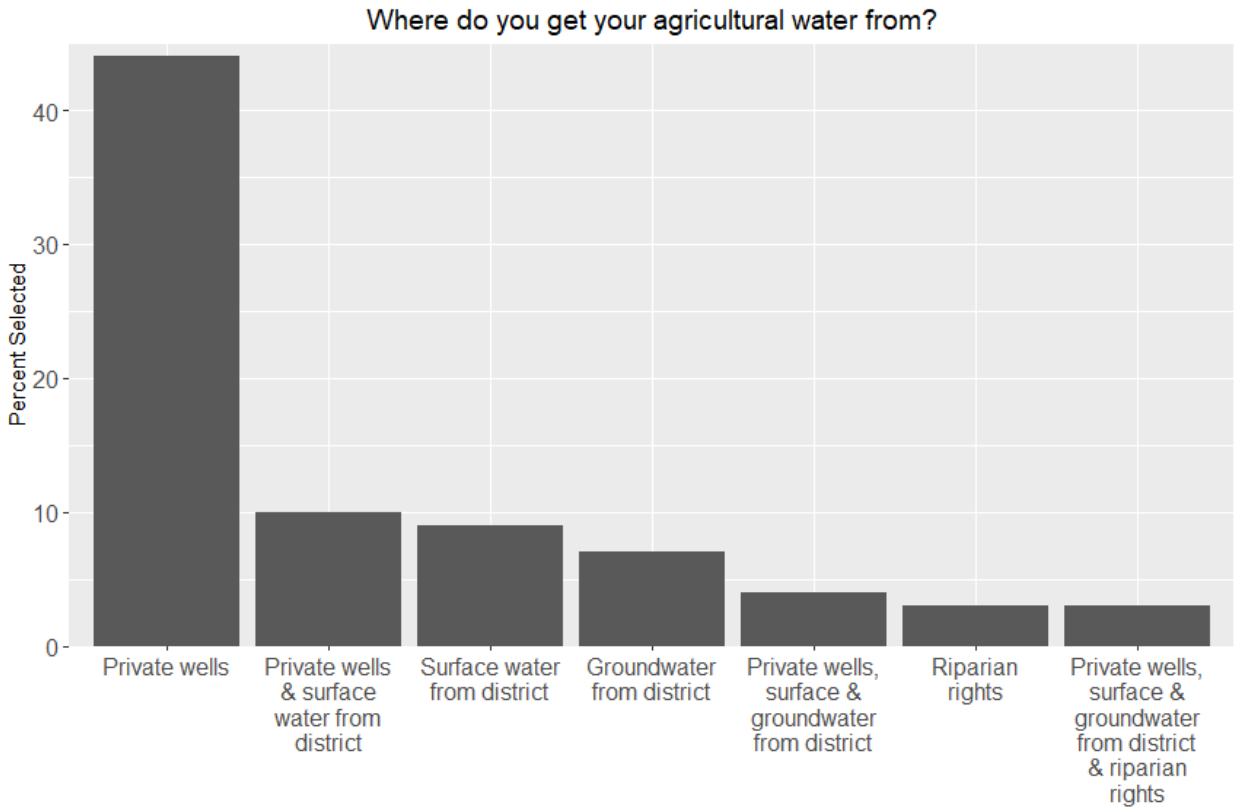


Figure 7b. Water Supply Sources for Agricultural Purposes



GOVERNANCE CHALLENGES AND SOLUTIONS

Governance Challenges for Groundwater Management

The survey asked respondents to identify perceived challenges for groundwater management. Figure 8 breaks challenges down in four broad categories: i) climate change impacts, ii) agricultural and urban development), iii) environmental regulations and water quality and, iv) governance challenges.

Around 75% of survey respondents considered drought to be a major or extreme challenge for groundwater management. In contrast, types of crops cultivated and urban growth were the top two reported issues related to agriculture and urban growth with over 25% of responses considering it a major or extreme challenge. Around 40% of survey respondents reported the Endangered Species Act as a major issue for groundwater management. This was followed by dedicated flows for rivers and worsening water quality. Less than 25% of survey respondents reported water restrictions or cuts as an issue, with another 25% reporting it as not a challenge. Finally, on governance issues, lack of trust among different groundwater users was the most important reported challenge with over 50% of survey participants considering it as extreme or major issue. This was followed by lack of financial resources (45%) and lack of cooperation (40%), lack of inclusion of all users (approximately 35%), and lack of human resources (25%). In summary, survey respondents perceive that worsening and recurrent droughts, lack of trust and cooperation among stakeholders, and financial resources, and increasing regulations to protect endangered species aggravate groundwater management.

Survey respondents were also asked to identify what groundwater issues (or known in SGMA as “undesirable results”) were a problem for them in their local groundwater basins. As shown in Figure 9a, lowering groundwater levels and reduction of groundwater storage are the top two reported issues. This is followed by sea-water intrusion, which only affects coastal areas. Accordingly, around 50% of respondents reported sea-water intrusion as not a problem for them; but when sea-water intrusion is a problem it is perceived as relatively severe. The same is true for land subsidence which has been more visibly experienced in the Central Valley of California, and less in areas were groundwater pumping and over-extraction has not been as acute.

Figure 8. Perceived challenges for groundwater management

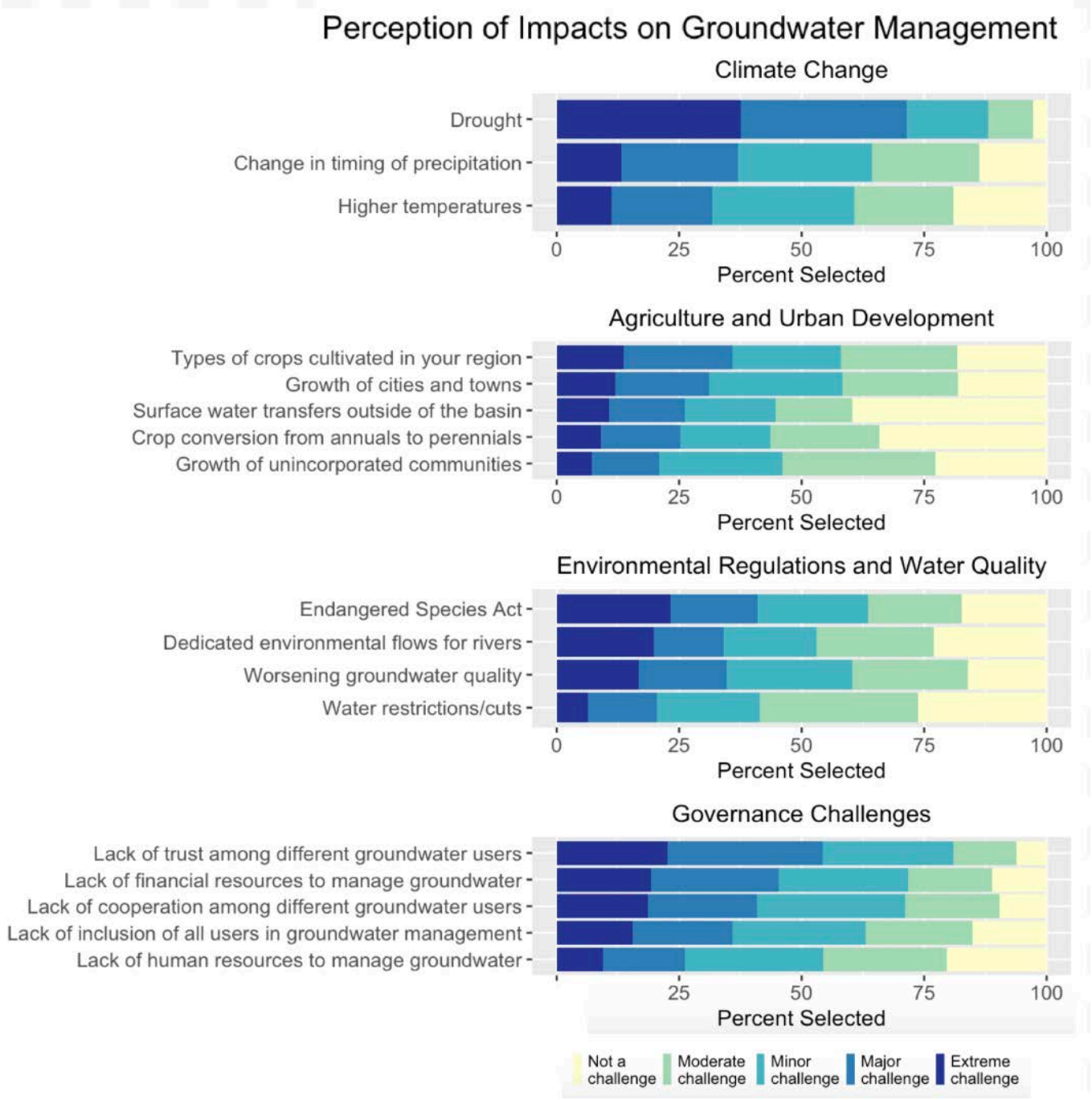


Figure 9a. Perceptions of SGMA's undesirable results

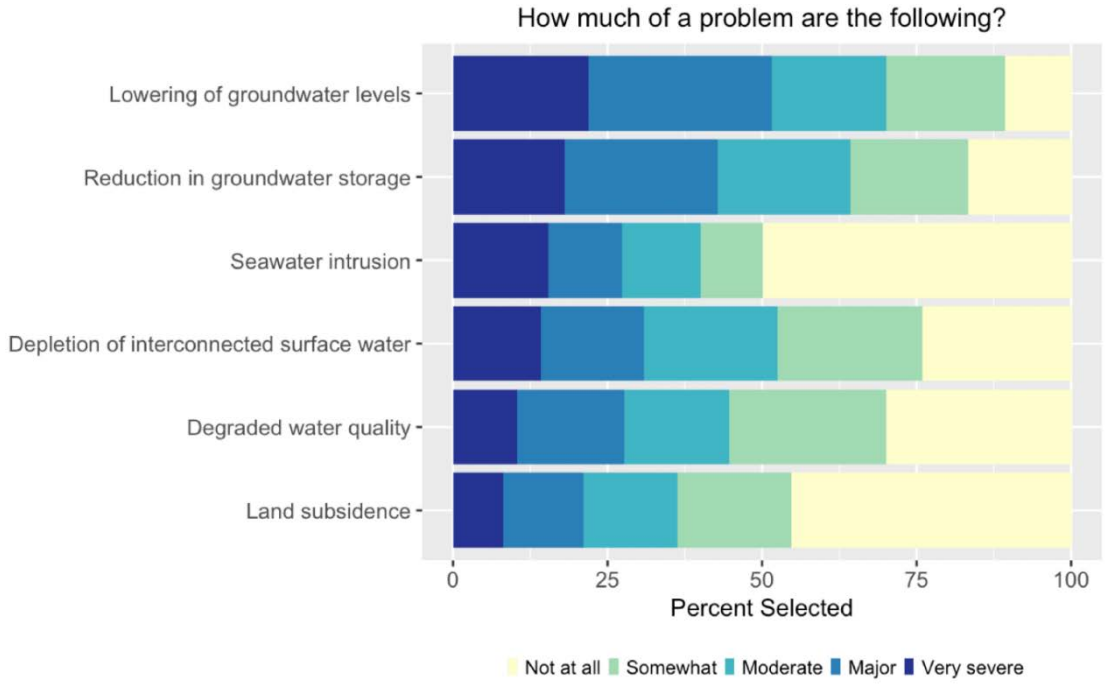
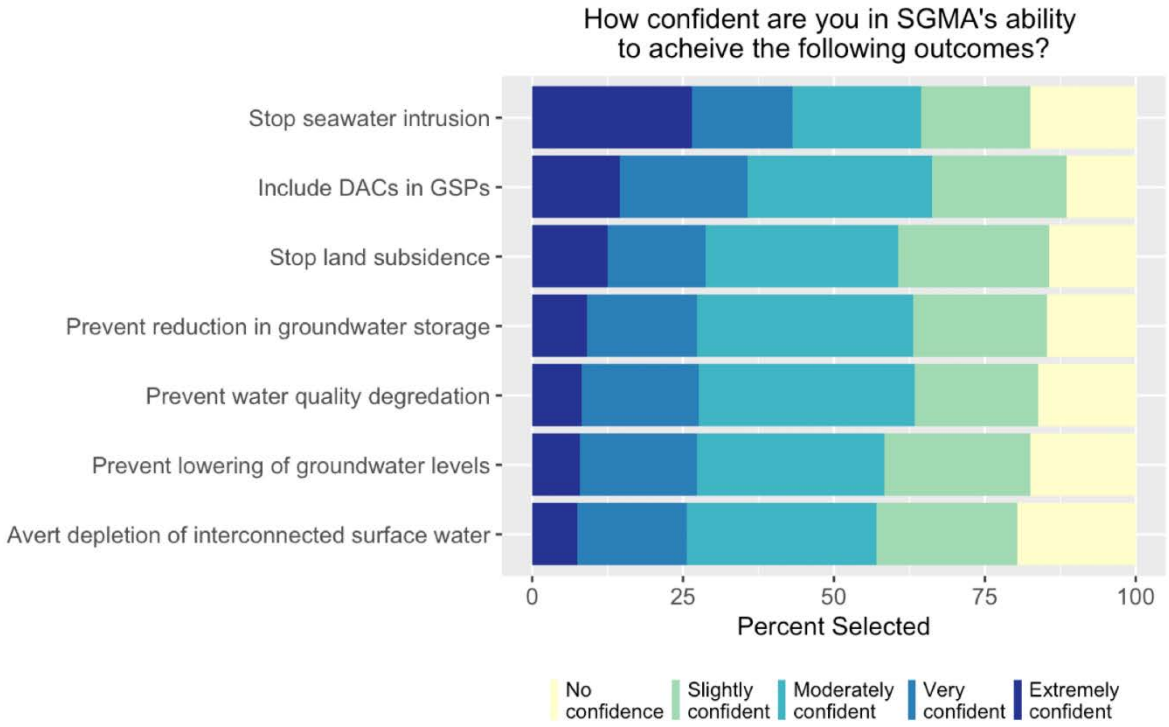


Figure 9b. Confidence in SGMA

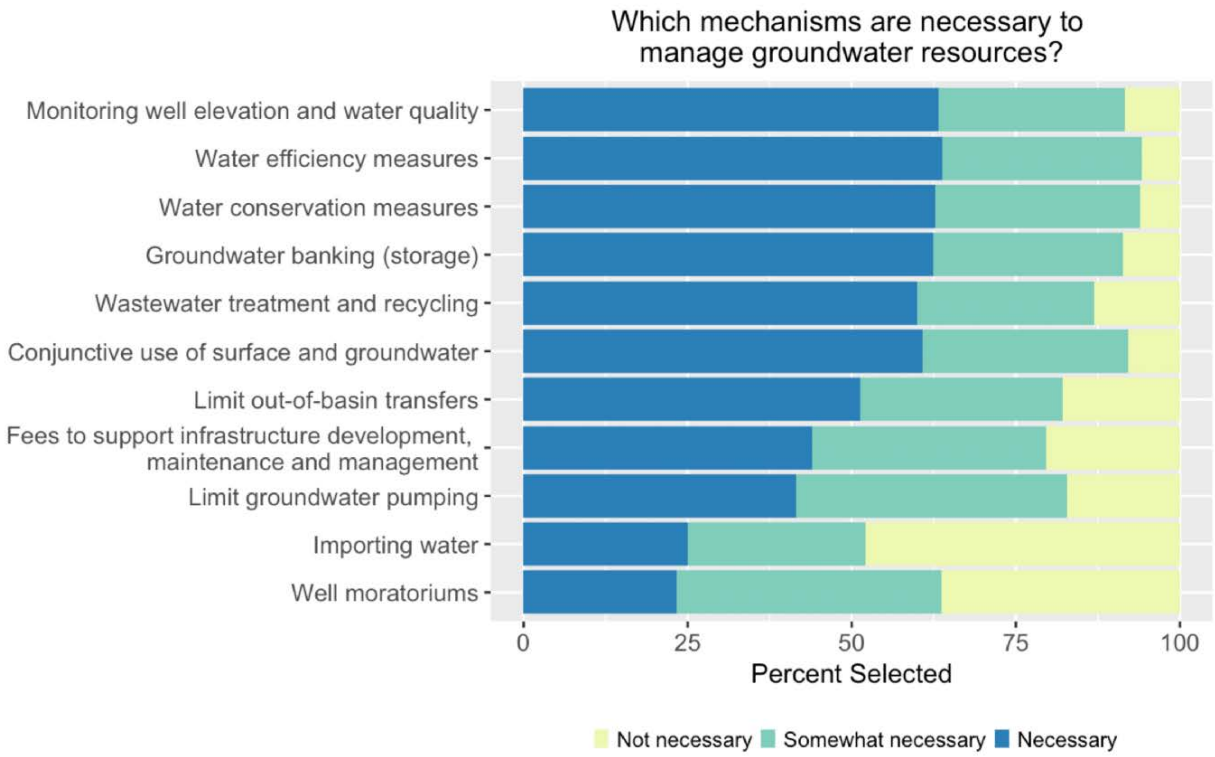


Survey respondents reported little confidence in meeting SGMA sustainability goals. As shown in Figure 9b, with the slight exception of sea-water intrusion, which 35% of respondents reported being extremely and very confident this issue will be resolved, all other environmental issues had less than 25% of overall positive confidence. Around 45% of survey respondents considered that all of the associated groundwater issues would slightly or not be met at all. Confidence on social outcomes such as the inclusion of disadvantaged communities in groundwater sustainability plans (GSPs) was also included in this question. About 30% of survey respondents believed that DAC inclusion will be achieved in GSPs, a confidence level slightly higher than other environmental issues. In contrast to studies of integrated regional water management (IRWM) (Lubell and Balazs, 2016), the relatively higher optimism regarding DAC inclusion may be the result of higher level of attention to environmental justice issues from the outset of SGMA. Overall, about ¾ of survey respondents had little to moderate confidence on SGMA and its capacity to achieve environmental and social outcomes.

Governance Solutions for Groundwater Management

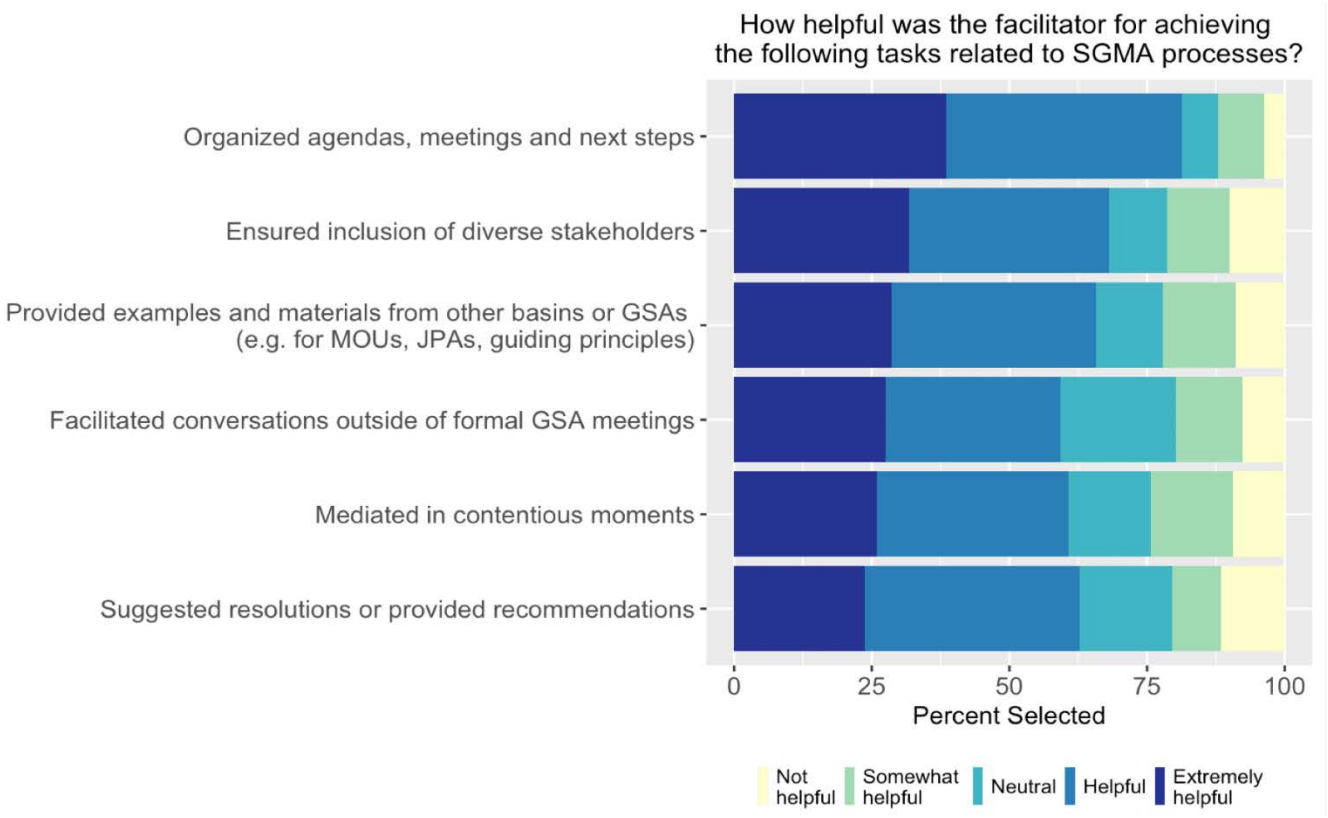
As shown in Figure 10, most mechanisms to manage groundwater enjoyed a positive perception from survey respondents in terms of the necessity to implement them to achieve groundwater sustainability.

Figure 10. Preferred solutions to achieve sustainable groundwater management



These include monitoring activities, water efficiency and conservation measures, groundwater banking, wastewater treatment and recycling, conjunctive use of surface and groundwater and limiting water transfers. Less popular mechanisms included water imports, well moratoriums, limitations to groundwater pumping and fees to support groundwater management. Nevertheless, even among less popular mechanisms, between 25-75% of survey respondents agreed these were necessary and somewhat necessary.

Figure 11. Perceptions of facilitation support services for GSA development



In 2015, the Department of Water Resources launched a grant program to support the implementation of SGMA for GSA development. Subsequently, in 2017, it announced a new grant phase to support GSP development. In total, 21 and 78 applications were awarded for the two phases (DWR, 2017b). As part of these efforts, local stakeholders and newly formed GSAs contracted facilitation services from various consultancy firms to support SGMA development.

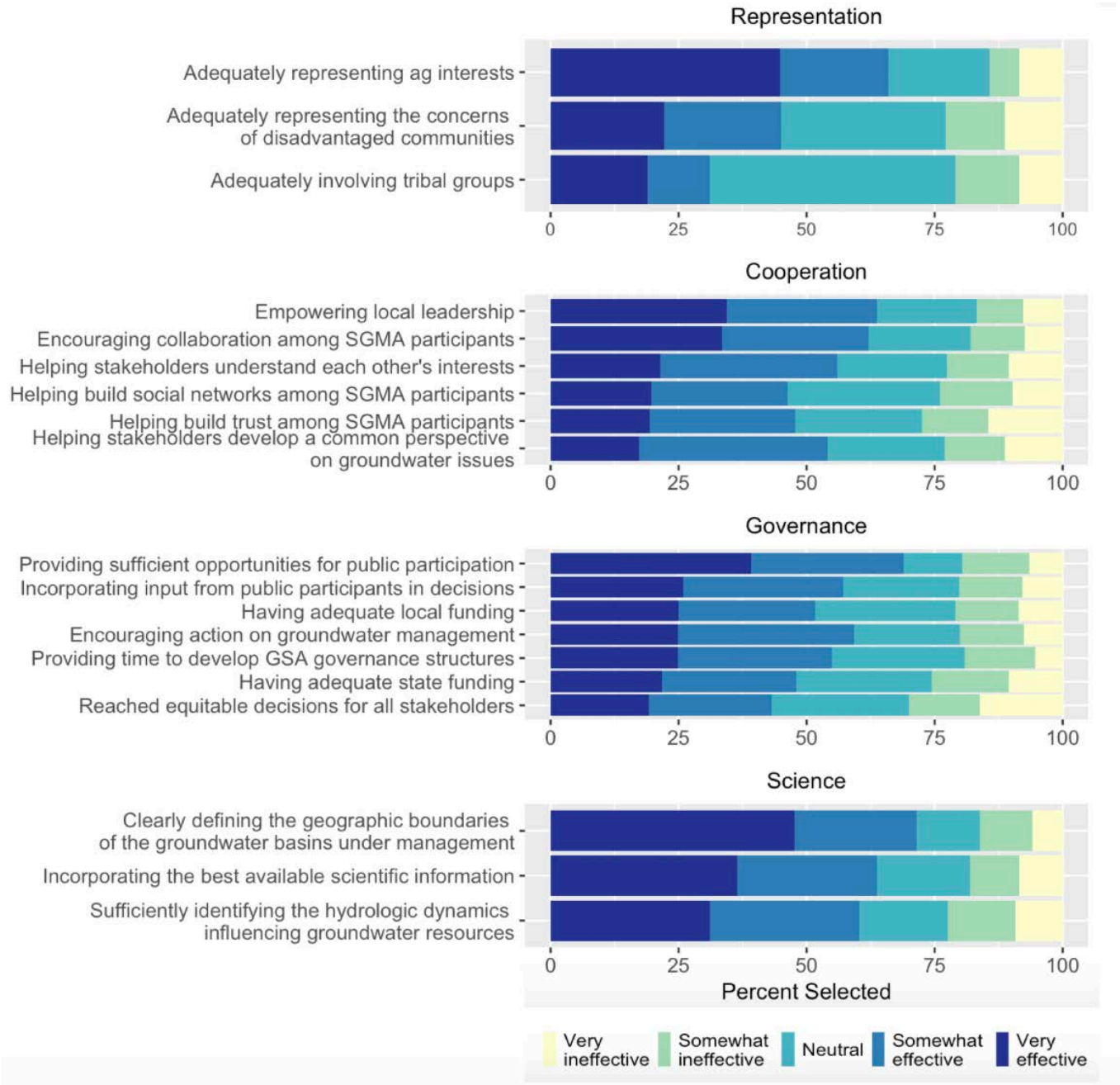
We asked survey respondents to evaluate the effectiveness of facilitators in helping them meet various tasks related to SGMA. As Figure 11 shows, more than 75% of respondents thought facilitators were helpful in steering and coordinating meetings by organizing agendas, meetings and next steps. Around 25% and 60% of respondents considered that facilitators were 'extremely helpful' and 'helpful' in all of the following

tasks respectively; these included: ensuring the inclusion of diverse stakeholders, providing examples and materials, facilitating conversations outside of formal engagement spaces, mediating contentions moments and suggesting resolutions and recommendations. Less than 25% of respondents considered that facilitators were ‘somewhat helpful’ and ‘not helpful’ in supporting stakeholders and GSAs in achieving these tasks.

EVALUATION OF THE SGMA PROCESS UP UNTIL NOW

Figure 12 shows survey responses related to the evaluation of SGMA processes up until now. First, we show perceptions on representation, followed by perceptions on cooperation, governance and science. Below, we present the distribution of perceptions per question for all respondents in the state regardless of basin (with a scale from 1 to 5).

Figure 12. Effectiveness of SGMA Processes



Perceptions of representation of various stakeholders showed mixed results. Around 65% of survey respondents considered that SGMA was effective in adequately representing agricultural interests. In contrast, less than 50% considered that disadvantaged communities had been adequately represented in SGMA processes. This was worst for tribal representation which only about 30% of survey respondents reported as effective and somewhat effective representation of tribes in SGMA processes.

Perceptions of cooperation were more or less split, with around 50% of survey respondents assigning 'very effective' and 'somewhat effective' evaluation to these categories, which included: empowerment of local leadership, encouraging collaboration, helping stakeholders understand each other, develop a common perspective and build social networks among SGMA participants. In contrast, around 25% of survey respondents considered that SGMA processes have been 'very ineffective' and 'somewhat ineffective' at achieving those cooperation goals. Finally, around 25% of survey respondents provided neutral answers to these questions.

Perceptions of governance were more varied. Seventy percent of survey respondents considered that SGMA processes had provided sufficient opportunities for public participation. However, less than 45% of survey respondents considered that equitable decisions had been reached for all stakeholders. This result is more striking if we only take into account those that answered this question as 'very effective' which accounts to less than 25% of survey respondents. Other governance questions such as adequate local and state funding, sufficient time to develop GSA governance structures, encouraging action and incorporation of input from public participants positively varied between around 25 to 50% for 'very effective' and 'somewhat effective' categories. Around 25% of survey respondents gave neutral and negative answers to these categories, while almost 30% of respondents reported that SGMA processes had been ineffective in reaching equitable decisions for all stakeholders.

Perceptions of the use of science in SGMA processes were generally positive. The perceived greatest contribution of SGMA related to this topic is the definition of clear geographic boundaries of groundwater basins under management. Indeed, even before SGMA was passed and enacted, the Department of Water Resources launched its CASGEM program, which classified groundwater basins according to management priority. SGMA integrated this basin categorization and focused on medium and high priority groundwater basins. Furthermore, state authorities implemented a process in which local managers could submit a request for geographic boundaries changes, which were subsequently revised and new groundwater basin boundaries and GSA jurisdictions finalized. Finally, the two other science-related questions in survey reported more than 50% perceived effectiveness. These were inclusion of best available science and identification of hydrological dynamics influencing groundwater.

Figure 13. Equity in decision-making with SGMA Policy Processes

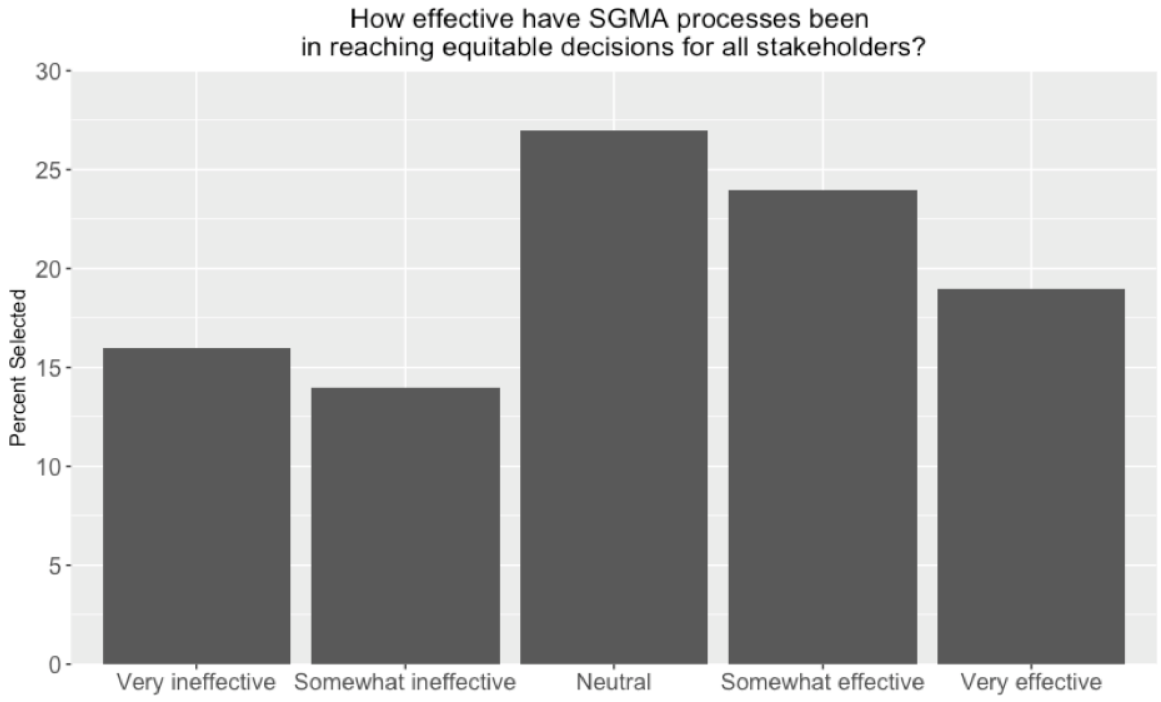


Figure 13 shows opinions on access to equitable decision-making. Around 30% of survey respondents considered SGMA processes have been somewhat ineffective or ineffective in reaching equitable decision for all stakeholders. This is contrasted with 42% of survey respondents who expressed that processes have been somewhat effective or very effective in that regard. To note is that Figure 13 includes all survey respondents which about 56% are highly involved in the SGMA processes as GSA staff, GSA board members or members of a committee compared to 12% and 32% of survey respondents not involved and lightly involved in SGMA processes.

Figure 14. Levels of Participatory access in SGMA Policy Processes

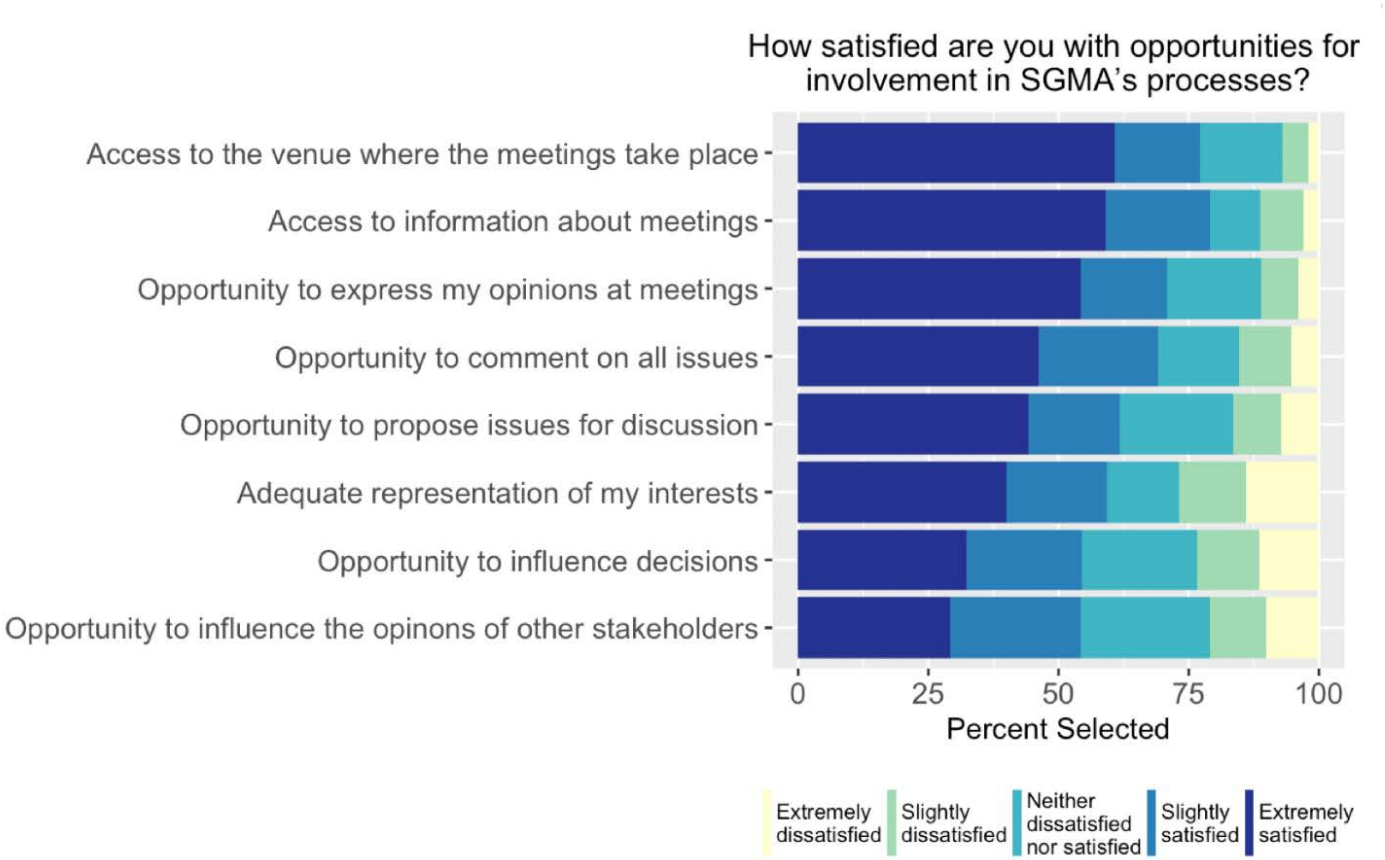


Figure 14 shows a closer look at access to participation in SGMA processes. This figure shows that SGMA participants may be generally satisfied with their access to information about meetings and access to the venues where SGMA meetings have taken place. This does not mean that there are not some groups that still reported being extremely dissatisfied with their access to SGMA meetings. Furthermore, when asked about stakeholder access to comment on issues and express opinions, reported satisfaction on the process went down 10%. About half of survey respondents reported being satisfied with their representation in SGMA, and over 25% reported being dissatisfied. Finally, when it comes to stakeholder's perception on their opportunities to influence decisions and opinions of other stakeholders in the decision-making processes only about half of survey respondents reported positive satisfaction.

CONCLUSIONS

This survey sought information on perceptions regarding the SGMA process, access to participation and engagement, cross-sector and multi-actor collaboration, groundwater management strategies as well as stakeholder's groundwater dependence and vulnerability. The survey gathered a total of 690 responses distributed across 108 high and medium priority basins subject to SGMA. Response rates are higher in the Central Coast (Salinas Valley, Santa Cruz and Santa Margarita groundwater basins), North Coast (Santa Rosa Valley groundwater basin) and in the Northern Central Valley (Colusa sub-basin in the Sacramento Valley groundwater basin).

Our findings show that survey respondents have little trust in SGMA's capacity to achieve environmental and social outcomes, which is key for its success. Nevertheless, while they were not confident on the policy reform, they reported support for a portfolio of practical solutions for groundwater management. This means that in general, survey respondents showed support for taking necessary measures to solve groundwater overdraft. These included infrastructural measures such as groundwater banking and wastewater treatment and recycling, water supply management such as water efficiency and conservation, water governance such as implementing monitoring activities, and conjunctive use of surface and groundwater, and even less popular mechanisms such as well moratoriums, groundwater pumping limitations and fees.

Climate change events such as drought and governance are perceived as the two most pressing challenges for groundwater management. In the short term, drought management and preparedness, which is intrinsically related to governance, is important to promote resiliency against the negative impacts of drought on groundwater access and sustainability. Likewise, long-term planning governance efforts, such as SGMA, need continuous governmental support to increase stakeholder resiliency, sustainable management and confidence on the solutions proposed.

While survey respondents reported a favorable perception of the opportunities provided for public participation, they reported a hierarchy of access to participation in SGMA decision-making processes. Stakeholders reported a generally positive access to information about meetings and attendance. However, they reported less opportunities to comment on issues and express opinions, and even less opportunities to be adequately represented and influence decisions. This suggests, that even among stakeholders who are involved in groundwater management and are knowledgeable about SGMA, there are important barriers to participation in SGMA processes.

Reaching equitable decisions for all stakeholders showed mixed results. Moreover, perceptions of representation varied among groups. Perceptions of adequate representation for agricultural interests, disadvantaged communities and tribal groups varied from 65%, less than 50% and about 30% respectively. However, it's worth noting that these are really high reported numbers given that only 12% of GSAs (n=31/260) have included private groundwater users, disadvantaged communities or tribal

representatives in their decision-making boards. This may be explained by the survey response distribution which was dominated by stakeholders involved in groundwater management (98%) and knowledgeable of SGMA (86%), as well as overwhelmingly representing agriculture and local government interests.

The experience of SGMA is unsurprisingly diverse across California. Governance questions such as adequate local and state funding, sufficient time to develop GSA governance structures and encouraging action positively varied between around 25 to 50% for 'very effective' and 'somewhat effective' categories. Around 25% of survey respondents gave neutral and negative answers to these categories.

Perceptions of cooperation among stakeholders was also mixed. While 50% of respondents considered that SGMA had effectively empowered local leadership, built social networks, encouraged collaboration and help stakeholders understand each other to agree on a common perspective, about 25% disagreed on SGMA's effectiveness in achieving these outcomes. This is not surprising as SGMA governance arrangements have also been diverse, with some GSAs structured independently as single GSAs, and others as collective-action organizations or multi-agency GSAs.

Finally, the definition of clear geographic boundaries between groundwater basins and GSAs was generally characterized as effective. This is important because avoiding jurisdictional overlaps among GSAs managing groundwater basins is key to assign responsibility and accountability. Furthermore, inclusion of best available science and identification of hydrological dynamics influencing groundwater were also perceived as effective in SGMA processes. All of these activities are key for the design and implementation of GSPs.

These remarks should be considered within the limitations of survey distribution. In the absence of a publically available comprehensive list of all SGMA participants in the state, the distribution strategy relied on GSP and GSA managers' willingness to collaborate and distribute the survey invitation to their interested parties list of contacts for their participation. We disseminated the survey online using the survey platform Qualtrics and designated a unique code to each survey link for every survey receiver (i.e. GSP and GSA managers). A total of 209 survey invitations with unique codes embedded in survey links were distributed. Of these, 74 codes were used and 29 reported more than one response for that code. This indicates that only 29 GSP and GSA managers out the 209 distributed (14%) forwarded the survey invitation to other stakeholders, while 45 managers (22%) reported only one response.

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ACKNOWLEDGEMENTS

We thank all of the survey respondents who took the time to carefully answer this survey. Our outmost gratitude goes to all of the GSA and GSP managers who also took the time to answer the survey and shared it with their interested parties list. Special thanks to the survey reviewer team (Lisa Beutler, Mary Fahey, Supervisor Carre Brown, Adriana Renteria, Samuel Boland-Brian, Tania Carlone, Michael Harty and Simarjit Dhanota) and the network of facilitators who also encouraged participation in the survey.